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Local Government Environmental Attention and Urban Land Green Use Efficiency in China: The Intermediary Role of Industrial Restructuring

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Abstract: Local governments in China have decision-making authority over urban land use, and their level of environmental attention influences the green use of urban land. However, the impact of local government environmental attention on urban land green use efficiency and its mechanisms remain unclear. This study utilizes panel data from 284 cities from 2003 to 2020 in China and employs fixed effects models and mediation analysis to investigate the pathways through which local government environmental attention affects urban land green use efficiency. The main results are as follows: (1) Through a series of significance tests, local government environmental attention has a significant positive influence on urban land green use efficiency in cities. (2) Further research suggests that both the quantity and quality of industrial structure upgrading act as intermediaries between local government environmental attention and urban land green use efficiency, while the rationalization of industrial structure plays a partial masking role rather than acting as an intermediary. (3) Furthermore, a regional heterogeneity analysis indicates that the impact of local government environmental attention on urban land green use efficiency is significant in the central region but not in the eastern and western regions. Based on these research findings, this study provides valuable policy insights aimed at contributing to green land use and sustainable development in Chinese cities.

Keywords: urban land green use efficiency; local government environmental attention; industrial restructuring; intermediary effect

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1. Introduction

The Chinese government has consistently prioritized environmental concerns, dedicating considerable attention to environmental protection efforts. Shifts in government attention toward specific issues have correspondingly influenced policy adjustments [1], impacting the handling of relevant matters and resource allocation [2]. Government attention is recognized as a limited resource, compelling decision-makers to strategically allocate or redirect this attention toward perceived priorities [2]. In China, attention allocation operates within a hierarchical system among different government levels: 34 provincial-level administrative regions and 333 prefecture-level cities. Within this centralized political framework in China, higher-level governments wield authority over the performance assessments and personnel appointments of their lower-level counterparts, significantly shaping attention distribution. China is actively promoting comprehensive ecological civilization construction [3], underscored by national leaders' extensive discourse and directives on green development and environmental preservation. Consequently, local governments and their leaders have heightened their environmental attention in response [4]. Changes in local government environmental attention (LGEA) can influence policy directions and resource allocation for environmental governance at the regional level [5], inevitably triggering industrial restructuring within these areas [6]. Prior studies have underscored the pivotal role of government environmental attention in regional environmental governance and

green development [7–9]. Urban land, serving as a spatial carrier to balance economic development and ecological environmental conservation [10,11], has witnessed inefficient use due to the rapid growth of China's economy in recent years [12,13]. This surge in economic expansion has accentuated the conflict between green development and urban land use [14,15].

In response to the urgent imperative to improve urban land green use efficiency (ULGUE), scholars have conducted a significant amount of research on ULGUE. These studies have primarily focused on examining the impacts of environmental regulation [16] and policy arrangements [17–19] on ULGUE. Some scholars have also paid attention to the influence of government environmental attention on ULGUE. Their findings primarily indicate that enhancing government environmental attention is conducive to improving ULGUE. For instance, the reinforcement of government environmental attention not only significantly enhances enterprises' levels of green innovation [20] but also contributes to regional pollution reduction efforts [21] and air pollution control [7], resulting in a positive impact on local environmental quality [22]. It is evident that the increased environmental attention given by local governments has stimulated environmental protection and green development in the respective regions. Some scholars have pointed out that the process of local government advancing environmental protection initiatives can trigger industrial restructuring. This influence manifests through mechanisms that enhance industry quality and competitiveness through a process of natural selection [23], as well as the fostering of an elevated industrial structure driven by innovative upgrades within enterprises [9]. Evidently, scholars have already identified the potential positive impact of LGEA on ULGUE. However, there is currently a lack of in-depth and systematic exploration regarding the effects and mechanisms of their interplay. Building upon the existing literature, this study endeavors to thoroughly investigate the impact of LGEA on ULGUE. Previous research has also suggested that industrial structural adjustments may play a role in this impact process [6,24]. Therefore, this study aims to examine whether LGEA can, through influencing industrial structural adjustments, promote ULGUE. This has significant implications for China's pursuit of green and sustainable economic development.

In light of these considerations, this study utilizes data from 284 Chinese cities at the prefectural level for the period 2003 to 2020, aiming to propose the operational mechanisms among LGEA, industrial restructuring, and ULGUE. Through an empirical examination of their impact effects and underlying mechanisms, the study seeks to offer policy insights for enhancing ULGUE and optimizing the allocation of local government attention in China. Compared to existing research, this study presents a unique contribution. Prior studies have examined the notable influence of LGEA on regional industrial restructuring [23,24]. The potential positive impacts of industrial restructuring on environmental governance have also been discussed [25]. Moreover, bolstering LGEA proves beneficial for enhancing ULGUE, potentially achieved through fostering green innovation in enterprises [9], regional pollution reduction [26], and the control of atmospheric pollution [7]. Previous research has discussed LGEA, industrial restructuring, and ULGUE. However, most works have solely explored pairwise relationships and lacked comprehensive discussions. This study marks the first integration of LGEA, industrial restructuring, and ULGUE within a research framework, aiming to explore their impact effects and mechanisms through a theoretical analysis and empirical study. The marginal contributions of this study can be summarized as follows: (1) The integration of LGEA, industrial restructuring, and ULGUE within a single analytical framework contributes to the enrichment of the related theoretical research on ULGUE and government attention. (2) In order to comprehensively investigate the impact of government environmental attention on ULGUE, discussions are conducted from both the national and regional perspectives. By analyzing common regional characteristics and regional heterogeneity, potential pathways for enhancing ULGUE are elucidated.

The remaining sections of this study proceed as follows. Section 2 presents the theoretical analysis. Section 3 outlines the materials and methods employed. Section 4 reports

the empirical tests and analysis. We conclude with conclusions and policy implications in Section 5.

2. Theoretical Analysis

2.1. Direct Impact of LGEA on ULGUE

This study defines local government environmental attention (LGEA) as the extent to which local government decision-makers allocate limited attention to environmental conservation issues, influencing the formulation and implementation of relevant policies as well as the allocation of public resources [5]. Previous studies have provided empirical evidence supporting the notion that government attention to environmental protection issues exerts both pressure and guidance, directly promoting pollution control at the regional level [8,26]. Changes in LGEA have been found to influence the formulation of environmental protection policies [5], consequently impacting the performance of environmental governance and the level of green development within a region.

On one hand, local governments can enhance regional environmental governance performance through the formulation and implementation of environmental policies, as well as increased investments in environmental initiatives [27,28]. Policy measures such as tax incentives, corporate credit control, and green production subsidies can guide enterprises towards adopting greener production practices and reducing undesirable outputs. The effective enforcement of environmental protection policies is essential for driving environmental governance within a region [29]. Stringent environmental enforcement actions incentivize enterprises to reduce high energy consumption and adopt cleaner production practices, thereby fostering regional green development. Additionally, increased expenditure by local governments in the field of environmental protection significantly reduces pollution emissions, thus contributing to improved regional environmental governance [30]. On the other hand, local governments in China exercise direct control over urban land use, thereby influencing the types of land use and the proportion of industrial land. This authority allows them to curtail production and business activities associated with high levels of pollution and emissions. The marketization of urban land transfer contributes to the promotion of pollution reduction in urban areas [31]. It also helps prevent overreliance on land-based investments in development models [32] while fostering regional green development [33]. In conclusion, the heightened environmental attention of local governments plays a pivotal role in advancing regional green development and improving environmental governance performance, thereby exerting a positive influence on the enhancement of ULGUE.

2.2. Intermediary Role of Industrial Restructuring

The environmental protection policies and land use adjustments implemented by local governments have a significant impact on the local industrial structure [6]. Industrial restructuring is typically assessed from two perspectives: industrial structure upgrading and industrial structure rationalization [34]. Industrial structure upgrading refers to the reallocation of production resources towards higher-level industries and the upgrading of economically dominant sectors [35]. It is important to note that industrial structure upgrading entails not only a quantitative expansion but also a qualitative improvement. The quality of industrial structure upgrading encompasses the evolution of proportional relationships among industries and the enhancement of labor productivity [36]. The rationalization of industrial structure is a dynamic process characterized by the continuous enhancement of industrial coordination capabilities. It represents the degree of coupling between factor input allocation and output distribution, reflecting the efficient alignment of resource allocation in the production system [37].

