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The Impact of Political Incentives Received by Key Local Officials on Enterprises' Green Innovations for the Development and Construction of Ecological Civilization in China

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Abstract: In recent years, there has been an increase in awareness of the need for green innovation to attain sustainable development. Green innovation has been proven to be one of the ways to achieve sustainable development. Most research on determinants of green business innovation has focused on either personal or regulatory factors. This paper examines whether and how the personal factors of local officials are rarely concerned. While in the context of accelerating the construction of an ecological civilization, China has implemented a series of reforms, including those that concern the achievement of environmental objectives while assessing the performance and supervising the responsibility of officials. As these reforms have been designed on a personalized basis, this paper adopts a micro perspective to measure the political incentives of key local officials. Taking A-share-listed companies as our sample, our empirical investigation shows that the political motivations of key local officials can promote regional enterprises' green innovation, and the government–enterprise relationship along with the corporate social responsibility of enterprises can strengthen this effect. Our conclusions prove that the reforms mentioned above have been operating effectively, and political incentives have improved local officials' supervision of regional enterprises' energy conservation and pollution reduction, which provides new evidence for the “promotion competition” of local officials during the transitional period in China.

Keywords: political incentives; green innovation; government–enterprise relationship; corporate social responsibility; promotion competition; corporate innovation



Citation: Wang, Y.; Feng, J.; Yasir, N.; Bai, Y. The Impact of Political Incentives Received by Key Local Officials on Enterprises' Green Innovations for the Development and Construction of Ecological Civilization in China. *Sustainability* **2022**, *14*, 11347. <https://doi.org/10.3390/su141811347>

Academic Editors: Asma Mobarek, Kais Bouslah and Qian Li

Received: 24 July 2022

Accepted: 6 September 2022

Published: 9 September 2022

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1. Introduction

In the era of innovation-driven development, green innovation has been proven to be a key measure to reduce environmental risk by upgrading production processes [1]. The focus has been on pollution emission technologies [2–4] and improving resource utilization [5] in order to reduce energy consumption [6–9], as well as controlling pollution [1,10,11] from the source. As basic units of industrial production, enterprises have been endowed with the responsibility of green innovation [12]. Porter (1995) believes that the advantages of green innovation can effectively offset the costs of investment for enterprises, thus promoting positive externality utility [13]. However, from the perspective of a single enterprise, investment in green innovation is inconsistent with the goal of maximizing financial profits in the short-term [14]. Improving an enterprise's capacity for green innovation is significant to sustainable development; however, the profit-maximization motivation struggles to fully encourage enterprises to increase their investment in environmental governance [15].

The Institutional Theory holds that enterprises tend to sacrifice certain short-term interests in order to integrate themselves into the mainstream realm of social rules and obtain business legitimacy [16,17], social reputation [16,18,19], and the resources essential

for long-term development [16,20]. The proceeding literature also confirmed that institutional factors have a significant impact on the green innovation behavior of commercial organizations [21–30]. While, to explain China's rapid economic growth since the "Reform and Opening-up", the "Promotion Competition" theory states that regional economic development achievements during the tenure of local officials have been the main criteria used to determine their chance of promotion and their political future [31]. Therefore, the benefits and political prospects brought about by political promotion are a strong incentive for competition regarding the GDP growth rate between provinces [32]. This theory could be a solid theoretical basis to concentrate on local officials' personal station in the study of the realization of governmental objectives. Obviously, when economic performance is taken as the single evaluation criterion in promotion considerations, it is difficult to motivate local officials in their environmental governance [31,33]. Studies from different countries have also confirmed the negative impact of political competition on environmental governance and resource efficiency [34–37].

Among the proceeding literature concentrated on the effect of institutional factors on green innovation [21–30], most of them treated institutional influence as an integral factor [21,22,25–27]. In order to expand the research into officials' personal perspectives, Yang et al., (2021) concentrated on the promotion pressure of City Leaders [27].

Following this logic, this paper focus on the political incentives driven by individual aspiration for certain key local officials. There is a difference between political incentives and promotion pressure as in the study of Yang et al., (2021) [27]. In the study of Yang et al., the city leaders were passively driven by promotion pressure. Economic indicators were adopted to measure promotion, which is obviously an external factor. While in this paper, the political incentives of local officials are treated as a subjective factor, which is prominent in the local officials' personal motivation to realize the environmental governance targets through their effort and performance.

This paper assesses a sample composed of the A-listed companies from 2015 to 2020. It has been proven that the political incentives received by key local officials could increase the green innovation output of regional enterprises and that the government–enterprise relationship and corporate social responsibility could strengthen this effect. Further, our results are made more reliable by our use of a good internal control system and focus on a regional governance environment.

The academic contributions of our paper are as follows: (1) the political incentives of local officials are measured by personal characteristics. The logic here is that developing countries such as China going through the transitional period would adopt radical reforms, and design relevant incentive systems for their local officials, in order to effectively realize their governance objectives. The "Promotion Competition" theory primarily held that taking GDP as the assessment criteria for officials' promotion has an intensive effect on regional economic development since "Reform and opening up" in the past forty years [31]. Given the background of high-quality growth and construction of ecological civilization in recent years, this paper considers that there are adequate institutional reforms to support that the political incentives for local officials to concentrate on the balance between economic development and environmental governance, instead of only the former one [38]. (2) The empirical results of this paper imply the positive impact of the political incentives of key local officials on environmental governance achievements, which is inconsistent with the conclusion of the negative effects of political competition on the environmental objectives derived from the previous literature [36]. This distinction illustrates that the criterion of "promotion competition" in China has been changing since the introduction of the construction of an ecological civilization project, which emphasizes sustainable development. (3) This paper introduces the moderating variables of the government–enterprise relationship and corporate social responsibility and illustrates the dependent and voluntary roles that enterprises play in these two mechanisms, which evidences the chain of influence from officials' personal incentives to enterprises' behavior. This chain provides a logical

basis for the influence of governments over enterprises' green innovation, providing new evidence that will help to improve green innovation.

In recent years, China has been going through a transitional period, shifting the focus of its economic development from the stage of high-speed growth to the stage of high-quality growth, in order to achieve sustainable development [39]. The environmental and resource-based problems that have already arisen need to be resolved urgently, which requires the acceleration of the construction of the ecological civilization and the adherence to the basic national policy of "Saving Resources and Protecting the Environment". Although the successful transformation of the industrial structure is already clear [40,41], the "one size fits all" ban on high-energy-consuming and high-polluting industries are not practical [42,43].

In the "Opinions of the Central Committee of the Communist Party of China and the State Council on Accelerating the Construction of Ecological Civilization" issued in 2015, the proposition was made to establish an accountability system for the construction of an ecological civilization, which requires that the leading cadres should hold responsibility for life. As a subsystem for the evaluation and supervision of national governance, the national audit was developed to follow the objectives of national governance [44,45]. The National Audit Office launched a pilot project involving an exit audit of the natural resource assets of leading cadres (hereafter referred to as the "exit audit of natural resource assets") in 2015 and fully implemented it nationwide in 2018. This audit is supposed to strengthen the weaker aspects of officials' actions related to the construction of an ecological civilization [46] and to help in striking a balance between the achievement of economic growth and sustainable development [47–49].

