

# 1 Appendix A Supplementary information

## 2 Appendix 1. The measurement and calibration of the outcome variables with antecedent variables.

	<b>Variables</b>	<b>Measurement</b>	<b>Skewness</b>	<b>Calibration anchors</b>	<b>Calibration principle</b>
Outcome variable	Industrial pollution emission flexibility	$\frac{\Delta SO_2(t)}{SO_2(t)} / \frac{\Delta GDP(t)}{GDP(t)}$ Where $\Delta SO_2(t) = SO_2(t) - SO_2(t - 1)$ , $\Delta GDP(t) = GDP(t) - GDP(t - 1)$ . $SO_2$ represents industrial $SO_2$ emissions in each region, GDP represents industrial added value in each region, and $t$ represents the year $t$ .	/	0, 0.33, 0.67, 1	Indirect calibration
	Industrial CO <sub>2</sub> Emission flexibility	$\frac{\Delta CO_2(t)}{CO_2(t)} / \frac{\Delta IVA(t)}{IVA(t)}$ Where $\Delta CO_2(t) = CO_2(t) - CO_2(t - 1)$ , $\Delta IVA(t) = IVA(t) - IVA(t - 1)$ . $CO_2$ represents industrial CO <sub>2</sub> emissions in each region, $IVA$ represents industrial added value in each region, and $t$ represents the year $t$ .	/	0, 0.33, 0.67, 1	Indirect calibration
Policy instrument	Regulatory instrument	Percentage of regulatory instruments out of the total number of instruments in the same year in each region.	1.03	0.21, 0.3301, 0.45	Direct calibration
	Market instrument	Percentage of market instruments out of the total number of instruments in the same year in each region.	3.12	0, 0.001, 0.14	Direct calibration
	Technology adoption subsidy instrument	Percentage of technology adoption subsidy instruments out of the total number of instruments in the same year in each region.	0.09	0, 0.2901, 0.5	Direct calibration
	Independent Innovation support instrument	Percentage of independent innovation support instruments out of the total number of instruments in the same year in each region.	2.00	0, 0.001, 0.125	Direct calibration

social conditions	Information provision instrument	Percentage of information provision instruments out of the total number of instruments in the same year in each region.	2.51	0.09, 0.1701, 0.25	Direct calibration
	Environment problem severity	The intensity of industrial sulfur dioxide emissions in each region in the current year. The intensity of industrial carbon dioxide emissions in each region in the current year.	2.18	0, 0.001, 0.02	Direct calibration
			1.23	1.40, 2.4101, 3.97	Direct calibration
	Environment goal priority	A comparison of the governance goals set by local governments and the central government for carbon abatement in the Five-Year Plan. When the individual goal set by the local government is higher than that set by the central government, a score of 1 is given; a score of 0.4 is given when the goal is equal to that of the central government; a score of 0 is given when the goal is lower than that of the central government. The scores of individual goals are calculated separately and then added together to calculate the total score.	/	0, 0.33, 0.67, 1	Indirect calibration
	Enterprise innovation motivation	Investment in R&D per unit of output value of industrial enterprises above a certain scale.	1.06	0.01, 0.021, 0.03	Direct calibration

Appendix 2a. Truth table of configuration solutions leading to high pollution reduction performance.

Regulatory	Market	Adoption Subsidy	Innovation support	Information provision	Innovation Investment	pollution Severity	Goal Priority	number	Performance	Raw Consist.	PRI Consist.	SYM Consist
0	1	1	0	0	1	0	0	2	1	0.975	0.973	0.973
0	1	0	1	0	1	0	0	6	1	0.975	0.974	0.974
1	1	1	0	1	0	1	0	2	1	0.974	0.968	0.968
0	0	1	1	1	1	0	0	2	1	0.973	0.970	0.970
0	1	1	1	1	1	0	0	2	1	0.972	0.971	0.971
1	0	1	0	0	0	1	1	5	1	0.971	0.968	0.968
0	1	0	1	0	1	0	1	2	1	0.971	0.969	0.969
1	1	1	1	1	0	1	0	2	1	0.971	0.966	0.966
0	1	0	1	1	1	0	0	2	1	0.969	0.967	0.967
1	1	0	1	0	1	0	0	5	1	0.969	0.967	0.967
0	1	1	1	1	0	0	0	2	1	0.968	0.965	0.965
0	1	1	1	0	0	0	0	2	1	0.968	0.965	0.965
1	1	0	0	0	1	0	0	6	1	0.968	0.965	0.965
0	1	1	0	0	1	0	1	3	1	0.967	0.965	0.965
0	1	0	0	1	0	0	0	2	1	0.966	0.958	0.958
1	1	1	0	0	0	1	0	2	1	0.965	0.958	0.958
1	1	0	0	1	0	1	0	2	1	0.964	0.952	0.952
0	1	0	0	1	0	1	0	2	1	0.964	0.954	0.954
1	0	1	1	0	0	1	0	2	1	0.963	0.956	0.956
0	0	1	1	1	1	1	1	2	1	0.962	0.957	0.957

