



Green Finance Pilot Policies and Environmental Governance: Empirical Evidence Based on Prefecture-Level Cities

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Abstract

- This research delves into the mechanisms and impacts of green finance pilot policies on regional environmental governance.
- Utilizing panel data from 287 prefecture-level cities across China from 2012 to 2021,
- Conducting a **PSM-DID** model, and passes the parallel trend test. It verifies the **mediating effect of urban innovation levels** and conducts a **heterogeneity analysis based on the geographical location** of cities.
- Green finance pilot policies have **significantly positive effect** on regional environmental governance capabilities in pilot cities.

Data and Method

- E_level: regional industrial soot emissions (in tons) *Dependent Variable*.
- Policy: Dummy variable for green finance pilot policy constituted by interaction term with time dummy variable *Independent Variable*.
- Other Variables: *Control Variables*.
- The implementation of this policy began in 2017.
- Pilot districts: 7

Variable Name	Observations	Mean	Variance	Min	Max
E_level	2870	9.392	1.279	2.398	15.458
treat	2870	0.028	0.165	0	1
post	2870	0.5	0.5	0	1
Policy	2870	0.014	0.117	0	1
GDP	2870	16.572	0.943	13.388	19.541
T_level	2868	8.598	1.693	0	12.547
Ind_structure	2870	42.677	15.123	0.15	83.43
finance	2870	16.902	1.014	14.582	20.794
EDU	2870	13.168	0.731	9.932	16.082
foreign	2840	13.455	2.164	4.605	19.052
NOX	2870	9.383	1.13	3.367	12.777
I_level	2868	11.603	2.092	0	16.75
Ins_HC	2870	44.969	10.765	10.68	87.96

Table 1: Descriptive Stats.