A series of reforms have been carried out to influence local officials, but whether these reforms will offer new evaluation criteria related to sustainable development in the context of "promotion competition" remains unclear. Furthermore, due to the significant influence of local governments over enterprises' behavior, how does the political incentive of local officials affect the enterprises' green innovation behavior?

The rest of this paper is arranged as follows: Section 2 gives a review of the institutional influences affecting green innovation and proposes the theoretical analysis and research hypothesis of this paper; Section 3 introduces the method; Section 4 illustrates the method and analyzes the empirical results; Sections 5 and 6 discuss the conclusions, presenting the relevant theoretical and practical implications. This paper ends by elaborating the limitations and research to be addressed in the future.

2. Theoretical Analysis and Research Hypothesis

2.1. The Influence of Key Local Officials' Political Incentives on Enterprises' Green Innovation Behavior

The central government and local governments, as well as local environmental administrative departments, each perform their own respective duties within the environmental governance system of China [35]. The central government is mainly responsible for formulating national policies, rules, and regulations, and for deploying political decisions related to environmental governance [50], while the local governments and local environmental administrative departments are responsible for practical execution and implementation [51,52]. The environmental supervision responsibilities of local governments and local environmental administrative departments include the supervision of enterprises within their jurisdiction [53], such as ensuring compliance with environmental rules and regulations, energy conservation and emission reduction, and pollution disposal [54]. Key local officials, especially the leading cadres of local political and administrative departments and environmental administrative departments, have been playing important role in accelerating the construction of an ecological civilization. At the provincial level, the key local officials mainly include the Secretary of the Provincial Party Committee, the Governor of Provincial Government, and the Director of the Department of Ecology and Environment. They are responsible for the interpretation of policies, the actual execution and implementation of environmental regulation, and the formulation of local rules and regulations [32,55].

In the political system of China, the selections or appointments made by the central and superior party committees are the main avenues through which local officials can seek promotion and personal political development [56]. Therefore, continuously developing the assessment standards and systematic processes of the selection and appointment of local officials in line with the objectives of national governance is an important institutional guarantee of the implementation of the “four comprehensives” in the new era.

In 2009, the general office of the Communist Party of China Central Committee issued the “Opinion on Establishing the Assessment and Evaluation Mechanism for the Party and Government Leading Groups and Leading Cadres to Promote Scientific Development”, and the corresponding trial measures. This publication pointed out that it is necessary to fully realize the requirements of the “Scientific Outlook on Development” and the “Correct Outlook on Political Performance” when considering the assessment of economic construction, coordinated economic and social development, and the harmonious development of man and nature [57]. Specific computing operations for quantitative assessment have been developed in trials. This opinion signaled the establishment of a performance assessment system for leading cadres [58]. In September 2015, the Political Bureau of the Communist Party of China Central Committee deliberated over and adopted “the Overall Plan for the Reform of Ecological Civilization System”, which requires adherence to the basic national policy of “Saving Resources and Protecting the Environment” [59,60]. Under this framework, six specific plans were formulated, and the national governance objectives were defined. These six systematic reform plans include the trial measures relevant to investigations of the key political and administrative officials with responsibility for ecological environmental damage, and the exit audit of natural resource assets [61,62]. The former defined the accountability of relevant officials for environmental issues for the first time, while the latter set out the rules for evaluating and supervising the carrying out of environmental governance responsibilities and the governance objectives of leading cadres through a national audit. Both are strengthening measures that operate at the organizational and personal level against the background of ecological civilization system reforms [63]. In summary, the above reform plans support each other and together form an institutional homogeneity that will improve the performance of environmental governance via the performance assessment of local officials.

Local officials are responsible for regional development from many perspectives, including economic development, people’s livelihood, social equity, environmental governance, and so on [50]. Especially after the Tax Sharing Reform, the local governments have been distributing a large part of the taxation income, and greater responsibility for regional governance meanwhile [64]. The power and responsibility of local government are centralized in the hands of certain key local officials, mainly including the Secretary of the Party Committee and Governor of Local Government. While in the field of environmental governance, the Director of the Department of Ecology and Environment should also be considered. The policy decision and administrative capacity of these key local officials have a great influence on the regulatory strength of regional environmental governance. According to the “Promotion Competition” theory, the assessment policy, and criteria for political promotion of the officials are designed as a powerful system for the realization of governance targets. From the perspective of key local officials, their personal pursuit of political promotion should also be taken into consideration, which would vary significantly with personal factors [65]. Clearly, the mentioned reforms of the assessment system and national audit are to stimulate the local officials’ effort and performance. Therefore, in this paper, the political incentives are defined as the officials’ personal motivation for the realization of government targets in order to obtain station promotion and better political prospects. If the relevant reforms operate effectively, this will indicate that the motivation of officials to seek political promotions has a significant impact on the degree of their due diligence to regulatory responsibilities. Therefore, research Hypothesis 1 (H1) of this paper is put forward as follows:

Hypothesis 1 (H1). *The political incentives of key local officials can promote the green innovation behavior of the regional enterprises.*

2.2. *The First Strengthening Mechanisms: Government–Enterprise Relationship as Moderator between the Political Incentives and Green Innovation*

An interactive relationship exists between local governments and enterprises in China [65–70]. On one hand, local governments hold the responsibility for the distribution of vital resources, including land, franchises, and administrative examination and approval, which has a significant impact on the operation and sustainable growth of enterprises [65,68–70]. On the other hand, as important market subjects, enterprises are important to regional economic development and environmental governance, and thus to livelihood, employment, and social welfare issues [66]. The development of enterprises and industries also has an important political impact on local governments and key officials [65].

The government can deconstruct governance objectives into the distribution requirements of various resources required for competition to develop between enterprises [71]. Since Fiscal Decentralization in 1994, China has delegated substantial financial authority to local governments through the model of “political centralization–fiscal decentralization” [72]. This reform generally focuses on the delegation of revenue authority, while the delegation of expenditure authority is relatively vague [64]. The income from taxation on enterprises’ operating profits is a substantial source of local government revenue while strengthening environmental protection supervision requires local governments to increase the input of organizational, human, and material resources into administrative management, audit, and supervision, therefore increasing fiscal expenditures [73]. However, environmental supervision has both internalized and short-term effects in terms of cost, and outwardly directed, long-term effects in terms of the result. Therefore, the government–enterprise relationship can be mainly defined as the dependence of enterprises on the government, and the adaptation of enterprises’ behavior to the government’s orientation [74]. As such, research Hypothesis 2 (H2) of this paper is put forward as follows:

Hypothesis 2 (H2). *The stronger the government–enterprise relationship, the stronger the impact of key local officials’ political incentives on enterprises’ green innovation behavior.*

2.3. *The Second Strengthening Mechanism: Corporate Social Responsibility as a Moderator between Political Incentives and Green Innovation*

In addition to the utilitarian dependence on the local government, enterprises also assume the social responsibility advocated by local governments out of a sense of honor and moral worth [75]. Actively undertaking social responsibility is a measure that enterprises can take to coordinate their relationship with the government [76] and the market [77], as well as other outside stakeholders [78,79]. Enterprises paying attention to social responsibility will gain a good reputation [80], and can thus meet the demands of external stakeholders, therefore obtaining a better market position [81] and more financial benefits [82].

