Supplementary Material

The Impact of New Ambient Air Quality Standards on Green Total Factor Energy Efficiency: Evidence from an Environmental Information Disclosure Policy in China

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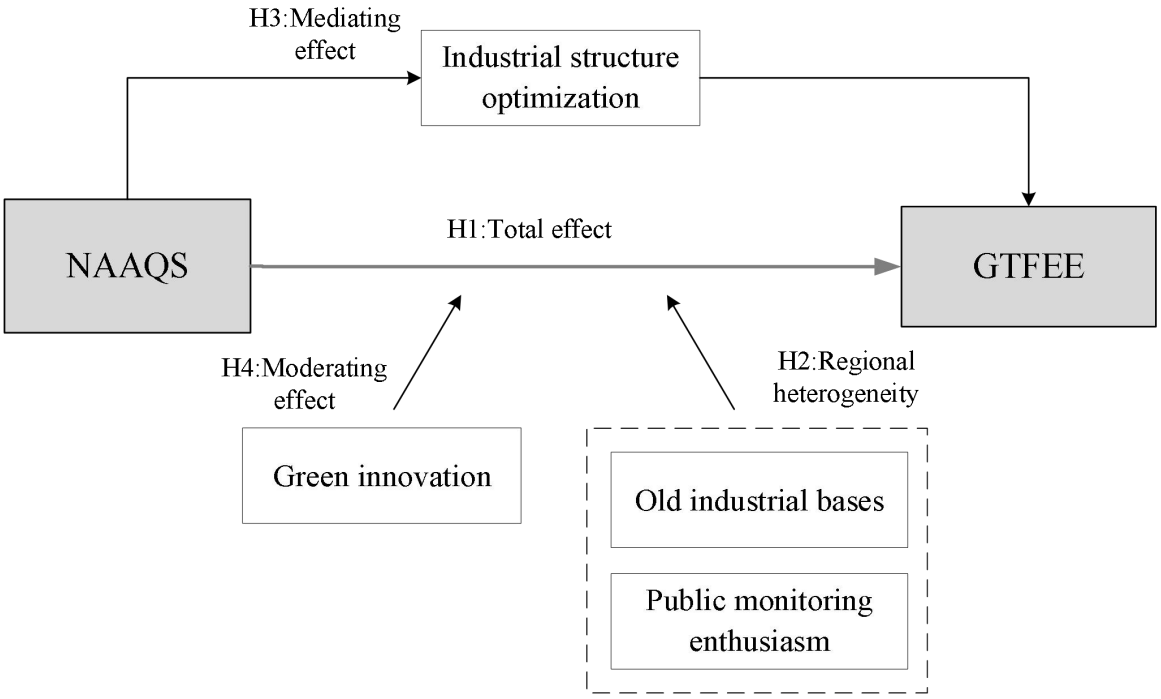
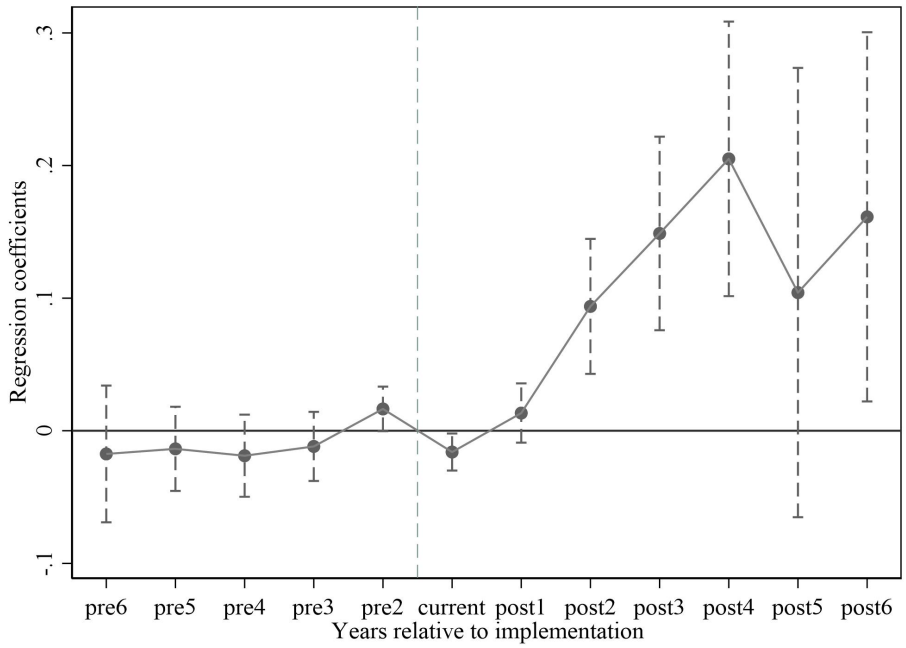
1 Supplementary Figures and Tables