In line with the Chinese government's efforts to promote green development, local governments are placing growing attention on environmental protection issues. This shift in focus has significant implications for local industrial restructuring. The strengthening of LGEA contributes to industrial structure upgrading. First, local governments have imple-

mented environmental protection policies and measures and strengthened supervision to compel pollution-intensive enterprises to reduce their production levels. These efforts have also facilitated the growth of emerging environmental protection industries [38,39]. This process enhances industrial quality and competitiveness through a survival-of-the-fittest mechanism, ultimately driving the upgrading of the industrial structure [40]. Moreover, local governments can incentivize enterprise innovation and upgrading to achieve industrial structure upgrading by reducing research and development (R&D) and innovation risks. This can be accomplished through the provision of tax incentives and financial subsidies [41]. Second, local governments can influence industrial restructuring by adjusting urban land use patterns. They are actively promoting the marketization of land transfer and optimizing land use patterns to foster the normalization of commercial and residential land prices. This strategic approach proves advantageous for the development of the tertiary industry. Moreover, the marketization of land transfer can leverage the competitive pricing mechanism of "highest bidder wins" to elevate the prices of industrial land within a region [42]. Consequently, local enterprises are confronted with escalating costs. In response, they actively engage in technological innovation and industrial upgrading. This drive towards innovation and upgrading directly contributes to the advancement of the overall industrial structure within a region [43]. Industrial structure upgrading significantly reduces energy consumption and pollution emissions in economic development, thereby exerting a substantial positive impact on ULGUE [44]. It improves energy use efficiency, mitigates the greenhouse effect, and enhances resource and environmental conditions within the region [25,45]. The transition from the secondary industry to the tertiary industry contributes to resolving air pollution issues [46]. The development of the tertiary industry not only promotes carbon emissions but also enhances the efficiency of urban land use [47]. The quantitative enhancement of industrial structure upgrading significantly drives energy conservation and emission reduction [48]. The qualitative improvement in the industrial structure upgrade facilitates the rational and efficient use of production resources within a region. This leads to a reduced impact on the ecological environment and contributes to promoting green development to a certain extent in China [49].

The enhancement of LGEA fosters the rationalization of the industrial structure. On one hand, local governments effectively address market information asymmetry by implementing stringent environmental protection policies. This, to some extent, mitigates blind investments and overproduction by enterprises [50], resulting in reduced unwarranted fluctuations in the industrial structure. With a strong focus on green development, enterprises tend to reduce investments and production in high-energy consumption and high-pollution products [51]. As a result, production resources are redirected towards green and clean industries [52]. On the other hand, local governments strive to strike a balance between economic development and ecological protection, avoiding direct intervention in factor prices to attract foreign investment. They achieve this by promoting the demand for green products, guiding the rational allocation of factor resources, and subsequently advancing the rationalization of the industrial structure [53]. The rationalization of the industrial structure contributes to a reduction in industrial sulfur dioxide emissions and enhances the green use efficiency of industrial land [54]. Moreover, it improves carbon emission efficiency and resource use efficiency [55] and enhances the resource and environmental conditions in the region [45], ultimately promoting green development in China [49].

Based on the theoretical analysis provided, this study presents the following analytical framework (Figure 1) for further analysis.

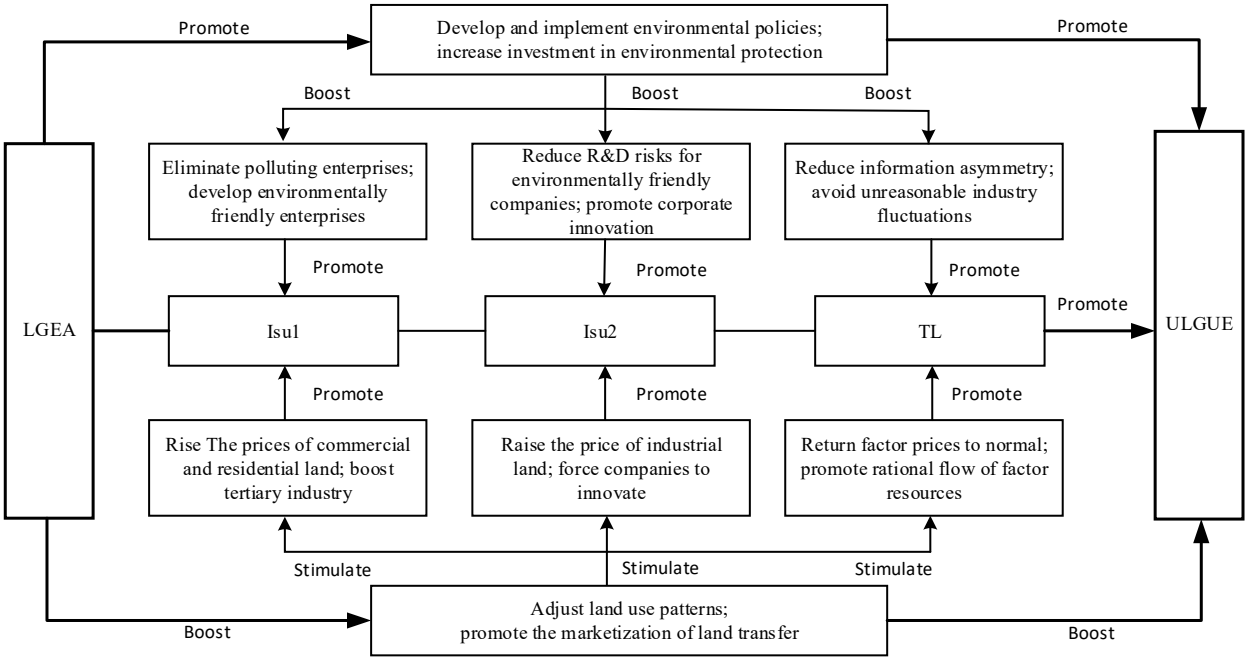


Figure 1. Theoretical analytical framework for the impact of LGEA on ULGUE. Note: industrial structure upgrading (Isu) refers to the reallocation of production resources towards higher-level industries and the upgrading of economically dominant sectors [31]. Isu1 denotes the quantity of Isu, and Isu2 denotes the quality of Isu. Industrial structure rationalization (TL) represents the degree of coupling between factor input allocation and output distribution, reflecting the efficient alignment of resource allocation in the production system [37].

3. Materials and Methods

3.1. Model Setting

The fixed effects model effectively manages individual-specific fixed effects, yielding estimations that are relatively robust [56,57]. Consequently, it finds extensive application in addressing individual heterogeneity in regional land use changes and mitigating endogeneity concerns [58,59]. The panel data employed in this study exhibit individual-specific effects. Opting for the fixed effects model provides more robust and dependable outcomes. Consequently, we employ the fixed effects model to examine the impact of LGEA on ULGUE in this study. To test the mediating effect of industrial restructuring, the methodology proposed by Wen et al. [60] is employed: if the independent variable affects the dependent variable by influencing variable M, then M is considered the mediating variable. The mediating effect is assessed using the model in Equation (1):

$$\begin{aligned} Y_{it} &= \beta_0 + \beta_1 LGEA_{\mathrm{it}} + \beta_2 CV_{it} + \mu_i + \varepsilon_{it} \\ M_{it} &= \alpha_0 + \alpha_1 LGEA_{\mathrm{it}} + \alpha_2 CV_{it} + \mu_i + \varepsilon_{it} \\ Y_{it} &= \varphi_0 + \varphi_1 LGEA_{\mathrm{it}} + \varphi_2 M_{it} + \varphi_3 CV_{it} + \mu_i + \varepsilon_{it} \end{aligned} \quad (1)$$

In Equation (1), the subscript i represents a prefecture-level city, and t represents a year. Y_{it} represents the dependent variable ULGUE, $LGEA_{\mathrm{it}}$ represents the independent variable $LGEA$, and CV_{it} represents the control variables. β_0, α_0, and φ_0 denote constants. M_i represents the individual effect, and ε_{it} represents the random error term. If β_1, α_1, and φ_2 are all statistically significant, this indicates the presence of a mediating effect. If β_1 is significant and at least one of α_1 and φ_2 is insignificant, a coefficient product test is conducted. If the coefficient product is significant, a mediating effect exists. When a mediation effect is present, if φ_1 is not significant, it is a complete mediation effect; otherwise, it is a "partial" mediation effect.