The connotations of corporate social responsibility change with the social environment, whereby the transmission of values can shape the formation of social responsibility [83]. Within the realm of values guided by the government, the expression of corporate social responsibility is also deeply affected by national governance objectives and local government policies [84]. Differently from the passive position they hold in the government–enterprise relationship, companies always play an active role when undertaking social responsibility. Furthermore, accepting social responsibility is one of the main paths by which enterprises can realize long-term and intrinsic value, which cannot be measured by short-term financial performance. For some enterprises, especially those from innovative and knowledge-based industries, strengthening green innovation is vital to realizing corporate social responsibility [85]. Even for companies outside of these industries, undertaking corporate social responsibility could also be seen as an indication of sustainable development, thus bringing the financial benefits described above. Enterprises with a high sense of social responsibility

are sensitive to the needs of their country and society and will respond to the call of local governments for energy conservation and pollution reduction [79]. They can also actively improve the investments in and actual effectiveness of green innovation. In summary, research Hypothesis 3 (H3) of this paper is put forward as follows:

Hypothesis 3 (H3). *The better the corporate social responsibility performance of the enterprise, the stronger the impact of key local officials' political incentives on corporate green innovation behavior.*

3. Research Design

3.1. Sample Selection and Data Source

This paper focuses on the A-share-listed companies in China from 2015 to 2020 as the research sample, and we selected the initial sample in the following way: (1) since the green innovation behavior of enterprises differs between industries, companies within industries not strongly related to energy conservation and environmental protection behaviors have been excluded (the excluded industries are as follows: wholesale (F51), retail (f52), postal (G60), accommodation (H61), catering (H62), real estate (K70), health (Q83), social work (Q84), education (P82), culture, sports and entertainment (R) (the industries are classified based on the industry classification guidelines of listed companies issued by the CSRC in 2012)); (2) ST, *ST and delisted companies have been excluded; (3) observations with missing data have been excluded. After the above process, unbalanced panel data of the studied companies from the past six years were obtained, with a total of 10,583 effective company-year observations. All continuous variables have been Winsorized at the 1% level.

The information from the Secretary of the Party Committee and Governor of Province used in this paper was mainly taken from the Local Leadership Database of the People's Network (The Local Leadership Database is a public information bank listed under the "Personnel" column of the People's Network, which contains the resume information of the main provincial leaders. The website is: <https://ldzl.people.com.cn/dfzlk/front/firstPage.htm> accessed on 1 January 2022). The information on the Director of the Department of Ecology and Environment was mainly taken from the Official Records of the People's Republic of China to which insufficient information was supplemented through the Baidu search engine. The green patent application information of the companies comes from the Chinese Research Data Service. The internal control index was taken from the DIB Internal Control and Risk Management Database. The marketization degree of each provincial unit was taken from the 2020 expansion data of the marketization index constructed by Fan Gang and Wang Xiao-lu. Other data at the company level are from the China Stock Market and Accounting Research Database.

3.2. Variables Definition and Measure

3.2.1. Explained Variable: Enterprise Green Innovation (GI)

The previous literature has measured enterprises' green innovation in different ways. In some studies, specific questionnaires have been designed to take surveys to evaluate the green innovation among the observed companies [16,19], while some studies adopted an index to measure green innovation, such as green patent [26–29,32], R&D investment [33] and eco-labeling product certification [34]. Since the green patent information of Chinese companies is available and reliable, relevant studies based in China have mainly adopted the green patent as a proxy for enterprises' green innovation behavior. There is a high level of green patent applications and a long time-lag from application to authorization. On the other hand, among the three types, green invention patents and green utility model patents have more practical effects than green appearance patents. Therefore, the natural logarithm of the number of green invention patent applications and green utility model patent applications plus one has been taken as the measurement of enterprise green innovation (GI) in this paper.

3.2.2. Explanatory Variable: Political Incentive Received by the Key Local Officials (Inc)

The previous literature has mainly measured the political motivation of officials from two points of view: the first involves measuring the degree of influence of political performance assessments in their political career, according to their resume and personalized characteristics [86]; the second involves selecting important political performance indicators, such as GDP growth rate and fiscal revenue growth rate [87–89]. Given the effects of the reforms of assessments of officials' responsibility and new audit supervision on their environmental performance, the common focus of these two systems has been on individual officials, and the main intention is to strengthen the responsibility and perceived political achievements of key officials personally. Therefore, this paper defines political incentive as the motivation of individual officials to follow the environmental objectives of national governance and to satisfy the performance evaluation standards, in order to obtain performance awards, promotions, or political resources. The measurement process of political incentives is personalized, as motivation varies with individual factors.

Within provincial units, the Secretary of the Provincial Party Committee and the governor are the key officials who decide the political orientation and issue administrative orders, respectively [90], while the Department of Ecology and Environment is the administrative department responsible for pollution prevention, environmental monitoring, and environmental protection supervision in a province. The Secretary of the Provincial Party Committee, and the governor and director of the Department of Ecology and Environment, are the subjects of the exit audit of natural resource assets, and so are the main subjects of the adjusted assessment and evaluation mechanisms of leading cadres. Therefore, this paper selects the Provincial Party Secretary (municipal Party Secretary), the governor (mayor), and the director of the Department of Ecology and Environment (director of the Bureau of Ecology and Environment), in each provincial unit (including the four municipalities directly overseen by the central government) as samples. According to the research of Chen et al., (2017), the type of office, the tenure, and the age of officials are important factors affecting their degree of political incentive [86]. Therefore, based on these three influencing factors and the three types of audit objects, this paper establishes an index system for the region–year observations and standardizes the original data (as shown in Table 1) as the proxy variable of provincial officials' political incentive.

Among the index values shown in the above table, the primary purpose of transferring officials from the central government is cadres training. These officials face the least pressure of performance appraisal [90]. Therefore, their political incentive value is 0. On the other hand, the officials in other types of positions, including locally transferred officials, locally promoted officials, and officials transferred from other provinces, face the greatest pressure in terms of performance appraisal, and therefore their political incentive value is 1. The tenures of officials are inversely proportional to their political incentives. Generally, new officials make a great effort to reform their jurisdiction. With the extension of tenure, the administrative means of officials tend to become "routine", and their political incentives are gradually weakened [86]. Therefore, the index of the tenure has been standardized and takes the form of the ratio of the tenure of the official to the average tenure of officials in the same position by year. The age of officials is inversely proportional to their promotion opportunities, and therefore inversely proportional to their political incentives [91]. As such, the age index of provincial officials by year is standardized, and the value is the ratio of the age of the official to the average age of officials in the same position by year.

Table 1. The value of the “provincial political incentive index” and its weights.