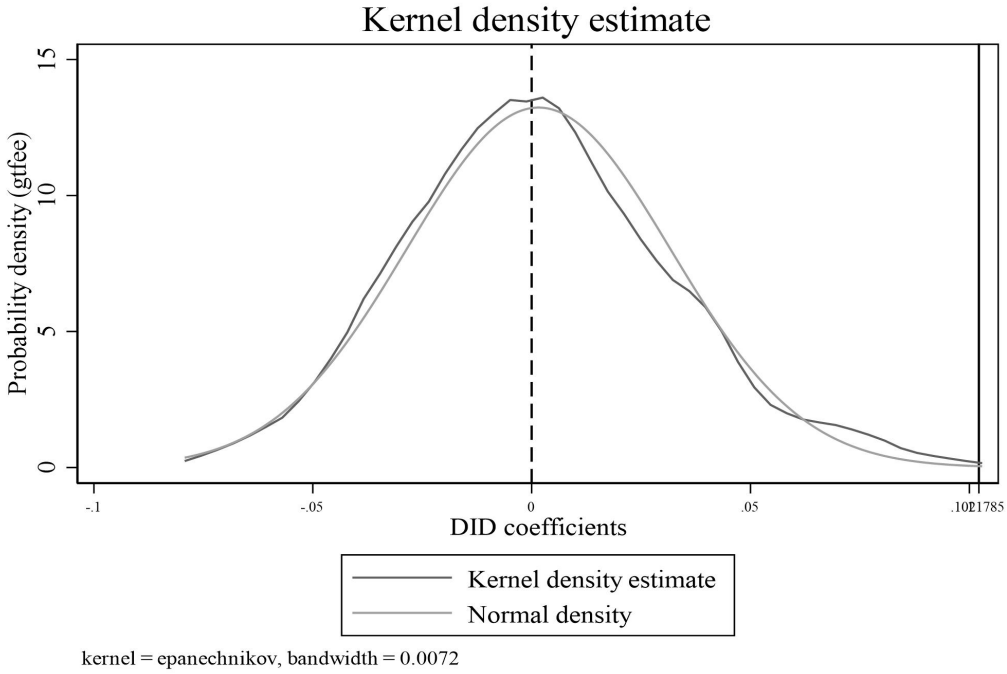
1.1 Supplementary Figures



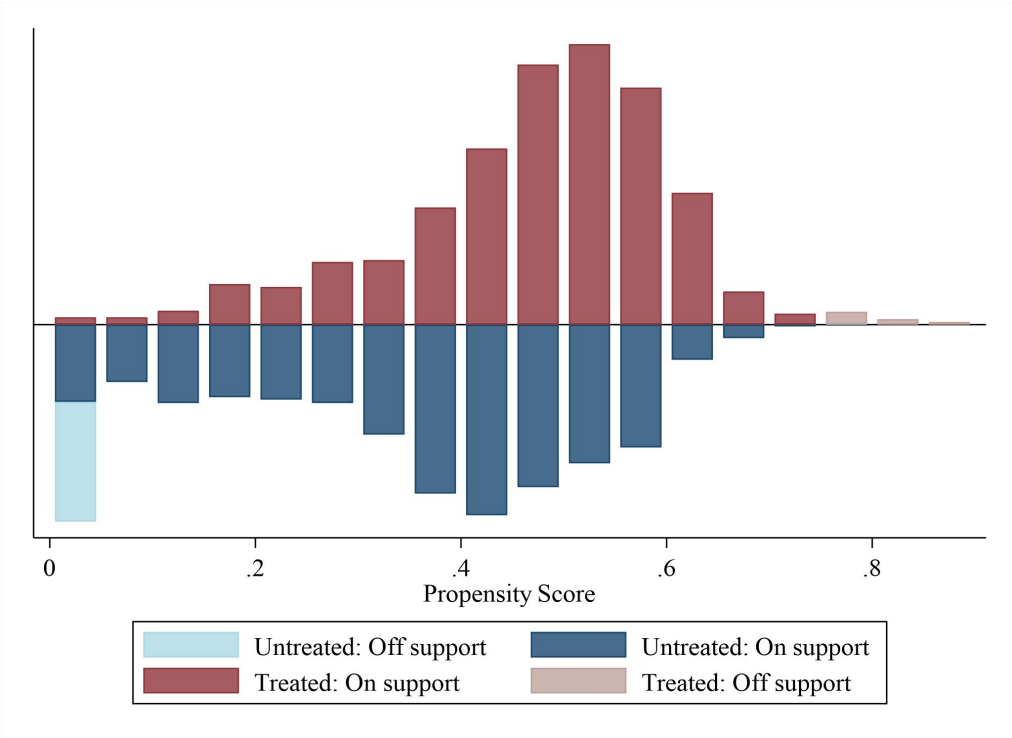
Supplementary Figure 1. Theoretical mechanism diagram