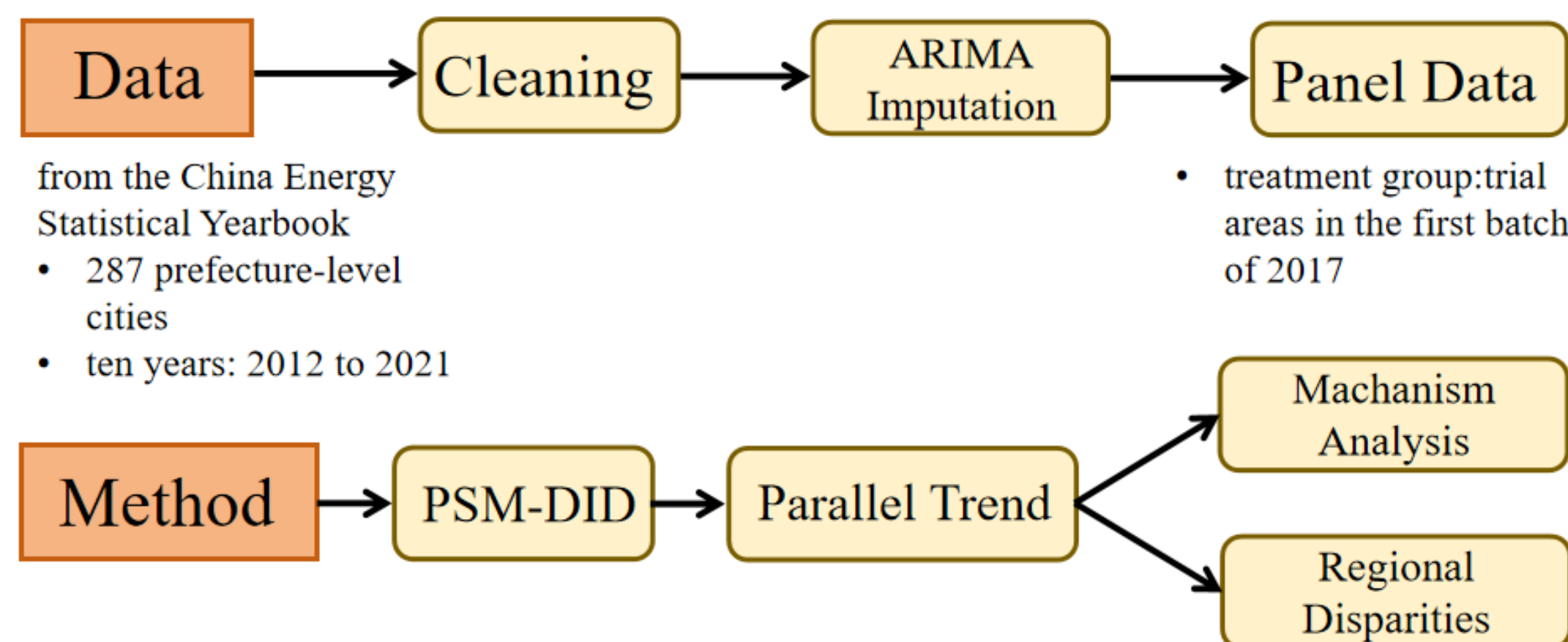


Figure 1: Tech Process

PSM-DID Estimation

$$E_level_{it} = \beta_0 + \beta_1 treat_i + \beta_2 post_t + \beta_3 policy_{it} + \beta_4 X_{it} + \mu_i + \varphi_t + \varepsilon_{it}$$

Variables	E_level (2)
Policy	0.233* (0.125)
GDP	-0.020 (0.091)
T_level	0.052** (0.022)
Ind_structure	0.005* (0.003)
finance	-0.410*** (0.113)
EDU	0.198* (0.104)
foreign	-0.022 (0.024)
NOX	0.173*** (0.032)
Province fixed effects	Yes
Year fixed effects	Yes
-cons	12.071*** (2.132)
Observations	2838
R-squared	0.839
Adjusted R-squared	0.82