3.2. Variables Selection and Data Source

(1) Dependent variable: urban land green use efficiency (ULGUE). The undesired super-efficiency SBM model, which combines the advantages of the super-efficiency model and the SBM model, is extensively employed in ULGUE measurements. This model effectively avoids the loss of valuable information from decision-making units [61] and can be expressed in Equations (2) and (3) [62]:

$$\min\rho = \frac{\frac{1}{c}\sum_{i=1}^{c}(\overline{x}/x_{ik})}{\frac{1}{r_1+r_2}\left(\sum_{S=1}^{r_1}\overline{y^d}/y^d_{Sk} + \sum_{q=1}^{r_2}\overline{y^u}/y^u_{qk}\right)} \tag{2}$$

$$\begin{cases} \overline{x} \geq \sum_{j=1,\neq k}^{n} x_{ij}\lambda_j; \overline{y^d} \leq \sum_{j=1,\neq k}^{n} y^d_{Sj}\lambda_j; \\ \overline{y^d} \geq \sum_{j=1,\neq k}^{n} y^d_{qj}\lambda_j; \overline{x} \geq x_k; \\ \overline{y^d} \leq y^d_k; \overline{y^u} \geq y^u_k; \\ \\ \lambda_j \geq 0, i = 1, 2, \cdots, c; j = 1, 2, \cdots, n; \\ s = 1, 2, \cdots, r_1; q = 1, 2, \cdots, r_2; \end{cases} \tag{3}$$

In Equations (2) and (3), we assume the presence of n decision-making units, with each unit comprising an input vector, c, an expected output vector, r_1, and a non-expected output vector, r_2. Here, x represents an element in the input matrix c, y^d represents an element in the expected output matrix r_1, y^u represents an element in the undesired output matrix r_2, and ρ denotes the ULGUE value of the measure. The specific design of the index system can be found in Table 1. The ULGUE calculation for prefecture-level cities is conducted using the MAXDEA Ultra 9 (v9.1) software.

Table 1. Evaluation index system of ULGUE.

Layer of Criteria	Layer of Factors	Layer of Indicators	Unit	References
Input	Land	Urban built-up area	km^2	Lu et al. [63]
	Capital	Urban fixed asset investment	100 million yuan	Wu et al. [64]
	Labor	Annual total number of employed people in urban areas	10,000 persons	Xue et al. [65]
Desirable output	Economic benefits	The added value of the secondary and tertiary industries in the municipal district	100 million yuan	Zhu et al. [66]
	Social benefits	Average salary of urban workers	yuan	Xie et al. [62]
	Environmental benefits	Green coverage rate of built-up area	%	Lu et al. [67]
Undesirable output	Environmental pollution index	Discharge of industrial wastewater	10,000 tons	Chen et al. [68]
		Industrial SO_2 emissions	ton	
		Industrial dust emission	ton	
	Carbon Emissions	Total urban carbon emissions	10,000 tons	Chen et al. [69]

(2) Independent variable: local government environmental attention (LGEA). China's government annual reports serve as comprehensive guidance documents and have been widely utilized for analyzing diverse topics, including government attention allocation [7]. Previous studies have employed text analysis techniques on government work reports to measure the Chinese government's focus on innovation, entrepreneurship, and basic public services [70,71]. In this research, the WinGo financial text data platform is utilized to measure LGEA through a word frequency ratio calculation. The specific methods and steps employed are outlined as follows [72]:

First, LGEA is defined, and selection criteria for environmental keywords are determined. Second, seed words are selected based on the definition of LGEA, taking into account the Environmental Protection Law of the People's Republic of China. The selected seed words include "environmental protection", "environmental improvement", "pollution prevention", "public health", "ecological civilization", and "sustainable development". Third, the WinGo financial text data platform's deep learning similar words section is utilized to obtain similar words to the seed words and correct any inaccuracies. Fourth, the third step is repeated to ensure saturation of the seed words and similar words. Similar words that are unrelated to environmental protection are eliminated. Fifth, combining the LGEA definition, only keywords with similar meanings and high frequencies are retained to create the final keyword vocabulary. Sixth, LGEA is measured based on the keyword vocabulary. The ratio of the word frequency of environmental attention in cities above the local level to the total word frequency in the government work reports of each city is calculated to obtain LGEA [73]. Table 2 shows the keyword vocabulary of LGEA.

Table 2. Quantitative keyword vocabulary of LGEA.

Definition	Key Words
Protect and improve the environment	Environment, energy consumption, environmental protection, energy saving, greening, outdated production capacity, consumption reduction, energy consumption
Prevent pollution and other public hazards	Pollution, atmosphere, desulfurization, emission reduction, low carbon, emission, smoke, sewage discharge
Protect public health	livability, soil and water, cleanliness, body of water, blue sky
Promote the construction of ecological civilization	Ecology, water resources, natural forests, oceans, lakes, biology, watersheds, wetlands, conversion of farmland to forests, afforestation, forests, heavy metals
Promote sustainable economic and social development	Green, scientific development, coordinated development, sustainability, recycling, green water and green mountains

(3) Industrial structure: Industrial restructuring is commonly evaluated based on two dimensions: industrial structure rationalization and industrial structure upgrading [34]. In line with previous research [74], this study adopts the Taylor index to measure the level of industrial structure rationalization. The calculation formula for the Taylor index is as follows: $TL_{i,t} = \sum_{m=1}^{3} y_{i,m,t} ln\left(\frac{y_{i,m,t}}{l_{i,m,t}}\right)$. The variable $y_{i,m,t}$ represents the proportion of industry, m, in region i's GDP in year t, while $l_{i,m,t}$ represents the ratio of employment in industry, m, in region i to the total employment in the same region at time t. $TL_{i,t}$ represents the Taylor index, which serves as an indicator of the industrial structure in terms of both output composition and employment composition within the three major industries in China. A value of 0 for the Taylor index suggests a balanced industrial structure, indicating equilibrium. On the other hand, a non-zero value indicates an imbalance in the industrial structure. Based on the previous research conducted by Yuan and Zhu [36], this study aims to quantify both the quantity and quality of the industrial structure upgrading. The measurement method for the quantity of the industrial structure upgrading (Isu1) is established as $\text{Isu1}_{i,t} = \sum_{m=1}^{3} y_{i,m,t} \times m$, using the same variables $y_{i,m,t}$ as mentioned earlier. The Isu1 index indicates the gradual shift of China's leading industry from the primary sector to the secondary and tertiary sectors. For the measurement of the quality of the industrial structure upgrading (Isu2), the equation employed is $\text{Isu2}_{i,t} = \sum_{m=1}^{3} y_{i,m,t} \times \frac{Y_{i,m,t}}{L_{i,m,t}}$, utilizing the same variables $y_{i,m,t}$ as mentioned earlier. The ratio $Y_{i,m,t}/L_{i,m,t}$ represents the

labor productivity of industry m in region i during period t. The selection of variables and the reference basis for this study can be found in Table 3.

Table 3. Variables selection and explanation.

Variables	Expressions	Explanation	Reference
Urban land use green efficiency	ULGUE	Measured by the non-desired output over efficiency SBM model	Xie et al. [62]
Local government environmental attention	LGEA	Calculated by building a keyword vocabulary and using the WinGo financial text data platform	Zhang. [72]
Industrial structure rationalization	TL	Calculated from formula $TL_{i,t} = \sum_{m=1}^{3} y_{i,m,t} ln(\frac{y_{i,m,t}}{l_{i,m,t}})$	Zheng. [74]
The quantity of industrial structure upgrading	Isu1	Calculated from formula $\text{Isu1}_{i,t} = \sum_{m=1}^{3} y_{i,m,t} \times m$	Yuan et al. [36]
The quality of industrial structure upgrading	Isu2	Calculated from formula $\text{Isu2}_{i,t} = \sum_{m=1}^{3} y_{i,m,t} \times \frac{Y_{i,m,t}}{L_{i,m,t}}$	Yuan et al. [36]
Economic development level	Ecl	Calculated from GDP growth rate	Chen et al. [75]
Social development equity	Sde	Urban road area per capita	Yan et al. [76]
Intensity of investment in science and education	Ise	The proportion of expenditure on science and education in the general budget expenditure of local finance	He et al. [77]
Opening-up degree	Fdi	The ratio of foreign direct investment to GDP in prefecture-level cities	Lu et al. [6]

(4) Control variables (CV): (1) Economic development level (Ecl). The level of ULGUE in a region is closely associated with its economic development, which can be measured using the growth rate of GDP [75]. (2) Social development equity (Sde). The unrestricted growth of urban road traffic presents social equity concerns [78]. Thus, this study employs per capita urban road area as a metric to gauge Sde [76]. (3) Intensity of investment in science and education (Ise). This can be quantified by assessing the ratio of science and education expenditures to the general budgetary spending of local governments [77]. (4) Opening-up degree (Fdi). This can be measured by assessing the proportion of the total actual utilized foreign investment to the GDP [6]. Table 4 presents the descriptive statistics of the variables.