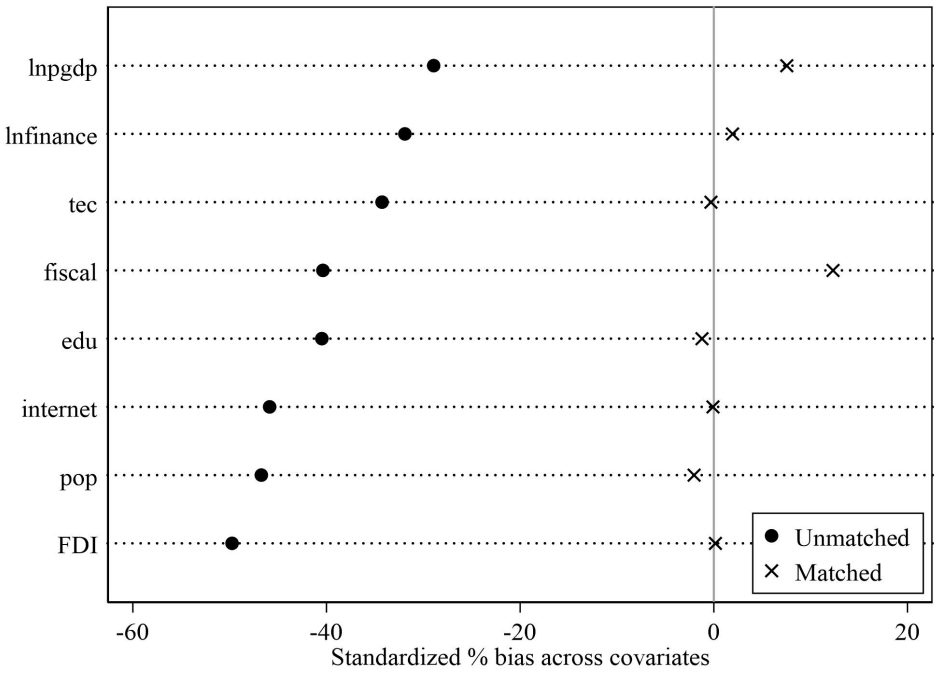
Supplementary Figure 2. Parallel trend test and policy dynamic effects.



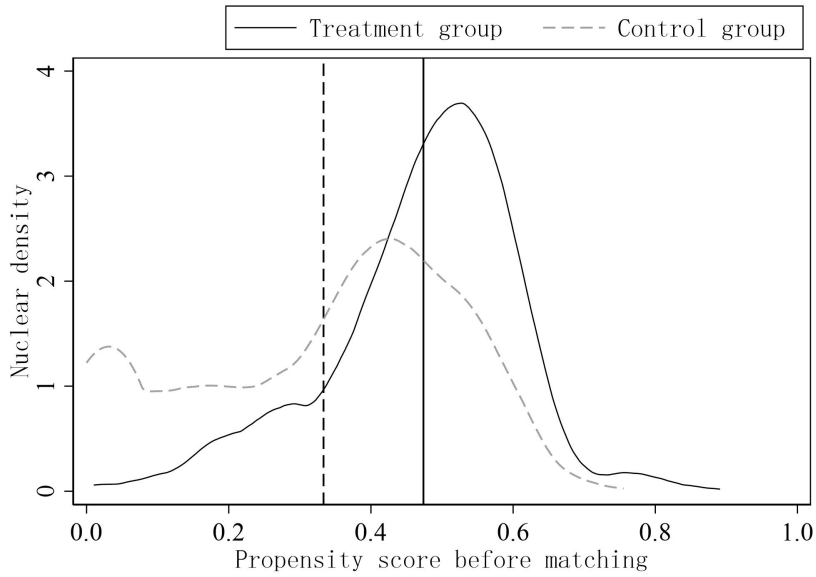
Supplementary Figure 3. Empirical cumulative distribution of placebo test coefficients.