Factor Weights	Object Weights		
	Secretary of the Provincial Party Committee (Municipal Party Secretary) (Weight: 0.4)	Governor (Mayor) (Weight: 0.3)	Director of the Department of Ecology and Environment (Director of the Bureau of Ecology and Environment) (Weight: 0.3)
Promotion Type (Weight: 0.4)	The value of “central transfer” is 0, the value of “local transfer”, “local promotion” and “transfer from other province” is 1 (Weight: 0.16);	The value of “central transfer” is 0, the value of “local transfer”, “local promotion” and “transfer from other province” is 1 (Weight: 0.12);	The value of “central transfer” is 0, the value of “local transfer”, “local promotion” and “transfer from other province” is 1 (Weight: 0.12);
Official Tenure (Weight: 0.3)	Ratio of the average tenure of all Provincial Party Secretaries to the tenure of the Provincial Party Secretary by year (Weight: 0.12);	Ratio of the average tenure of all governors to the tenure of the governor by year (Weight: 0.09);	Ratio of the average tenure of all directors to the tenure of the director by year (Weight: 0.09);
Official Age (Weight: 0.3)	Ratio of the average age of all the secretaries to the age of the Provincial Party Secretary by year (Weight: 0.12);	Ratio of the average age of all governors to the age of the governor by year (Weight: 0.09);	Ratio of the average age of all directors to the age of the director by year (Weight: 0.09);

3.2.3. Moderator Variables: Government–Enterprise Relationship (GER) and Corporate Social Responsibility (CSR)

Government subsidies are an important reflection of the government–enterprise relationship [90]. The allocation standards of government subsidies reflect the government’s policy orientation and its governance objectives [92]. Due to the limited amount of total government subsidies, the pursuit of environmental benefits by local governments will be extended to pursuing non-environmental government subsidies, resulting in other types of government subsidies, including those for technological innovation and improving people’s livelihoods, which are also relatively more likely to be awarded to enterprises that produce environmental benefits. Therefore, the government subsidy has been taken as the proxy variable of the government–enterprise relationship in this paper.

In recent years, more and more listed companies have issued annual social responsibility reports, while other companies have disclosed their corporate social responsibility behaviors within their annual financial reports [93]. Therefore, this paper has constructed an index system containing 13 aspects of corporate social responsibility (as shown in Table 2) according to the social responsibility information disclosed by listed companies and sorted by the China Stock Market and Accounting Research Database. The descriptive statistics of GER and CSR are presented in Table 2.

Table 2. Company–year corporate social responsibility (CSR) index system. In current study the index has presented in binary coded “consider one for Yes and zero for No.

Benchmark	Value
Whether the corporate social responsibility information is verified by a third party	1/0
Whether the disclosure of corporate social responsibility information adheres to the GRI guidelines for sustainable development reporting	1/0
Whether the protection of shareholders’ rights and interests is disclosed	1/0
Whether the protection of creditors’ rights and interests is disclosed	1/0

Table 2. Cont.

Benchmark	Value
Whether the protection of employees' rights and interests is disclosed	1/0
Whether the protection of suppliers' rights and interests is disclosed	1/0
Whether the protection of customers and consumers' rights and interests is disclosed	1/0
Whether the environmental and sustainable development are disclosed	1/0
Whether the public relations and social public welfare undertakings are disclosed	1/0
Whether the construction and improvement measures of the social responsibility system are disclosed	1/0
Whether the content of work safety is disclosed;	1/0
Whether the deficiencies of corporate social responsibility are disclosed	1/0
The method of the disclosure of the corporate social responsibility information	1/0
The company-year proxy variable of corporate social responsibility (CSR)	Total value

3.2.4. Control Variables

This paper selects three types of control variables: financial variables, governance information variables, and basic information variables.

The financial variables include company size, capitalized expenditure, financial leverage, and return on equity. A natural logarithm of the sum of total assets is adopted to measure the company size, which is a fundamental factor influencing green innovation. The larger the company size, the greener innovation it can output [94]. Capitalized expenditure is an important indicator at the individual level that reflects the investment mode of a company and could also influence green innovation [28]. Financial leverage is the proportion of liabilities to assets as it stands at the end of the year, which reflects the company's operating risk and therefore affects the green innovation [95]. The return on equity is the proportion of annual net profit to the average balance of shareholders' equity, representing the overall performance of a company [96].

The governance information variables include the proportion of independent directors, the shareholding proportion of the board of directors, and the degree of ownership concentration. The proportion of independent directors and the shareholding proportion of the board can reflect the independence of the board, and hence the effectiveness of its governance [97], while the degree of ownership concentration is measured as the percentage of shares held by the top ten shareholders. This ratio represents the influence of the major shareholders, who have a greater motivation to pursue long-term investment [98].

The basic information variables include the company age, the number of employees, and whether the company operates in a heavily polluting industry. The company's age usually reflects its life cycle and can determine the investment mode [99]. The number of employees can also influence the innovation capacity by affecting the knowledge base of green innovation [19]. Whether the company operates in a heavily polluting industry can determine the necessity of investments in green innovation [47].

In addition, considering that individual companies show significant differences in terms of their investment approach and strategies, and the attention paid to sustainable development at the national strategic level has presented a strong time-based trend in recent years, the individual effect and time-based effect by year have been controlled in our regression analysis. All variables are shown in Table 3.

Table 3. Variable definitions.

Variable Type	Variable Name	Variable Definition
Explained variable	Enterprise green innovation (GI)	The natural logarithm of the number of green invention patent applications and green utility model patent applications plus one
Explanatory Variable	Political incentive received by the key local officials (Inc)	The value of the “provincial political incentive index” of the province where the company is located
Moderator Variables	Government–enterprise relationship (GER)	Natural logarithm of the sum of total annual government subsidies plus one
	Corporate social responsibility (CSR)	Generated by the company–year “corporate social responsibility index system”
Control Variables	Company size (Size)	Natural logarithm of the sum of total assets
	Capitalized expenditure (Cap)	Natural logarithm of the sum of total capitalized expenditure
	Financial leverage (Lev)	Ratio of total liabilities to total assets at the end of the year
	Return on equity (Roe)	Ratio of annual net profit to average balance of shareholders’ equity
	Proportion of independent directors (Indir)	Ratio of the number of independent directors to the number of people on the whole board
	Shareholding ratio of the board (Manh)	Ratio of the number of shares held by the board to the total number of shares
	Ownership concentration (Oc)	Ratio of the number of shares held by the top ten shareholders to the total number of shares
	Number of employees (Emp)	Natural logarithm of the number of employees in service
	Whether it is a heavily polluting industry (Pul)	Take one for “Yes”, and zero for “No”
	Company age (Age)	Natural logarithm of the company age
	Company (Com)	Individual dummy variable
	Year (Year)	Annual dummy variable

3.3. Model Construction

To test the impact of the political incentivization of key local officials on enterprises’ green innovation, model 1, which refers to certain relevant studies [26,27,30–32], has been established as follows:

$$GI_{i,t} = \alpha_0 + \alpha_1 Inc_{i,t} + \alpha_i Controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

$GI_{i,t}$ is the explained variable, which represents the green innovation of company i in t year. $Inc_{i,t}$ is the explanatory variable, which measures the political incentivization of key local officials in the province where i company is located in year t . $Controls_{i,t}$ refers to all control variables of enterprise i in year t . Considering that the construction of ecological civilization has been attached more and more important at the national strategic level year by year, and the enterprise’ green innovation behavior itself has strong individual differences at the company level, the year dummy variable and individual dummy variable are controlled in the model. $\varepsilon_{i,t}$ is the stochastic disturbance.