Table 4. Descriptive statistics of variables.

Variables	Observation	Mean	Std. Dev.	Min	Max
ULGUE	5112	0.281	0.178	0.026	1.045
LGEA	5112	0.006	0.002	0.000	0.012
TL	5112	0.180	0.185	0.002	0.888
Isu1	5112	2.375	0.142	2.026	2.708
Isu2	5112	1.013	0.694	0.144	3.706
Ecl	5112	0.108	0.051	−0.036	0.257
Sde	5112	12.539	7.177	1.930	36.960
Ise	5112	0.179	0.054	0.070	0.350
Fdi	5112	0.023	0.026	0.000	0.131

Since 2003, there has been a significant shift in the spatial allocation of urban construction land indicators in China [79]. To ensure data accessibility and completeness, this study selected data from 2003 to 2020 for research. The study focuses on municipal districts, which serve as the core and main component of urban functions. Missing values

were handled using the mean interpolation method. The required data were obtained from sources such as the China Urban Statistical Yearbook, the China Urban and Rural Construction Statistical Yearbook, and the WinGo financial text data platform. To mitigate the influence of extreme values, bilateral truncation at the first percentile was applied to all continuous data.

3.3. Description of the Research Area

In China, there exists a hierarchical relationship between the central government and local governments, where the central government assumes leadership while local governments follow. The central government is responsible for formulating nationwide policies, laws, and regulations, while local governments are tasked with implementing and adhering to these policies. In the realm of environmental protection, the central government takes the lead in developing national-level policies, providing financial support, and conducting oversight and inspections. Local governments, in turn, are responsible for executing and managing specific initiatives to ensure the comprehensive advancement and implementation of environmental protection measures. China encompasses a vast territory of approximately 9.6 million square kilometers, consisting of 34 provincial administrative regions and 333 prefecture-level administrative regions. Based on geographical location, economic conditions, and resource endowment, mainland China is classified into three regions: eastern, central, and western (Figure 2). The eastern region demonstrates a higher level of economic development, characterized by rapid growth in secondary and tertiary industries, followed by the central region. Conversely, the western region, predominantly reliant on resource-based industries, exhibits relatively lower levels of economic and industrial development, resulting in discernible regional disparities [80]. It is important to note that this study excludes data from certain regions, including Hong Kong, Macau, Taiwan, Tibet, and other areas, due to unavailability of data.

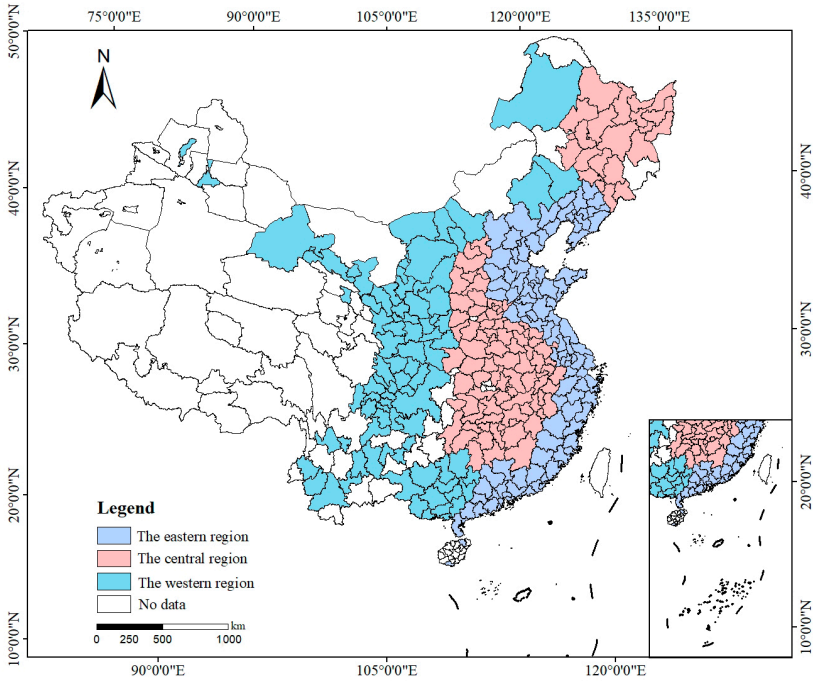


Figure 2. The distribution of eastern, central, and western region of China.

4. Empirical Test and Analysis

4.1. National Empirical Analysis

The estimation results of the fixed effects model for the entire country are presented in Table 5. In the first column (Model 1), the estimated results for LGEA and ULGUE are shown without the inclusion of any control variables. The second to fifth columns

(Model 2 to Model 5) display the estimated results when control variables are gradually added. The findings from Table 5 reveal that the estimated coefficients of LGEA in each column are significantly positive at a 1% level of statistical significance. This indicates that LGEA makes a substantial and positive contribution to ULGUE overall. These results are consistent with the theoretical analysis conducted in this study. This aligns with the findings of Reidsma et al., whose research emphasizes that the emphasis of developing countries' governments on green development can foster the sustainable and green use of urban land [81].

Table 5. Stepwise baseline regression results for China.

Explanatory Variables	ULGUE				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
LGEA	6.932 *** (0.810)	5.293 *** (0.859)	4.749 *** (0.882)	4.188 *** (0.882)	3.525 *** (0.882)
Ecl		−0.218 *** (0.039)	−0.174 *** (0.042)	−0.136 *** (0.042)	−0.102 ** (0.042)
Sde			0.001 *** (3.66×10^{-4})	0.001 *** (3.65×10^{-4})	0.001 *** (3.63×10^{-4})
Ise				0.321 *** (0.048)	0.288 *** (0.048)
Fdi					−0.735 *** (0.102)
Cons	0.367 *** (0.030)	0.396 *** (0.031)	0.386 *** (0.031)	0.340 *** (0.032)	0.348 *** (0.031)
R^2	0.513	0.516	0.517	0.521	0.526
N	5112	5112	5112	5112	5112

Note: numbers in parentheses denote robust standard errors. **, and *** correspond to significance levels of 5%, and 1%, respectively.

From the results of the control variables, it can be observed that: (1) The variable Ecl exhibits a significant negative effect on ULGUE. This suggests that an increase in the growth rate of GDP within the region has a dampening effect on the improvement in ULGUE to some extent. It is often the case that environmental protection goals conflict with economic development targets. Local officials, in their pursuit of short-term economic benefits, may inadvertently have a negative impact on the local ecological environment [82]. Additionally, previous studies have identified the presence of a short-term economic development strategy among local officials. This strategy involves utilizing land to attract investments and granting construction land [83]. This approach often hinders the sustainable and green use of urban land at the local level, consequently impeding the enhancement of ULGUE. (2) The estimated coefficient of Sde, measured by the road area per capita, shows a significant positive relationship at a 1% level of statistical significance. This finding suggests that an increase in road area per capita contributes to the enhancement of ULGUE. A larger road area per capita contributes to the alleviation of urban road traffic pressure, thereby reducing the likelihood of congestion in the central city. Moreover, it facilitates the smooth flow of factors, attracting them to urban areas and accelerating their movement. Additionally, an adequate road network optimizes land use patterns, thereby enhancing ULGUE [84]. (3) The variable Ise makes a significant contribution to the enhancement of ULGUE at a 1% level of statistical significance. This finding suggests that an increase in investment in science and education positively influences urban technical efficiency, thereby promoting an improvement in ULGUE. Furthermore, the variable Fdi exhibits a significant negative impact on ULGUE at a 1% level of statistical significance. This implies that an increase in the ratio of the total actual foreign capital utilized in the region to local GDP hinders improvement in ULGUE. Indeed, the negative effect of Fdi on ULGUE could be attributed to the composition of foreign investment in China. Historically, foreign investment has been primarily directed towards high-energy-consumption and high-pollution industries.