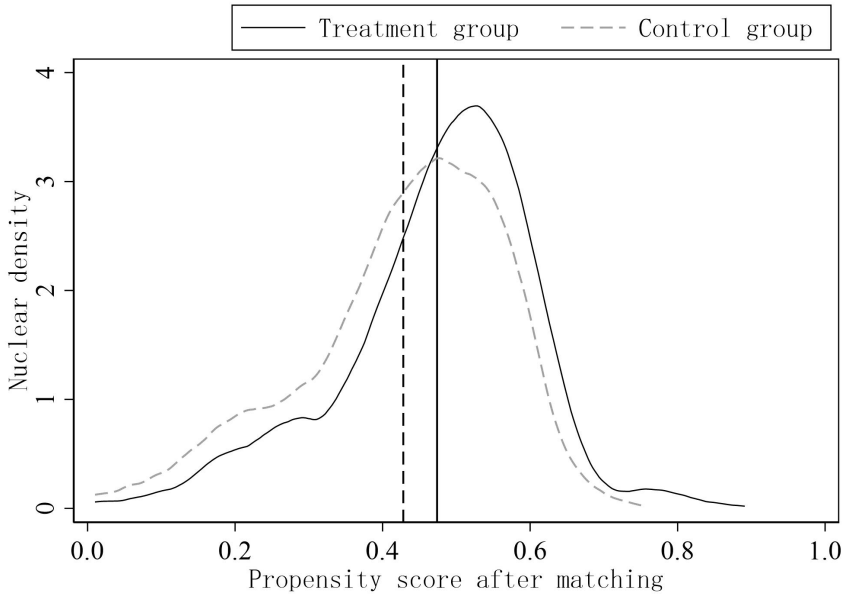
Supplementary Figure 4. The propensity score of treatment group and control group.



Supplementary Figure 5. The result of balance test



Supplementary Figure 6. Kernel density after propensity score matching.



Supplementary Figure 7. Kernel density after propensity score matching.

1.2 Supplementary Tables

Supplementary Table 1. Selection of Super-EBM measurement indicators.

Category	Meaning	Indicators
Inputs	Labor	Number of employees in urban units at the end of the period
	Capital	Fixed asset investment adjusted for capital stock
	Energy	Total city energy consumption
Desired output	GDP	Deflated regional GDP
Undesired outputs	Industrial waste	Industrial fume and dust emissions Industrial sulfur dioxide emissions Industrial wastewater discharge
	Carbon Dioxide	Urban CO2 emissions

Supplementary Table 2. Descriptive statistics of variables.

VARIABLES	Obs	Mean	Std. Dev	Min	Max
GTFEE	4,230	0.971	0.733	0.013	14.715
did	4,230	0.142	0.349	0	1
pop	4,230	442.177	311.998	17.22	3,416
edu	4,230	0.051	0.076	0.000	1.136
tec	4,230	0.008	0.029	0.000	0.555
internet	4,230	75.791	137.842	0.024	5,174
lnpgdp	4,230	0.865	0.799	-1.417	3.648
lnfinance	4,230	10.161	0.461	8.542	12.654
fiscal	4,230	0.472	0.229	0.0256	1.541
fdi	4,230	0.051	0.123	0.000	2.059

Supplementary Table 3. Baseline regression results.