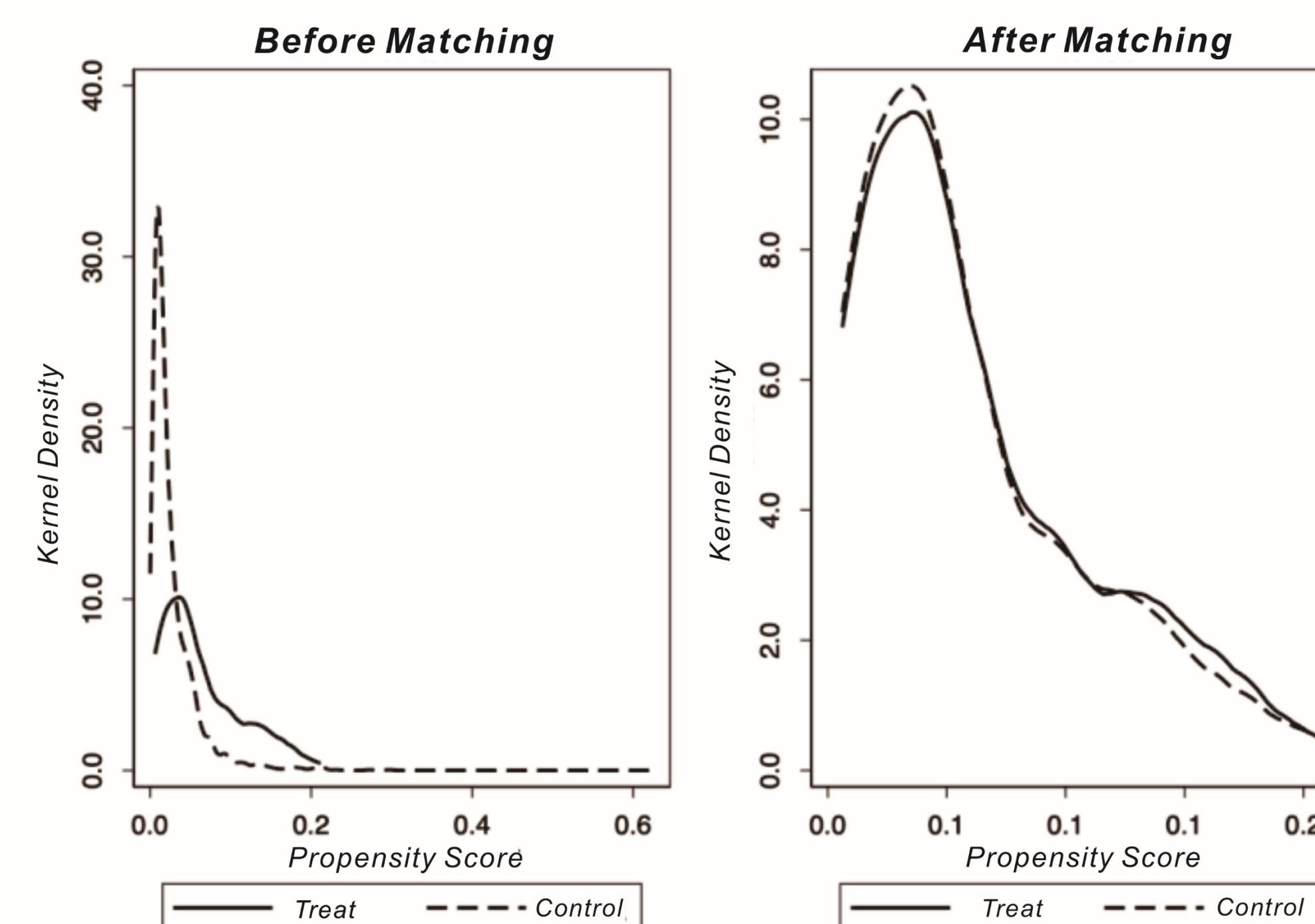


Figure 2: Propensity Score

After the treatment, the propensity scores of both groups were mainly concentrated on the left side and were distributed more consistently.

Table 2: Basic Reg. Result

Variables	E_level (1)
Policy	0.230* (0.123)
GDP	-0.033 (0.104)
T_level	0.072*** (0.028)
Ind_structure	0.006** (0.003)
finance	-0.471*** (0.157)
EDU	0.249** (0.112)
foreign	-0.004 (0.029)
NOX	0.261*** (0.041)
Province fixed effects	Yes
Year fixed effects	Yes
Constant	11.443*** (2.664)
Observations	2425
R-squared	0.837
Adjusted R-squared	0.82

Table 3: PSM-DID Result

Parallel Trend

Variables	E_level (1)
pre4	-0.201 (0.215)
pre3	-0.266 (0.215)
pre2	-0.299 (0.215)
current	-0.049 (0.214)
post1	-0.108 (0.214)
GDP	-0.017 (0.091)
T_level	0.052** (0.022)
Ind_structure	0.005* (0.003)
finance	-0.414*** (0.113)
EDU	0.207** (0.104)
foreign	-0.024 (0.024)
NOX	0.171*** (0.032)
Province fixed effects	Yes
Year fixed effects	Yes
-cons	12.009*** (2.134)
Observations	2838
R-squared	0.839
Adjusted R-squared	0.82

Table 6: Parallel Trend
Before implementing, trends between 2 groups were similar.

Mechanism

Variables	I_level (1)
Policy	0.288** (0.140)
GDP	0.277** (0.117)
T_level	0.802*** (0.031)
Ind_structure	-0.010*** (0.003)
finance	-0.073 (0.177)
EDU	-0.116 (0.126)
foreign	-0.056* (0.032)
NOX	-0.057 (0.046)
Province fixed effects	Yes
Year fixed effects	Yes
-cons	4.753 (3.009)
Observations	2425
R-squared	0.907
Adjusted R-squared	0.90

Table 4: Mechanism Result

By improving resource allocation, promoting technological innovation, raising public awareness and increasing market demand.