This pattern of foreign investment exacerbates the ecological challenges faced by China and lends support to the "pollution paradise" hypothesis associated with foreign capital [85].

4.2. Results of Robustness Test

To assess the robustness of the estimated results presented in Table 5, this study conducted re-estimations using various approaches: substituting variable indicators, employing alternative estimation methods, lagging the treatment by one period, excluding outliers, and removing special samples. (1) For the national regression, the initial choice of measurement using ULGUE involved adopting a non-anticipated output super-efficiency SBM model with variable returns to scale. In comparison to the SBM model with variable returns to scale, the results obtained from the SBM model with constant returns to scale incorporate scale efficiency. These findings have the potential to enhance the robustness of the conclusions drawn. Consequently, in this study, the non-anticipated output, super-efficiency SBM model with constant returns to scale was selected for the re-measure of ULGUE. The test results from Model 1 in Table 6 demonstrate that LGEA continues to significantly enhance ULGUE, indicating the stability of the regression outcomes. (2) In this study, to verify the robustness of the results, the precise sentence frequency of occurrences of the environmental protection keyword was selected instead of the frequency of the keyword word to recalculate LGEA [7]. The test results of Model 2 in Table 6 demonstrate that the environmental attention of local governments, calculated using the exact sentence frequency (RLGEA), continues to significantly enhance the ULGUE. (3) In order to obtain unbiased estimates of ULGUE, which is a restricted dependent variable, this study employed a Tobit panel model for re-estimation [86]. The results of the Tobit regression in Model 3 of Table 6 provide evidence of the robustness of the empirical analysis conducted at the national level. (4) Acknowledging the time lag in the effect of local government policy implementation, this study incorporates a lag of one period for the LGEA variable to examine its robustness. The test results of Model 4 in Table 6 reveal that even with a one-period lag, LGEA continues to significantly improve ULGUE at a 1% level of statistical significance. (5) To account for the distinct economic and political characteristics of the four first-tier cities and municipalities directly under the central government, which could potentially impact the baseline regression results, this study excluded six samples from Beijing, Shanghai, Chongqing, Tianjin, Guangzhou, and Shenzhen. Subsequently, the panel data of other prefecture-level administrative regions were examined. The results of Model 5 in Table 6 demonstrate that LGEA continues to significantly improve the ULGUE.

Table 6. Results of robustness test.

Explanatory Variables	ULGUE				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
	Substitution of Dependent Variable	**Substitution of Independent Variables**	**Replacement Estimation Method**	**One-Period Lag**	**Exclusion of Special Samples**
LGEA	4.853 *** (0.811)		3.467 *** (0.875)		3.093 *** (0.857)
RLGEA		0.271 *** (0.051)			
L.LGEA				2.758 *** (0.941)	
Cons	0.338 *** (0.029)	0.344 *** (0.031)	0.225 *** (0.015)	0.370 *** (0.033)	0.345 *** (0.030)
CV	YES	YES	YES	YES	YES
R^2	0.528	0.528	--	0.522	0.535
wald	--	--	223.27	--	--
N	5112	5112	5112	4828	5004

Note: Numbers in parentheses denote robust standard errors. *** corresponds to significance level of 1%.

4.3. Mechanism Test Results

In this study, we employed a mediating effect model to examine the pathway through which LGEA affects ULGUE via industrial restructuring. The estimation results are presented in Table 7. The analysis of the estimation results is as follows:

Table 7. Results of intermediate effects test.

Variables	ULGUE	Isu1	ULGUE	Isu2	ULGUE	TL	ULGUE
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
LGEA	3.525 *** (0.882)	3.599 *** (0.468)	3.170 *** (0.887)	45.667 *** (3.150)	1.354 (0.889)	0.977 (0.644)	3.581 *** (0.882)
Isu1			0.098 *** (0.027)				
Isu2					0.048 *** (0.004)		
TL							−0.058 *** (0.020)
Cons	0.348 *** (0.031)	2.332 *** (0.017)	−0.118 * (0.071)	0.136 (0.112)	0.341 *** (0.031)	0.093 *** (0.023)	0.353 *** (0.031)
CV	yes	yes	yes	yes	yes	yes	yes
R^2	0.526	0.792	0.528	0.603	0.540	0.765	0.527
N	5112	5112	5112	5112	5112	5112	5112

Note: Numbers in parentheses denote robust standard errors. *, and *** correspond to significance levels of 10% and 1%, respectively.

In Table 7, Model 1 presents the findings of the national empirical analysis, incorporating control variables. Model 2 investigates the impact of LGEA on Isu1 and demonstrates that enhancing LGEA is beneficial to improving Isu1. This finding suggests that the implementation of a series of environmental policies and measures by local governments promotes the transition of the industrial structure to higher levels within the region. Model 3 examines the effects of LGEA and Isu1 on ULGUE. Both variables significantly promote ULGUE at the 1% statistical level, indicating that Isu1 plays a partially mediating role in the relationship between LGEA and ULGUE. These results are consistent with the theoretical analysis presented in this study.

The estimation results of Model 4 reveal that the enhancement of LGEA significantly contributes to the improvement in Isu2 at a statistical significance level of 1%. This finding indicates that the environmental protection policies implemented by local governments can, to some extent, simultaneously facilitate the evolution of the proportional relationship within the local industrial structure and enhance labor productivity. In Model 5, the estimation results indicate that the enhancement of Isu2 has a positive effect on ULGUE. However, the effect of LGEA on ULGUE is not statistically significant in this model. This suggests that there is a full mediation effect of Isu2 on ULGUE, which is consistent with the results of the theoretical analysis conducted in this study.

In Model 6, the impact of LGEA on industrial structure rationalization lacks significance, contradicting the theoretical analysis presented in this study. Possible explanations include: China's ongoing economic development relies heavily on the manufacturing industry, and local government initiatives to promote environmental policies predominantly focus on the secondary sector [87]. Furthermore, technological innovations within companies are often limited to their specific industries, offering restricted support for the overall rationalization of industrial structure [6]. This study employs the Taylor index to assess industrial structure rationalization, where a larger deviation of the TL from 0 indicates a more irrational industrial structure. The results from Model 7 indicate that, at a 1% statistical level, the improvement in ULGUE is more beneficial when the industrial

structure within the study area is more rational. The next step involves further testing the significance of the indirect effect using the mediation effect test. For this purpose, the bootstrap sampling method was utilized in Stata 14 software to examine whether a mediating effect exists. The interval values (BootLLCI, BootULCI) for the indirect effect and the direct effect are (−1.006, −0.358) and (1.202, 5.758), respectively. Both intervals do not include 0, indicating the simultaneous presence of both direct and indirect effects. It is important to note that the estimated coefficient of industrial structure rationalization in Model 7 exhibits an opposite sign to that of GEA, with a larger estimated coefficient than in Model 1. This suggests that the rationalization of industrial structure has a partial masking effect rather than a partial mediating effect in the process of GEA's impact on ULGUE [88].

4.4. Regional Empirical Analysis

As the world's largest developing country, China exhibits significant regional differences in terms of resource endowment, economic development, and urban land use. Therefore, it is crucial to consider regional heterogeneity when analyzing the impact of LGEA on ULGUE. To address this, the present study employs a fixed effects model and examines heterogeneity among the east, central, and west regions. The estimated results of this analysis are presented in Table 8.

Table 8. Results of regional heterogeneity analysis.

Explanatory Variables	Model 1	Model 2	Model 3
	The Eastern Region	The Central Region	The Western Region
LGEA	2.484 (1.622)	5.705 *** (1.329)	2.424 (1.653)
Cons	0.255 *** (0.048)	0.379 *** (0.029)	0.139 *** (0.039)
CV	YES	YES	YES
R^2	0.517	0.465	0.553
N	1800	1800	1512

Note: Numbers in parentheses denote robust standard errors. *** corresponds to significance level of 1%.