	(1)	(2)	(3)	(4)	(5)
			GTFEE		
did	0.0665**	0.0551**	0.0174	0.0528**	0.1022***
	(0.0293)	(0.0263)	(0.0782)	(0.0265)	(0.0274)
pop		0.0002	-0.0001	-1.86e-07	0.0003
lnpgdp		0.1035***	0.1539***	0.0956***	0.3236***
tec		0.6599	-0.2729	0.6588	0.7019
edu		0.6634	1.6203***	0.7373	1.0370**
internet		-0.0002	0.0001	-0.0002	0.0006
lnfinance		-0.3629***	-0.1373*	-0.3491***	-0.1682***
fiscal		0.2816***	-0.1330	0.2640***	0.0650
FDI		-0.1371	-0.2961	-0.1317	-0.2737
_cons	0.9617***	4.2992***	2.2813***	4.2700***	2.1701***
Year fixed effects	Yes	No	Yes	No	Yes
City fixed effects	Yes	Yes	No	No	Yes
Observations	4230	4200	4200	4200	4200
R-squared	0.8330	0.8334	0.0399	0.0235	0.8419

*Standard errors are in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

Supplementary Table 4. PSM-DID regression results.

	Full sample matching		Pre-matching
	(1)	(2)	(3)
	Samples with non-null weights	Samples satisfying the common support hypothesis	
did	0.0629**	0.0815***	0.0733***
	(2.1920)	(3.1622)	(0.0259)
Covariates	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes
Observations	2710	3972	2946
R-squared	0.8087	0.8395	0.6829

*Standard errors are in parentheses, *** p< 0.01, ** p< 0.05, * p< 0.1*

Supplementary Table 5. DID regression results with complementary weather factors.

	(1) GTFEE
did	0.1007***
	(0.0281)
AR	-0.0006*
	(0.0003)
AP	0.0007
	(0.0031)
AW	0.0178
	(0.0537)
AT	-0.0351**
	(0.0142)
Other covariates	Yes
Year fixed effects	Yes
City fixed effects	Yes
Observations	4200
R-squared	0.8421

*Standard errors are in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

Supplementary Table 6. Regression results for instrumental variables.

	(1) Phase I	(2) Phase II
venticoe*post	0.0003*** (0.0000)	
did		0.1589*** (0.0299)
Covariates	Yes	Yes
Year fixed effects	Yes	Yes
City fixed effects	Yes	Yes
Observations	4200	4200
Pseudo R^2	0.6513	0.1097

*Standard errors are in parentheses; *** p< 0.01, ** p< 0.05, * p< 0.1*

Supplementary Table 7. Heterogeneity analysis of the role of NAAQS energy efficiency improvement based on industrial base type.

	(1) Old industrial base	(2) Non-Old Industrial Base
did	-0.0244	0.1813***
	(0.0354)	(0.0391)
_cons	3.1571***	1.7114*
	(1.1210)	(0.8694)
Covariates	Yes	Yes
Year fixed effects	Yes	Yes
City fixed effects	Yes	Yes
Observations	1775	2425
R-squared	0.6081	0.8693

*Standard errors are in parentheses, *** p< 0.01, ** p< 0.05, * p< 0.1*

Supplementary Table 8. Heterogeneity analysis of the role of NAAQS in energy efficiency improvement based on public monitoring activism.

	(1) $eword$=1	(2) $eword$=0
did	0.0941*	0.1096***
	(0.0495)	(0.0304)
_cons	2.3104**	2.3577***
	(1.1048)	(0.8948)
Covariates	Yes	Yes
Year fixed effects	Yes	Yes
City fixed effects	Yes	Yes
Observations	1803	2397
R-squared	0.5963	0.8722

*Standard errors are in parentheses, *** p< 0.01, ** p< 0.05, * p< 0.1*

Supplementary Table 9. The mediating effect of industrial structure optimization.

	(1) Ind2
did	-1.1436**
	(0.5438)
_cons	1.1272
	(11.2467)
Covariates	Yes
Year fixed effects	Yes
City fixed effects	Yes
Observations	4200
R-squared	0.9018

*Standard errors are in parentheses, *** p< 0.01, ** p< 0.05, * p< 0.1*

Supplementary Table 10. The moderating effect of green innovation.

	(1) Green Innovation
did*Moderator$_i$	0.1422***
	(0.0187)
did	0.0897***
	(0.0268)
Covariates	Yes
Year fixed effects	Yes
City fixed effects	Yes
Observations	4200
R-squared	0.8431

*Standard errors are in parentheses, *** p< 0.01, ** p< 0.05, * p< 0.1*