To test the role of the government–enterprise relationship and corporate social responsibility as moderator variables, the following model has been established:

$$GI_{i,t} = \beta_0 + \beta_1 Inc_{i,t} + \beta_2 GER_{i,t} + \beta_3 Inc_{i,t} \times GER_{i,t} + \beta_n Controls_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$GI_{i,t} = \gamma_0 + \gamma_1 Inc_{i,t} + \gamma_2 CSR_{i,t} + \gamma_3 Inc_{i,t} \times CSR_{i,t} + \gamma_i Controls_{i,t} + \varepsilon_{i,t} \quad (3)$$

Models 2 and 3 retain the same explanatory variables, explained variables and control variables, introduce the government–enterprise relationship ($GER_{i,t}$) and corporate social responsibility ($CSR_{i,t}$) as moderator variables, and include the interaction items of the moderator variable and the explanatory variable, as encouraged by the results of the original model. Additionally, the year dummy variable and individual dummy variable are controlled in the model. All the regression models in this paper are estimated by adding the robust standard error. The software SPSS 20 has been used for the analysis.

4. Empirical Analysis

4.1. Descriptive Statistics

According to the descriptive statistical results of the main variables shown in Table 4, among the 10,435 valid samples of China's A-share-listed companies from 2015 to 2020, the average numbers of green invention patent applications (GI_1) and green utility model patent applications (GI_2) were 1.536 and 0.893, respectively, indicating that the overall green innovation achievements of the sample company are strong. The medians are both 0, the standard deviations are 13.80 and 6.345, respectively, and there is a great difference between the maximum (703 (209)) and the minimum (0), which indicates that there are great differences between samples. The mean value of the explanatory variable of political incentive (Inc) is 1.078, the median is 1.053, the standard deviation is 0.185, and the minimum and maximum values are 0.631 and 1.580, respectively, which indicates that the political incentives received by key local officials vary greatly between provinces. After employing the natural logarithm, the moderator variable of the government–enterprise relationship (GER) has a mean value of 16.50, a median value of 16.5, and a standard deviation of 1.566, which indicates that all companies in the sample have received government subsidies, the total amount is relatively high, and there are great differences between the sums. The mean value of the moderator variable corporate social responsibility (CSR) is 6.278, the median is 7, and the standard deviation is 2.737, which indicates that the social responsibility performances of the samples are good on the whole, but there is a gap between them. The green innovation achievements of the listed companies and their influencing factors are significantly differentiated, which makes it necessary to study the green innovation behaviors of enterprises from the perspective of local officials' political incentives.

Table 4. Descriptive statistics of main variables.

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
Green invention patent Application (GI_1)	10,435	1.536	0	13.80	0	703
Green utility model patent Application (GI_2)	10,435	0.893	0	6.345	0	209
GI	10,435	0.368	0	0.790	0	3.738
Inc	10,435	1.078	1.053	0.185	0.631	1.580
GER	10,435	16.50	16.50	1.566	11.98	20.56
CSR	10,435	6.278	7	2.737	1	11
Size	10,435	22.19	22.05	1.204	20.04	26.04
Cap	10,435	18.64	18.64	1.670	14.21	23.06
Lev	10,435	0.403	0.393	0.192	0.059	0.876
Roe	10,435	0.058	0.067	0.128	−0.658	0.338
Indir	10,435	0.377	0.364	0.054	0.333	0.571
Manh	10,435	0.148	0.023	0.193	0	0.688
Oc	10,435	0.580	0.587	0.144	0.247	0.893
Emp	10,435	7.715	7.627	1.165	5.236	11.06
Pul	10,435	0.296	0	0.457	0	1
Age	10,435	2.908	2.944	0.281	2.197	3.497

4.2. Results of Baseline Regression

4.2.1. Political Incentives Received by the Key Local Officials and Green Innovation Behavior of Enterprises

The ordinary least square method is here adopted to estimate the influence of political inventiveness on green innovation [27,28]. Column (1) of Table 5 shows the regression results between political incentives (Inc) and green innovation (GI). The coefficient of political incentive (Inc) is 0.126, which is significant at the 1% level, and this indicates that green innovation is significantly positively correlated with political incentive. The stronger the political incentivization of local key officials, the stronger the green innovation behavior of enterprises in the region is. Therefore, hypothesis 1 has been proven.

Table 5. Results of baseline regression: political incentive, green innovation, government–enterprise relationship, and corporate social responsibility.

Variables	GI	GI	GI
	(1)	(2)	(3)
Inc	0.126 *** (0.028)	0.133 *** (0.028)	0.131 *** (0.028)
IncxGER		0.071 *** (0.017)	
GER		0.024 *** (0.006)	
IncxCSSR			0.021 ** (0.010)
CSSR			−0.001 (0.003)
Size	0.075 *** (0.015)	0.065 *** (0.015)	0.076 *** (0.015)
Cap	0.010 (0.007)	0.010 (0.007)	0.011 (0.007)
Lev	0.132 ** (0.054)	0.126 ** (0.054)	0.130 ** (0.054)
Roe	0.126 *** (0.048)	0.126 *** (0.048)	0.127 *** (0.048)
Indir	0.121 (0.146)	0.119 (0.146)	0.121 (0.146)
Manh	0.125 ** (0.056)	0.118 ** (0.056)	0.125 ** (0.056)
Oc	−0.091 (0.072)	−0.086 (0.072)	−0.093 (0.072)
Emp	0.058 *** (0.014)	0.048 *** (0.014)	0.057 *** (0.014)
Pul	−0.099 *** (0.024)	−0.092 *** (0.024)	−0.100 *** (0.024)
Age	−0.156 (0.121)	−0.172 (0.120)	−0.152 (0.121)
_cons	−1.470 *** (0.339)	−1.530 *** (0.338)	−1.508 *** (0.341)
Company	Yes	Yes	Yes
Year	Yes	Yes	Yes
R2	0.0816	0.0889	0.0824
N	10,435	10,435	10,435

Note: standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The interactive items have been centralized.

4.2.2. The Moderating Effect of the Government–Enterprise Relationship (GER) between Political Incentives and Green Innovation

The government–enterprise relationship could act as a moderator between institutional factors and company-level factors [37]. Column (2) of Table 5 shows the regression results of political incentives (Inc) and green innovation (GI) with the moderating effect

of government–enterprise relationship (GER). The coefficient of the explanatory variable political incentive (Inc) is positive and significant at the 1% level, and the coefficient of the intersection between political incentive and the government–enterprise relationship (Inc*GER) is positive and significant at the 1% level, indicating that the stronger the government–enterprise relationship, the stronger the impact of political incentive on enterprise’s green innovation. The government–enterprise relationship thus presents a positive moderator effect. Therefore, hypothesis 2 is supported in this study.

4.2.3. The Moderating Effect of Corporate Social Responsibility (CSR) between Political Incentives and Green Innovation

Corporate social responsibility can enhance the public image and market performance of a company. Therefore, much of the previous literature has investigated the strengthening effect of this factor on enterprises’ public performance [74,100]. Column (3) of Table 5 shows the regression results of political incentive (Inc) and green innovation (GI) along with the moderating effect of corporate social responsibility (CSR). The coefficient of the explanatory variable political incentive (Inc) is positive and significant at the 1% level, and the coefficient of the intersection between political incentive and corporate social responsibility (Inc*CSR) is positive and significant at the 5% level, indicating that the company’s social responsibility was improved. This indicates that the impact of the political incentive of key local officials on green innovation in the region is stronger. Corporate social responsibility has a positive moderating effect. Therefore, hypothesis 3 has been proven.