Table 8 presents the estimation results, indicating that the impact of LGEA on ULGUE in the eastern and western regions is not statistically significant. However, a significant impact is observed in the central region, where the estimated coefficient surpasses that of the national level. The analysis of regional heterogeneity confirms substantial variations in the influence of LGEA on ULGUE across different regions. Several plausible explanations for this heterogeneity are delineated below: Firstly, the eastern region exhibits a higher level of economic development, rational urban land use patterns, and optimized production factor allocation. Its production technology is also more mature, though technological innovation necessitates a considerable period for productive integration. Consequently, the series of environmental protection policies enacted by local governments have limited effects on enhancing urban land utilization, optimizing production factors, and stimulating technological innovation. In contrast, the western region, reliant predominantly on resource-based industries, faces a weaker industrial foundation and lower levels of production facilities, equipment, and technological proficiency. Due to its relatively modest developmental base, the outcomes of regional endeavors to promote environmentally friendly land use by local governments remain inconspicuous. Hence, the impact of LGEA on ULGUE in the eastern and western regions is deemed statistically insignificant. Notably, the central region, endowed with resource and locational advantages alongside a certain industrial foundation, holds considerable developmental potential. Local governmental initiatives for sustainable development can facilitate an improvement in ULGUE. For instance, these measures include increasing investments in environmental protection, providing tax in-

centives for green enterprises, and promoting the introduction of production facilities and manufacturing technologies within the region.

5. Conclusions and Policy Implications

5.1. Conclusions

The study empirically examines the impact of LGEA on ULGUE and explores its underlying mechanism. The main conclusions of the study are as follows:

First, LGEA demonstrates a statistically significant and positive impact on the ULGUE of municipal districts within China's prefecture-level administrative regions. This indicates that the heightened attention of local governments to the environmental sector indeed has the potential to enhance the level of ULGUE. This finding is supported by a series of robustness tests.

Second, when examining the influence of LGEA on ULGUE, it is found that Isu1 plays a partially mediating role, while Isu2 plays a fully mediating role. However, in the process of LGEA affecting ULGUE, industrial structure rationalization shows a partial masking effect rather than a mediated effect. This also underscores the necessity for a comprehensive study of the crucial role of industrial restructuring in the process of LGEA impacting ULGUE.

Third, the effect of LGEA on ULGUE exhibits heterogeneity across the eastern, central, and western regions. Specifically, the effects on ULGUE in the eastern and western regions are not statistically significant. However, significant effects of LGEA on ULGUE are observed in the central region, where the estimated coefficient surpasses that of the national level.

Fourth, regarding the control variables, the economic development level and opening-up degree demonstrate significant negative effects on ULGUE. On the contrary, social development equity and the intensity of investment in science and education exhibit significant positive effects on the enhancement of ULGUE.

5.2. Policy Implications

First, in the ongoing modernization process aimed at fostering harmony between humans and nature, the central government should continue to propel China towards green development, aligning with the "UAE Consensus" reached at COP28. The successful convening of COP28 further solidified the irreversible global trend towards a green, low-carbon transformation. This study is closely linked to globally highlighted issues and holds significant practical relevance and applicability.

Second, in the pursuit of enhancing ULGUE, local governments should emphasize the mediating role of industrial structural transformation. They can actively facilitate regional industrial restructuring through various measures such as environmental protection investments, tax incentives, and entry restrictions. Indeed, China's industrial development policies have achieved notable progress, with the three-sector industrial structure transitioning from 9.1:45.4:45.5 in 2012 to 7.3:39.4:53.3 in 2021. Moreover, local governments should prioritize overall improvements in labor productivity and the quality enhancement of industrial structure rather than focusing solely on superficial changes in industrial structure.

Third, in the policy formulation process, the central government should take into account the specific conditions of each region, such as economic development levels, industrial progress, and land use status. Indeed, China's regional coordinated development policies have yielded commendable results. The coefficient of variation for per capita GDP across regions decreased from 0.46 in 2012 to 0.44 in 2021, while the coefficient of variation for per capita disposable income among residents across regions decreased from 0.43 in 2012 to 0.39 in 2021. However, China's regional coordinated development still faces numerous challenges that require further optimization. Local governments can implement targeted policy measures based on the unique requirements and challenges of each region. Areas with higher economic development levels and relatively equal factor distributions

require more emphasis on fostering technological innovation and advancement. Regions with lower economic development and limited industrial bases should actively attract high-quality industries from more developed areas.

Fourth, the conclusions drawn from this study hold significant relevance for developing countries with similar political systems. This study serves as a reference for other developing nations aiming to advance green, low-carbon transformations and enhance ULGUE. This offers valuable insights for strengthening interactions between central and local governments, facilitating the establishment of replicable and scalable models for green land use. Additionally, this study provides evidence for the global discourse on the crucial role of government in improving ULGUE.

5.3. Innovations and Limitations

The innovations in this study primarily encompass the following aspects: (1) Exploring the impact of local government behavior on ULGUE from the perspective of government attention. (2) Proposing the theoretical mechanism of how LGEA affects ULGUE, highlighting the mediating effect of industrial restructuring, thereby contributing to the enrichment of theoretical research on ULGUE. (3) Emphasizing China's unique central–local relationships and conducting heterogeneous analyses from both national and regional perspectives. This serves as a valuable reference for other developing countries with similar political systems and contributes to the global discourse by offering insights into China's approach and solutions to enhancing ULGUE.

This study also has several noteworthy limitations. First, there may be potential issues in measuring LGEA through the frequency ratio of environmental-related terms in local government work reports. In the future, a more accurate assessment of LGEA could be achieved by utilizing sources such as leaders' speeches, surveys, or more comprehensive written documents. Second, this study did not consider the personal characteristics of officials as a factor in investigating the potential impact of government environmental attention on ULGUE. This could be a promising avenue for further exploration in future research. Thirdly, this study solely focused on the mediating pathway of industrial restructuring. Future studies could delve into other potential mediating pathways, such as technological innovation.

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References

1. Jones, B.D.; Baumgartner, F.R.; Talbert, J.C. The destruction of issue monopolies in Congress. *Am. Political Sci. Rev.* **1993**, *87*, 657–671. [CrossRef]
2. Simon, H.A. *Administrative Behavior*; Simon and Schuster: New York, NY, USA, 2013.
3. Bai, X.; Shi, P.; Liu, Y. Society: Realizing China's urban dream. *Nature* **2014**, *509*, 158–160. [CrossRef] [PubMed]