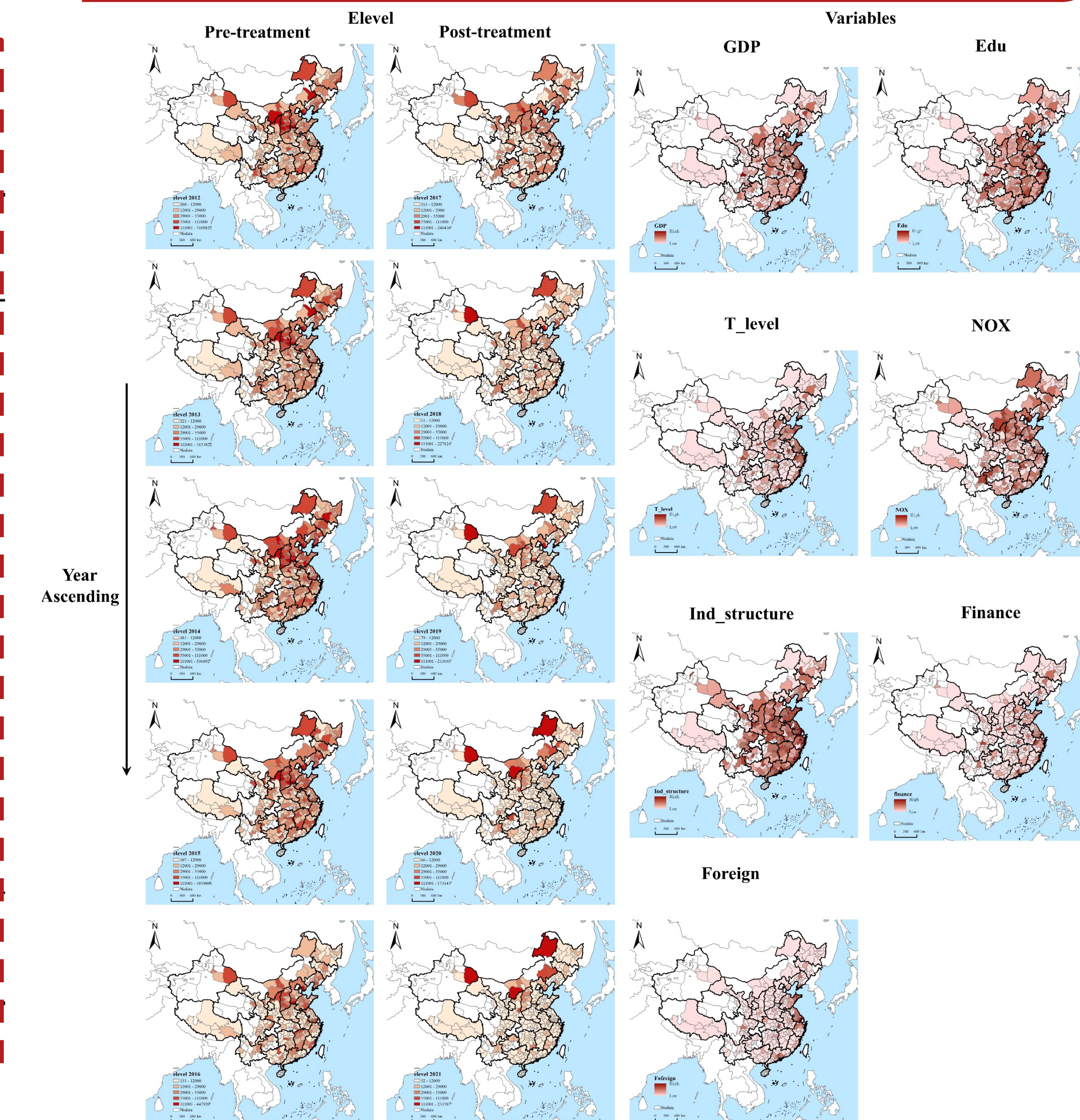
Heterogeneity Analysis

Variables	Eastern E_level	Central E_level	Western E_level
Policy	0.239 (0.162)	0.137 (0.375)	-0.003 (0.202)
GDP	0.397*** (0.152)	-0.893*** (0.177)	0.694** (0.278)
T_level	-0.031 (0.043)	0.094* (0.053)	0.068 (0.050)
Ind_structure	0.003 (0.004)	0.010* (0.006)	0.002 (0.006)
finance	-0.231 (0.199)	0.246 (0.348)	-0.583* (0.330)
EDU	0.153 (0.155)	0.744*** (0.212)	-0.225 (0.233)
foreign	-0.051 (0.043)	-0.173*** (0.066)	0.074 (0.047)
NOX	0.320*** (0.053)	0.297*** (0.075)	-0.060 (0.094)
Province fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
-cons	2.508 (3.871)	8.693* (4.771)	9.665 (5.950)
Observations	959	932	534
R-squared	0.900	0.790	0.822
Adjusted R-squared	0.89	0.76	0.79

Table 5: Hetetrogeneity (Location)

Due to the unique characteristics of the regions, the strength of policy implementation, the influence of mediating effects, or the impact of moderating variables.

Explanatory Variable Visual



Conclusion

- The green finance pilot policies **have significantly enhanced regional environmental governance** capabilities in the pilot cities.
- The green finance pilot policies **enhance regional environmental governance by improving urban innovation levels**.
- The green finance pilot **policies show no heterogeneous effects across different geographic regions** in China.

Reference & Acknowledgements

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