4.3. Further Research: The Strengthening Effect of Enterprises’ Internal Governance and Regional Governance Environment

In order to expand the results of this research, the impacts of internal and external governance mechanisms and the political incentivization of key local officials on the green innovation behavior of enterprises have been further investigated. The whole sample has been divided into and tested in groups based on the effectiveness of internal control and the degree of regional marketization.

4.3.1. The Inter-Group Test According to the Impact Enterprises’ Internal Governance

Internal control ensures that the enterprise’s objectives are executed and implemented in its day-to-day operation and management. Internal control has a significant impact on the enterprise’s financial and non-financial performance. The proceeding literature has also confirmed the role of internal control in promoting enterprise innovation [101,102]. Therefore, this paper has grouped the samples by year according to the internal control index. Those whose internal control index is higher than the annual median have been placed in the “strong internal control” group (a total of 5473 samples), while those whose internal control index is lower than the annual median have been placed in the “weak internal control” group (a total of 5110 samples). Individual regression tests were then carried out, respectively. The results are shown in Table 6. The results of the “strong internal control” group are shown in columns (1) to (3); here, the regression coefficients of political incentive (Inc) and the interaction term between political incentive and government–enterprise relationship (Inc*GER) are positive and significant at the 1% level. The regression coefficient of the interaction term between political incentive and corporate social responsibility (Inc*CSR) is positive and significant at the 10% level. The regression results of the “weak internal control” group are shown in columns (4) to (6); here, the regression coefficients of political incentive (Inc) and the interaction term between political incentive and government–enterprise relationship (Inc*GER) are positive and significant at the levels of 5% and 10%, respectively, while the regression results of the interaction term between political incentive and corporate social responsibility (Inc*CSR) are not significant. This shows that a higher political incentivization of key local officials can improve the output of green innovation achievements in enterprises with strong internal control, and the moderating effects of the government–enterprise relationship and corporate social responsibility are also more

effective. Therefore, internal control is an effective internal governance mechanism that promotes enterprises' green innovation behavior.

Table 6. Results of inter-group tests on enterprises' internal governance.

Variables	GI	GI	GI	GI	GI	GI
	Strong Internal Control			Weak Internal Control		
	(1)	(2)	(3)	(4)	(5)	(6)
Inc	0.161 *** (0.043)	0.156 *** (0.044)	0.163 *** (0.043)	0.081 ** (0.040)	0.098 ** (0.041)	0.084 ** (0.041)
IncXGER		0.078 *** (0.027)			0.051 * (0.026)	
GER		0.036 *** (0.008)			0.031 *** (0.008)	
IncXCSR			0.029 * (0.016)			0.009 (0.014)
CSR			−0.000 (0.004)			−0.000 (0.003)
Size	0.089 *** (0.020)	0.074 *** (0.020)	0.090 *** (0.020)	0.063 *** (0.018)	0.049 *** (0.018)	0.063 *** (0.018)
Cap	0.018 * (0.010)	0.015 (0.010)	0.018 * (0.010)	0.002 (0.009)	0.001 (0.009)	0.003 (0.009)
Lev	0.257 *** (0.078)	0.254 *** (0.078)	0.255 *** (0.078)	0.150 ** (0.067)	0.146 ** (0.067)	0.149 ** (0.067)
Roe	0.500 *** (0.127)	0.491 *** (0.127)	0.504 *** (0.127)	0.120 ** (0.053)	0.119 ** (0.054)	0.121 ** (0.054)
Indir	0.101 (0.208)	0.088 (0.207)	0.102 (0.208)	0.123 (0.193)	0.129 (0.193)	0.124 (0.193)
Manh	0.106 (0.074)	0.095 (0.073)	0.106 (0.074)	0.163 ** (0.069)	0.153 ** (0.069)	0.163 ** (0.069)
Oc	−0.236 ** (0.095)	−0.219 ** (0.094)	−0.238 ** (0.095)	−0.098 (0.087)	−0.085 (0.087)	−0.098 (0.087)
Emp	0.045 ** (0.018)	0.031 * (0.018)	0.045 ** (0.018)	0.077 *** (0.017)	0.066 *** (0.017)	0.077 *** (0.017)
Pul	−0.126 *** (0.031)	−0.114 *** (0.031)	−0.126 *** (0.031)	−0.104 *** (0.027)	−0.092 *** (0.028)	−0.104 *** (0.027)
_cons	−2.145 *** (0.327)	−2.258 *** (0.326)	−2.167 *** (0.328)	−1.614 *** (0.306)	−1.729 *** (0.306)	−1.624 *** (0.307)
Company	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.1044	0.1148	0.1052	0.0630	0.0702	0.0632
N	5473	5473	5473	5110	5110	5110

Note: standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The interactive items have been centralized.

4.3.2. The Inter-Group Test According to the External Governance Environment

The primary external governance mechanisms of enterprises include the degree of regional marketization, the level of legalization, the level of government governance, and other factors [81], all of which can encourage the government to convert its environmental governance targets into active industrial policies and thus improve the administration and supervision of enterprises [103]. In regions with good external governance, local governments can improve the efficiency and effectiveness of environmental governance by investing reasonable amounts from the environmental fund [104], optimizing resource allocation [105], and implementing environmental audits [43]. As such, improving the external governance environment is not only the best means of strengthening environmental governance, but it is also an effective way to stimulate the modernization of the governance system and governance capacity [106].

This paper has taken the regional marketization index as a proxy variable for the external governance environment. The full sample has been grouped according to the

marketization index of the company in a region by year. The companies placed in the region with a higher marketization index than the median form the “strong external governance environment” group (a total of 9045 samples), while the rest form the “weak external governance environment” group (a total of 1538 samples). The results of the regression are shown in Table 7. The regression results of the “strong external governance environment” group are shown in columns (1) to (3); here, the regression coefficients of political incentive (Inc), and the interaction term between political incentive and government–enterprise relationship (Inc*GER), are positive and significant at the 1% level, while the coefficient of the interaction term between political incentive and corporate social responsibility (Inc*CSR) is positive and significant at the 10% level. The regression results of the “weak external governance environment” group are shown in columns (4) to (6), wherein the regression results of political incentive (Inc), the interaction term between political incentive and government–enterprise relationship (Inc*GER), and the interaction term between political incentive and corporate social responsibility (Inc*CSR) are not significant. This shows that the impact of the political incentivization of key local officials on green innovation is mainly evident in regions with a strong governance environment. That said, for regions with a weak external governance environment, the government’s effective supervision of enterprises’ energy conservation and pollution reduction also depends on the market-oriented reform and optimization of the business environment, which acts to strengthen the role of enterprises in environmental governance.

Table 7. Results of inter-group tests on the regional governance environment.