4. Shi, C.; Shi, Q.; Guo, F. Environmental slogans and action: The rhetoric of local government work reports in China. *J. Clean. Prod.* **2019**, *238*, 117886. [CrossRef]
5. Jones, B.D.; Baumgartner, F.R. A model of choice for public policy. *J. Public Adm. Res. Theory* **2005**, *15*, 325–351. [CrossRef]
6. Lu, X.; Jiang, X.; Gong, M. How land transfer marketization influence on green total factor productivity from the approach of industrial structure? Evidence from China. *Land Use Policy* **2020**, *95*, 104610. [CrossRef]
7. Bao, R.; Liu, T. How does government attention matter in air pollution control? Evidence from government annual reports. *Resour. Conserv. Recycl.* **2022**, *185*, 106435. [CrossRef]
8. Liu, X.; Cifuentes-Faura, J.; Zhao, S.; Wang, L. Government environmental attention and carbon emissions governance: Firm-level evidence from China. *Econ. Anal. Policy* **2023**, *80*, 121–142. [CrossRef]
9. Xu, J.; Hong, J.; Zhou, Z. Local attention to environment and green innovation: Evidence from listed manufacturing companies in 120 cities in China. *Emerg. Mark. Financ. Trade* **2023**, *59*, 1062–1073. [CrossRef]
10. Simwanda, M.; Murayama, Y. Spatiotemporal patterns of urban land use change in the rapidly growing city of Lusaka, Zambia: Implications for sustainable urban development. *Sustain. Cities Soc.* **2018**, *39*, 262–274. [CrossRef]
11. Surya, B.; Ahmad, D.N.A.; Sakti, H.H.; Sahban, H. Land use change, spatial interaction, and sustainable development in the metropolitan urban areas, South Sulawesi Province, Indonesia. *Land* **2020**, *9*, 95. [CrossRef]
12. Liu, Y.; Fang, F.; Li, Y. Key issues of land use in China and implications for policy making. *Land Use Policy* **2014**, *40*, 6–12. [CrossRef]
13. Liu, Y.; Long, H.; Li, T.; Tu, S. Land use transitions and their effects on water environment in Huang-Huai-Hai Plain, China. *Land Use Policy* **2015**, *47*, 293–301. [CrossRef]
14. Artmann, M.; Inostroza, L.; Fan, P. Urban sprawl, compact urban development and green cities. How much do we know, how much do we agree? *Ecol. Indic.* **2019**, *96*, 3–9. [CrossRef]
15. Godschalk, D.R. Land use planning challenges: Coping with conflicts in visions of sustainable development and livable communities. *J. Am. Plan. Assoc.* **2004**, *70*, 5–13. [CrossRef]
16. Fan, X.; Zhou, Y.; Xie, Q. Performance evaluation, environmental regulation, and urban land green use efficiency: Evidence from China. *Environ. Prog. Sustain. Energy* **2023**, *42*, e14120. [CrossRef]
17. Li, S.; Wang, D.; Wu, Q. Effect of Ecological Civilization Pilot Demonstration Area Construction on Urban Land Green Use Efficiency. *Front. Environ. Sci.* **2023**, *11*, 688. [CrossRef]
18. Ge, K.; Zou, S.; Chen, D.; Lu, X.; Ke, S. Research on the spatial differences and convergence mechanism of urban land use efficiency under the background of regional integration: A case study of the Yangtze River economic zone, China. *Land* **2021**, *10*, 1100. [CrossRef]
19. Wang, A.; Lin, W.; Liu, B.; Wang, H.; Xu, H. Does smart city construction improve the green utilization efficiency of urban land? *Land* **2021**, *10*, 657. [CrossRef]
20. Porter, M.E.; Linde, C.V.D. Toward a new conception of the environment-competitiveness relationship. *J. Econ. Perspect.* **1995**, *9*, 97–118. [CrossRef]
21. Atash, F. The deterioration of urban environments in developing countries: Mitigating the air pollution crisis in Tehran, Iran. *Cities* **2007**, *24*, 399–409. [CrossRef]
22. Bulus, G.C.; Koc, S. The effects of FDI and government expenditures on environmental pollution in Korea: The pollution haven hypothesis revisited. *Environ. Sci. Pollut. Res.* **2021**, *28*, 38238–38253. [CrossRef] [PubMed]
23. Yu, X.; Wang, P. Economic effects analysis of environmental regulation policy in the process of industrial structure upgrading: Evidence from Chinese provincial panel data. *Sci. Total Environ.* **2021**, *753*, 142004. [CrossRef] [PubMed]
24. Huang, Z.; Du, X. Toward green development? Impact of the carbon emissions trading system on local governments' land supply in energy-intensive industries in China. *Sci. Total Environ.* **2020**, *738*, 139769. [CrossRef] [PubMed]
25. Zhao, J.; Jiang, Q.; Dong, X.; Dong, K.; Jiang, H. How does industrial structure adjustment reduce CO_2 emissions? Spatial and mediation effects analysis for China. *Energy Econ.* **2022**, *105*, 105704. [CrossRef]
26. Liu, Z.; Tang, Y.; Wilson, J.; Tao, X.; Lv, B.; Wang, Z.; Xu, Y.; Zhang, Z.; Zhang, Y.; Zhao, W. Influence of government attention on environmental quality: An analysis of 30 provinces in China. *Environ. Impact Assess. Rev.* **2023**, *100*, 107084. [CrossRef]
27. Li, Z. The Impact of Public Participation on Local Government's Environmental Governance—An Analysis of Provincial Data 2003–2013. *China Public Adm.* **2017**, *8*, 102–108.
28. Zailani, S.H.M.; Eltayeb, T.K.; Hsu, C.C.; Tan, K.C. The impact of external institutional drivers and internal strategy on environmental performance. *Int. J. Oper. Prod. Manag.* **2012**, *32*, 721–745. [CrossRef]
29. Bao, Q.; Shao, M.; Yang, D. Environmental regulation, provincial legislation and pollution emission in China. *Econ. Res. J.* **2013**, *12*, 42–54.
30. Zhu, X.H.; Lu, Y.Q. Research on the Pollution Control Effects of Environmental Fiscal and Taxation Policies: From the Perspective of Regional and Threshold Effects. *China Popul. Resour. Env.* **2017**, *27*, 83–90.
31. Du, W.; Li, M. The impact of land resource mismatch and land marketization on pollution emissions of industrial enterprises in China. *J. Environ. Manag.* **2021**, *299*, 113565. [CrossRef]
32. Wetzstein, S.T. oward affordable, cities? Critically exploring the market-based housing supply policy proposition. *Hous. Policy Debate* **2022**, *32*, 506–532. [CrossRef]

33. Stavins, R.N. Experience with market-based environmental policy instruments. In *Handbook of Environmental Economics*; Elsevier: Amsterdam, The Netherlands, 2003; Volume 1, pp. 355–435.
34. Zheng, T.; Zhao, Y.; Li, J. Rising labour cost, environmental regulation and manufacturing restructuring of Chinese cities. *J. Clean. Prod.* **2019**, *214*, 583–592. [CrossRef]
35. Gan, C.H.; Zheng, R.G.; Yu, D.F. An empirical study on the effects of industrial structure on economic growth and fluctuations in China. *Econ. Res. J.* **2011**, *5*, 4–16.
36. Yuan, H.; Zhu, C. Has the National High-tech Zone promoted the transformation and upgrading of China's industrial structure? *China Ind. Econ.* **2018**, *8*, 60–77.
37. Zdrazil, P.; Kraftova, I.; Mateja, Z. Reflection of industrial structure in innovative capability. *Eng. Econ.* **2016**, *27*, 304–315.
38. de Mello, V.H.S.; Campos, T.L.R.; Espuny, M.; de Oliveira, O.J. Towards a green industry through cleaner production development. *Environ. Sci. Pollut. Res.* **2022**, *29*, 349–370. [CrossRef] [PubMed]
39. Mehmood, S.; Zaman, K.; Khan, S.; Ali, Z. The role of green industrial transformation in mitigating carbon emissions: Exploring the channels of technological innovation and environmental regulation. *Energy Built Environ.* **2023**, *5*, 464–479. [CrossRef]
40. Aşıcı, A.A.; Acar, S. How does environmental regulation affect production location of non-carbon ecological footprint? *J. Clean. Prod.* **2018**, *178*, 927–936. [CrossRef]
41. Krüger, J.J. Productivity and structural change: A review of the literature. *J. Econ. Surv.* **2008**, *22*, 330–363. [CrossRef]
42. Lian, H.; Li, H.; Ko, K. Market-led transactions illegal land use: Evidence from China. *Land Use Policy* **2019**, *84*, 12–20. [CrossRef]
43. Galor, O.; Tsiddon, D. Technological progress, mobility, and economic growth. *Am. Econ. Rev.* **1997**, *87*, 363–382.
44. Lu, X.; Li, J.; Liu, C.; Kuang, B.; Cai, D.; Hou, J. Driving factors and spatial differentiation of the urban land green use efficiency in China. *Sci. Geogr. Sin.* **2022**, *42*, 611–621.
45. Brannlund, R.; Persson, L. To tax, or not to tax: Preferences for climate policy attributes. *Clim. Policy* **2012**, *12*, 704–721. [CrossRef]
46. Luo, K.; Li, G.; Fang, C.; Sun, S.P.M. 2.5 mitigation in China: Socioeconomic determinants of concentrations and differential control policies. *J. Environ. Manag.* **2018**, *213*, 47–55. [CrossRef] [PubMed]
47. Zhang, Z.; Xue, Q. Low-carbon economy, industrial structure and changes in China's development mode based on the data of 1996–2009 in empirical analysis. *Energy Procedia* **2011**, *5*, 2025–2029.
48. Mi, Z.; Pan, S.; Yu, H.; Wei, Y. Potential impacts of industrial structure on energy consumption and CO_2 emission: A case study of Beijing. *J. Clean. Prod.* **2015**, *103*, 455–462. [CrossRef]
49. Fan, Q.Q.; Chu, C.; Gao, J.N. Effect of environmental regulation and industrial structure upgrade on High-quality Economic Development. *China Pop. Res. Environ.* **2020**, *30*, 84–94.
50. Wang, Y.; Wang, D.; Shi, X. Exploring the dilemma of overcapacity governance in China's coal industry: A tripartite evolutionary game model. *Resour. Policy* **2021**, *71*, 102000. [CrossRef]
51. Popp, D.; Newell, R. Where does energy R&D come from? Examining crowding out from energy R&D. *Energy Econ.* **2012**, *34*, 980–991.
52. Rugman, A.M.; Verbeke, A. Corporate strategies environmental regulations: An organizing, framework. *Strateg. Manag. J.* **1998**, *19*, 363–375. [CrossRef]
53. Wang, L.; Wang, Z.; Ma, Y. Heterogeneous environmental regulation industrial structure upgrading: Evidence from, China. *Environ. Sci. Pollut. Res.* **2022**, *29*, 13369–13385. [CrossRef] [PubMed]
54. Li, P.; Lu, Y.; Wang, J. Does flattening government improve economic, performance? Evidence from China. *J. Dev. Econ.* **2016**, *123*, 18–37. [CrossRef]
55. Zhang, J.F.; Deng, W. Industrial structure change and its eco-environmental influence since the establishment of municipality in Chongqing, China. *Procedia Environ. Sci.* **2010**, *2*, 517–526. [CrossRef]
56. Borenstein, M.; Hedges, L.V.; Higgins, J.P.; Rothstein, H.R. A basic introduction to fixed-effect and random-effects models for meta-analysis. *Res. Synth. Methods* **2010**, *1*, 97–111. [CrossRef] [PubMed]
57. Nickell, S. Biases in dynamic models with fixed effects. *Econom. J. Econom. Soc.* **1981**, *49*, 1417–1426. [CrossRef]
58. Fitzgerald, T.; Kuwayama, Y.; Olmstead, S.; Thompson, A. Dynamic impacts of US energy development on agricultural land use. *Energy Policy* **2020**, *137*, 111163. [CrossRef]
59. Qu, S.; Hu, S.; Li, W.; Wang, H.; Zhang, C.; Li, Q. Interaction between urban land expansion and land use policy: An analysis using the DPSIR framework. *Land Use Policy* **2020**, *99*, 104856. [CrossRef]
60. Wen, Z.; Chang, L.; Hau, K.; Liu, H. Testing and application of the mediating effects. *Acta Psychol. Sin.* **2004**, *36*, 614.
61. Tone, K. A slacks-based measure of super-efficiency in data envelopment analysis. *Eur. J. Oper. Res.* **2002**, *143*, 32–41. [CrossRef]
62. Xie, X.; Fang, B.; Xu, H.; He, S.; Li, X. Study on the coordinated relationship between Urban Land use efficiency and ecosystem health in China. *Land Use Policy* **2021**, *102*, 105235. [CrossRef]
63. Lu, X.; Kuang, B.; Li, J. Regional difference decomposition and policy implications of China's urban land use efficiency under the environmental restriction. *Habitat Int.* **2018**, *77*, 32–39. [CrossRef]
64. Wu, H.; Fang, S.; Zhang, C.; Hu, S.; Nan, D.; Yang, Y. Exploring the impact of urban form on urban land use efficiency under low-carbon emission constraints: A case study in China's Yellow River Basin. *J. Environ. Manag.* **2022**, *311*, 114866. [CrossRef] [PubMed]
65. Xue, D.; Yue, L.; Ahmad, F.; Draz, M.U.; Chandio, A.A.; Ahmad, M.; Amin, W. Empirical investigation of urban land use efficiency and influencing factors of the Yellow River basin Chinese cities. *Land Use Policy* **2022**, *117*, 106117. [CrossRef]