Variables	GI	GI	GI	GI	GI	GI
	Strong External Governance Environment			Weak External Governance Environment		
	(1)	(2)	(3)	(4)	(5)	(6)
Inc	0.145 *** (0.030)	0.154 *** (0.031)	0.149 *** (0.031)	−0.013 (0.059)	−0.008 (0.059)	−0.012 (0.060)
Inc*GER		0.071 *** (0.019)			0.051 (0.034)	
GER		0.028 *** (0.006)			0.002 (0.010)	
Inc*CSR			0.018 * (0.011)			0.001 (0.021)
CSR			−0.001 (0.003)			−0.001 (0.005)
Size	0.061 *** (0.016)	0.049 *** (0.016)	0.062 *** (0.016)	0.114 *** (0.029)	0.113 *** (0.029)	0.115 *** (0.029)
Cap	0.015 ** (0.008)	0.013 * (0.008)	0.015 ** (0.008)	−0.004 (0.013)	−0.004 (0.013)	−0.004 (0.013)
Lev	0.138 ** (0.060)	0.137 ** (0.060)	0.136 ** (0.060)	0.097 (0.104)	0.091 (0.104)	0.095 (0.104)
Roe	0.152 *** (0.052)	0.154 *** (0.052)	0.152 *** (0.052)	0.105 (0.086)	0.109 (0.086)	0.105 (0.086)
Indir	0.088 (0.163)	0.084 (0.162)	0.089 (0.163)	0.046 (0.277)	0.043 (0.277)	0.046 (0.277)
Manh	0.091 (0.061)	0.085 (0.060)	0.091 (0.061)	0.015 (0.152)	0.015 (0.152)	0.016 (0.152)
Oc	−0.082 (0.080)	−0.072 (0.079)	−0.085 (0.080)	−0.290 ** (0.135)	−0.290 ** (0.135)	−0.290 ** (0.136)
Emp	0.067 *** (0.015)	0.056 *** (0.015)	0.067 *** (0.015)	0.026 (0.026)	0.025 (0.026)	0.026 (0.026)
Pul	−0.107 *** (0.028)	−0.102 *** (0.027)	−0.108 *** (0.028)	0.001 (0.042)	0.002 (0.042)	0.001 (0.042)
_cons	−1.606 *** (0.272)	−1.716 *** (0.271)	−1.632 *** (0.272)	−2.061 *** (0.465)	−2.067 *** (0.466)	−2.068 *** (0.467)

Table 7. Cont.

Variables	GI	GI	GI	GI	GI	GI
	Strong External Governance Environment			Weak External Governance Environment		
	(1)	(2)	(3)	(4)	(5)	(6)
Company	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.0797	0.0880	0.0803	0.1214	0.1225	0.1212
N	9045	9045	9045	1538	1538	1538

Note: standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The interactive items have been centralized.

4.4. Robustness Test

4.4.1. Switch the Explained Variable

Considering that green invention patents have a greater influence over energy conservation and pollution reduction than green utility model patents, and the application conditions are stricter, some previous studies have tested the results of switching the explained variable into the natural logarithm of green invention patents, plus one [27,28,32]. Therefore, this paper employs this switch, while keeping the other conditions unchanged, in order to investigate the robustness. The regression results (see Table 8) still support the research hypotheses.

Table 8. The results of robustness test 1.

Variables	GI_in	GI_in	GI_in
	(1)	(2)	(3)
Inc	0.085 *** (0.022)	0.092 *** (0.022)	0.088 *** (0.023)
IncxGER		0.051 *** (0.014)	
GER		0.025 *** (0.005)	
IncxCSSR			0.020 ** (0.008)
CSSR			0.002 (0.002)
Size	0.071 *** (0.012)	0.060 *** (0.012)	0.071 *** (0.012)
Cap	0.011 ** (0.005)	0.010 * (0.005)	0.011 ** (0.005)
Lev	0.041 (0.044)	0.037 (0.043)	0.040 (0.044)
Roe	0.090 ** (0.037)	0.091 ** (0.037)	0.092 ** (0.037)
Indir	0.079 (0.118)	0.078 (0.117)	0.077 (0.118)
Manh	0.087 * (0.045)	0.079 * (0.045)	0.087 * (0.045)
Oc	−0.136 ** (0.057)	−0.129 ** (0.057)	−0.137 ** (0.058)
Emp	0.041 *** (0.011)	0.031 *** (0.011)	0.040 *** (0.011)
Pul	−0.086 *** (0.019)	−0.079 *** (0.019)	−0.087 *** (0.019)
_cons	−1.679 *** (0.196)	−1.765 *** (0.196)	−1.691 *** (0.197)

Table 8. Cont.

Variables	GI_in	GI_in	GI_in
	(1)	(2)	(3)
Company	Yes	Yes	Yes
Year	Yes	Yes	Yes
R ²	0.0826	0.0922	0.0833
N	10,583	10,583	10,583

Note: standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The interactive items have been centralized.

4.4.2. Narrowing down the Sample Range

The exit audit of natural resource assets was piloted in certain regions from 2015 to 2017 and has been implemented nationwide in China since 2018. As the key local officials of the political and administrative departments and the environmental departments in the pilot area were the first to receive audit supervision, their political incentivization increased most noticeably. The hypotheses of this paper take as their context the systematic reforms relevant to the construction of an ecological civilization, including this audit [43,45]. Therefore, if the conclusion is robust, the regression results of the baseline model should also be significant when the sample range is limited to that of the implementation of the audit. To test the robustness of the conclusions, the range has been narrowed to samples in the pilot region from 2015 to 2017, and all samples from after 2018. In total, 7074 samples were obtained. The other conditions were kept unchanged, and the regression results (see Table 9) still support the research hypotheses.

Table 9. The results of robustness test 2.

Variables	GI	GI	GI
	(1)	(2)	(3)
Inc	0.136 *** (0.039)	0.144 *** (0.039)	0.137 *** (0.039)
IncXGER		0.069 *** (0.025)	
GER		0.028 *** (0.007)	
IncXCSR			0.031 ** (0.014)
CSR			0.001 (0.003)
Size	0.063 *** (0.017)	0.053 *** (0.017)	0.064 *** (0.017)
Cap	0.017 ** (0.008)	0.015 * (0.008)	0.017 ** (0.008)
Lev	0.216 *** (0.063)	0.213 *** (0.063)	0.213 *** (0.064)
Roe	0.183 *** (0.056)	0.183 *** (0.056)	0.185 *** (0.056)
Indir	−0.069 (0.174)	−0.073 (0.174)	−0.068 (0.174)
Manh	0.141 ** (0.062)	0.131 ** (0.062)	0.140 ** (0.062)
Oc	−0.078 (0.080)	−0.069 (0.079)	−0.078 (0.080)
Emp	0.061 *** (0.015)	0.050 *** (0.015)	0.061 *** (0.015)
Pul	−0.102 *** (0.026)	−0.092 *** (0.026)	−0.103 *** (0.026)

Table 9. Cont.

Variables	GI	GI	GI
	(1)	(2)	(3)
_cons	−1.683 *** (0.279)	−1.815 *** (0.280)	−1.707 *** (0.280)
Company	Yes	Yes	Yes
Year	Yes	Yes	Yes
R ²	0.0823	0.0892	0.0830
N	7074	7074	7074

Note: standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The interactive items have been centralized.

5. Discussion

This paper offers a theoretical analysis of, along with relevant empirical evidence concerning, the effects of the political incentives received by key local officials on the regional enterprises' green innovation, in order to illustrate how local officials' political incentives affect China's construction of an ecological civilization.

First, the hypothesis concerning the promotional effect of incentivizing key local officials on green innovation (H1) is verified, which contradicts some earlier studies' findings that political competition would have a negative effect on environmental governance and resource efficiency [39–42]. Some of the latest studies also prove the promotional effect of institutional factors on enterprises' green innovation, but they generally treat these as integral elements and have not studied them in detail. When analyzing the institutional factors, as well as legal regulations, the business environment, and the macroeconomy, the factors related to government officials should also be addressed. Following the "Promotion Competition" theory, Yang et al., (2021) studied the promotion pressure of City Leaders [32]. In this paper, the political incentive driven by individual personal aspiration is also included in the institutional factors influencing enterprises' green innovation.

Second, this paper analyzes the two conduction mechanisms of political incentive and green innovation from two different perspectives. One is the government–enterprise relationship (H2), wherein the company adopts a relatively passive position. Previous studies have shown that the government has a significant influence over enterprises' operational decisions [64,69–75,87], and it is further proven in this paper that a good government–enterprise relationship could strengthen the relationship between political incentives and green innovation. Another relevant mechanism is corporate social responsibility (H3), which is generally related to the company's pursuit of mainstream values as advocated by the state [80]. Therefore, this paper shows how to maximize the effects of local officials' political incentivization on regional environmental governance.

Finally, the effects of enterprises' internal governance and the regional governance environment are both tested to further illustrate the relationship between political incentive and green innovation, as these both determine the efficiency and effectiveness of the government's actions [106]. Furthermore, both tests show that a strong governance environment can improve the effects of political incentivization on green innovation, which also indicates that systematic improvements should be attempted at both the state level and the company level in the context of the construction of an ecological civilization [60,62].

6. Research Conclusions

In the context of the systematic reforms being made that relate to the construction of an ecological civilization, this paper has taken China's A-share-listed companies from 2015 to 2020 as a sample, drawing the following conclusions: (1) the stronger the political incentive of key local officials, the better the green innovation behavior of the enterprises in the region; (2) the better the government–enterprise relationship the company sustains, the stronger the effects of key local officials' political incentivization on green innovation promotion in regional enterprises; (3) the stronger the corporate social responsibility shown by the enterprise, the stronger the effects of key local officials' political incentives

on promoting green innovation in the regional enterprises; (4) a good internal control and regional governance environment can strengthen the effects of political incentives on green innovation, as well as the moderating effects of the government–enterprise relationship and corporate social responsibility. The findings of this paper will help in realizing the environmental governance goals of energy conservation and pollution reduction at levels ranging from local governments to enterprises and show that relevant systematic reforms will encourage the environmental supervision of key local officials by strengthening environmental accountability and audit supervision. At the same time, the influence of the government–enterprise relationship and strongly affirmed values will also encourage enterprises to increase their output of green innovations.

6.1. Theoretical Implications

Although it is a complicated process for the government to exercise its power to regulate enterprises in realizing their government objectives, proceeding studies have mainly treated government regulations as an integral factor [26]. While this paper enriches the existing Institutional Theory on the impact of key local officials' personal characteristics [27], the conclusion that officials' personal political incentives affect the enterprises' green innovation could explain why the reforms made to political performance assessments and national audits have been so significant [30].

In the context of promotion competition, despite some earlier studies citing economic achievements alone as the evaluation criteria for local officials [41], this paper has adopted a different means to relate the political incentives of local officials to the achievement of the objectives of environmental governance. This new trend has accelerated the construction of ecological civilization. Changing ideas is the most difficult part of any reform [107]. Therefore, this paper also seeks to expand the approach of the research by altering the concept of political achievements and seeing how this affects the realization of governance objectives.

Although proceeding studies on institutional theory and green innovation are rather well-developed, government regulation has mainly been investigated as an exogenous factor, and research on the mechanism at play still requires further development. This paper has theoretically improved this area, finding that the government–enterprise relationship and corporate social responsibility can serve as institutional mechanisms and have a moderating effect.

6.2. Practical Implications

For a developing country in a transitional period, the implementation of the central government's political decisions relies on their enforcement by certain key local officials. In practice, the results of environmental responsibility assessments and exit audits of natural resource assets should be taken into consideration when making appointment and promotion decisions [31]. Although the effects of this auditing process are only considered in the part of this paper addressing the robustness test, several studies have proven that state audits have a positive effect on environmental behavior at the company level. In practice, though, there is a time lag between the implementation of the audit and its effect [32]. In addition to this, exit audits of natural resource assets have little effect on retiring officials, who are also important subjects of the audit. Therefore, it is necessary to enforce audits on a more regular basis after their successful implementation nationwide.

Beyond this, the government should consider the cultivation of culture and social ideology, integrate governance objectives into the design and publicity of mainstream values, and take measures to encourage enterprises to actively pursue their social responsibility, in order to promote the realization of governance objectives at the enterprise level.

6.3. Limitations and Future Research

In terms of the measurement of political incentives, we have here considered this as a single indicator on the provincial level, assigned object weights to the Secretary of the Provincial Party Committee (0.4), as well as the governor (0.3) and the director of the

Department of Ecology and Environment (0.3), and obtained a weighted average value. This is because the Secretary of the Provincial Party Committee has the greatest authority in China's regional political ecology. As such, a one-cut model has been constructed to estimate the political incentivization of key local officials from all regions. However, the actual situation and specific weights may vary according to regional political structures and the personal factors affecting officials in different provinces [108].

It is necessary to determine the factors affecting the differences in the levels of power of different officials in future work and to recalculate the object weights of each provincial unit according to these factors, in order to estimate the political incentives more accurately. Similarly, the factor weights between promotion type, official tenure, and official age also require further refinement.

In addition, this paper has employed the green patent application number as a proxy for the enterprise's green innovation. However, it should be noted that this proxy has the inherent defect of incentive distortion and preference substitution. The enterprises' green patents are quantifiable indicators, but the actual effectiveness and long-term impacts of new technologies and processes on energy conservation and environmental protection in the production domain are difficult to quantify.

Therefore, an index evaluation system should be established to analyze the enterprises' green innovation status in further research, which should at least include internal innovation capacity, team learning capacity, collaborative innovation capacity, and actual environmental performance.

Author Contributions: Conceptualization, Y.W., J.F., N.Y. and Y.B.; methodology, Y.W., J.F. and N.Y.; software, Y.W., J.F., N.Y. and Y.B.; validation, Y.W. and N.Y.; investigation, Y.W., J.F., N.Y. and Y.B.; resources, Y.W., J.F., N.Y. and Y.B.; data curation, Y.W., J.F., N.Y. and Y.B.; writing—original draft preparation, Y.W., J.F., N.Y. and Y.B.; writing—review and editing, Y.W., J.F., N.Y. and Y.B.; visualization, Y.W., J.F., N.Y. and Y.B. All authors have read and agreed to the published version of the manuscript.

Funding: Shaanxi Province Philosophy and Social Sciences Major Theoretical and Practical Problems Research Cooperation Project: "Research on the Role and Ways of State Audit in Preventing and Resolving Major Risks" (2022HZ0048).

Institutional Review Board Statement: All procedures followed in this research were in accordance with the ethical standards of the responsible committee on human experimentation (Northwest University, Xi'an 710127, China).

Informed Consent Statement: Written informed consent was obtained from all participants to be included in the study.

Data Availability Statement: The quantitative and qualitative data used to support the findings of this study are included within the article.

Conflicts of Interest: The authors declare no conflict of interest.

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