66. Zhu, X.; Li, Y.; Zhang, P.; Wei, Y.; Zheng, X.; Xie, L. Temporal–spatial characteristics of urban land use efficiency of China's 35mega cities based on DEA: Decomposing technology and scale efficiency. *Land Use Policy* **2019**, *88*, 104083. [CrossRef]
67. Lu, X.; Chen, D.; Kuang, B.; Zhang, C.; Cheng, C. Is high-tech zone a policy trap or a growth drive? Insights from the perspective of urban land use efficiency. *Land Use Policy* **2020**, *95*, 104583. [CrossRef]
68. Chen, J.; Cheng, S.; Song, M. Estimating policy pressure for China's cultivated land use protection based on an extended index. *Phys. Chem. Earth Parts A/B/C* **2017**, *101*, 21–34. [CrossRef]
69. Chen, J.; Gao, M.; Cheng, S.; Hou, W.; Song, M.; Liu, X.; Liu, Y.; Shan, Y. County-level CO_2 emissions and sequestration in China during 1997–2017. *Sci. Data* **2020**, *7*, 391. [CrossRef]
70. Chen, S.Y.; Chen, D.K. Air pollution, government regulations and high-quality economic development. *Econ. Res. J.* **2018**, *53*, 20–34.
71. Wen, H. A measurement of government's attention to basic public services in China: Based on the text analysis of the central government work report (1954–2013). *Jilin Univ. J. Soc. Sci. Ed.* **2014**, *54*, 20–26.
72. Zhang, K. Research on the inverted U-shaped relationship between local government attention and environmental policy execution. *China Public Adm. Rev.* **2021**, *3*, 132–161.
73. Hu, N.; Xue, F.; Wang, H. Does Managerial Short-sightedness Affect Enterprises' Long-term Investment?—Based on text analysis and machine learning. *J. Manag. World* **2021**, *37*, 139–156.
74. Zheng, J.; Shao, X.; Liu, W.; Kong, J.; Zuo, G. The impact of the pilot program on industrial structure upgrading in low-carbon cities. *J. Clean. Prod.* **2021**, *290*, 125868. [CrossRef]
75. Chen, D.; Lu, X.; Zhang, C.; Zhang, X. Research on the Influence Mechanism of Regional Integration on Green Utilization Efficiency of Urban Land from Multi-dimensional Perspective. *Res. Econ. Manag.* **2021**, *42*, 96–110.
76. Yan, S.; Peng, J.; Wu, Q. Exploring the non-linear effects of city size on urban industrial land use efficiency: A spatial econometric analysis of cities in eastern China. *Land Use Policy* **2020**, *99*, 104944. [CrossRef]
77. He, S.; Yu, S.; Li, G.; Zhang, J. Exploring the influence of urban form on land-use efficiency from a spatiotemporal heterogeneity perspective: Evidence from 336 Chinese cities. *Land Use Policy* **2020**, *95*, 104576. [CrossRef]
78. Ahmed, Q.I.; Lu, H.; Ye, S. Urban transportation and equity: A case study of Beijing and Karachi. *Transp. Res. Part A Policy Pract.* **2008**, *42*, 125–139. [CrossRef]
79. Lu, M. The crux of China's economy is spatial mismatch. *J. Shenzhen Univ. (Humanit. Soc. Sci.)* **2019**, *36*, 77–85.
80. Xie, H.; Chen, Q.; Lu, F.; Wang, W.; Yao, G.; Yu, J. Spatial-temporal disparities and influencing factors of total-factor green use efficiency of industrial land in China. *J. Clean. Prod.* **2019**, *207*, 1047–1058. [CrossRef]
81. Reidsma, P.; König, H.; Feng, S.; Bezlepkina, I.; Nesheim, I.; Bonin, M.; Sghaier, M.; Purushothaman, S.; Sieber, S.; Van Ittersum, M.K. Methods and tools for integrated assessment of land use policies on sustainable development in developing countries. *Land Use Policy* **2011**, *28*, 604–617. [CrossRef]
82. Gibbs, D. Ecological modernisation, regional economic development and regional development agencies. *Geoforum* **2000**, *31*, 9–19. [CrossRef]
83. Liu, Y.; Li, Y. Revitalize the world's countryside. *Nature* **2017**, *548*, 275–277. [CrossRef] [PubMed]
84. Xiao, Y.; Zhong, J.; Zhang, Q.; Xiang, X.; Huang, H. Exploring the coupling coordination and key factors between urbanization and land use efficiency in ecologically sensitive areas: A case study of the Loess Plateau, China. *Sustain. Cities Soc.* **2022**, *86*, 104148. [CrossRef]
85. Eskeland, G.S.; Harrison, A.E. Moving to greener pastures? Multinationals and the pollution haven hypothesis. *J. Dev. Econ.* **2003**, *70*, 1–23. [CrossRef]
86. Zhang, J.; Fang, H.; Wang, H.; Jia, M.; Wu, J.; Fang, S. Energy efficiency of airlines and its influencing factors: A comparison between China and the United States. *Resour. Conserv. Recycl.* **2017**, *125*, 1–8. [CrossRef]
87. Yu, D.H.; Sun, T. Environmental regulation, skill premium and international competitiveness of manufacturing industry. *China Ind. Econ.* **2017**, *5*, 35–53.
88. MacKinnon, D.P.; Krull, J.L.; Lockwood, C.M. Equivalence of the mediation, confounding and suppression effect. *Prev. Sci.* **2000**, *1*, 173–181. [CrossRef]

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