1	0	1	0	1	1	0	0	2	1	0.961	0.957	0.957
1	1	1	1	0	0	1	1	4	1	0.959	0.952	0.958
0	1	1	1	0	0	1	0	2	1	0.957	0.952	0.952
1	1	1	1	0	1	0	1	2	1	0.954	0.950	0.950
0	1	1	1	1	1	0	1	3	1	0.954	0.950	0.961
1	0	0	0	0	1	0	0	3	1	0.952	0.948	0.948
1	1	0	0	1	1	0	0	4	1	0.951	0.946	0.946
1	0	1	0	1	1	1	0	2	1	0.951	0.944	0.944
0	0	1	1	0	1	0	0	2	1	0.950	0.946	0.946
0	1	0	0	1	1	0	0	3	1	0.938	0.932	0.932
0	0	1	0	1	0	1	0	4	1	0.932	0.918	0.918
0	0	0	1	0	0	1	0	3	1	0.932	0.916	0.916
1	0	0	0	0	1	1	0	3	1	0.929	0.919	0.919
1	0	0	0	1	1	0	0	6	1	0.926	0.921	0.921
0	1	1	1	0	1	0	0	3	1	0.916	0.911	0.911
1	0	1	0	0	0	1	0	4	1	0.916	0.905	0.905
0	0	1	1	0	0	1	0	2	1	0.916	0.897	0.897
0	0	0	1	1	0	1	0	2	1	0.910	0.888	0.888
0	0	1	0	1	1	0	0	3	1	0.906	0.897	0.897
0	1	0	0	0	1	0	0	3	1	0.906	0.896	0.896
1	0	1	0	1	0	1	0	3	1	0.902	0.882	0.901
1	0	1	0	0	1	1	1	2	1	0.899	0.883	0.884
1	0	0	0	1	0	0	0	2	1	0.897	0.880	0.880

0	1	1	1	1	0	1	1	3	1	0.895	0.886	0.886
0	1	0	1	0	0	1	0	4	1	0.893	0.877	0.896
0	0	1	1	1	1	0	1	2	1	0.887	0.874	0.874
1	0	0	0	1	1	1	0	2	1	0.887	0.868	0.868
1	0	0	0	0	0	1	0	6	1	0.885	0.866	0.866
0	0	0	0	1	1	0	0	3	1	0.880	0.870	0.870
0	0	0	0	1	0	1	0	6	1	0.866	0.828	0.835
0	0	1	1	1	0	1	0	3	1	0.863	0.830	0.830
1	0	0	0	1	0	1	0	2	1	0.861	0.817	0.817
1	0	0	0	1	0	1	1	2	0	0.829	0.776	0.822
0	0	0	0	0	0	1	0	3	0	0.815	0.778	0.778

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8 Appendix 2b. Truth table of configuration solutions leading to high CO<sub>2</sub> abatement performance.

Regulatory	Market	Adoption Subsidy	Innovation support	Information provision	Innovation Investment	pollution Severity	Goal Priority	Number	Performance	Raw consist.	PRI consist.	SYM consist
0	1	1	0	0	1	0	0	2	1	0.961	0.879	0.879
0	1	0	0	0	1	0	0	2	1	0.947	0.825	0.825
1	1	1	1	0	0	0	1	2	1	0.939	0.770	0.770
1	1	1	1	0	1	0	1	2	1	0.940	0.769	0.769
1	1	1	0	0	0	1	0	2	1	0.955	0.763	0.763
1	1	1	0	1	0	1	0	2	1	0.941	0.757	0.761
0	0	0	1	0	0	1	0	2	1	0.935	0.748	0.748
0	0	1	1	0	0	1	0	2	1	0.946	0.735	0.751
1	0	1	0	0	0	1	1	5	1	0.920	0.733	0.863
0	0	1	1	1	1	0	1	3	1	0.926	0.728	0.728
0	1	0	1	0	1	0	0	7	1	0.890	0.723	0.723
1	1	0	0	0	0	1	0	2	1	0.931	0.707	0.723
0	0	1	1	0	1	0	0	2	1	0.936	0.700	0.756
0	0	1	1	1	1	0	0	2	1	0.940	0.692	0.692
1	0	1	0	0	1	0	1	2	1	0.929	0.691	0.809
1	1	0	0	0	1	1	0	2	1	0.920	0.690	0.690
0	1	1	1	1	1	0	1	3	1	0.914	0.690	0.762
1	0	1	1	0	0	1	0	2	1	0.938	0.677	0.692

1	0	0	0	1	1	0	0	4	1	0.877	0.673	0.679
1	0	1	0	0	0	1	0	5	1	0.905	0.663	0.679
1	1	0	0	0	1	0	0	4	1	0.886	0.662	0.662
1	1	0	1	0	1	0	0	3	1	0.873	0.652	0.657
0	0	0	0	1	1	0	0	3	1	0.874	0.652	0.652
1	1	1	1	1	0	0	0	2	1	0.902	0.651	0.651
0	1	1	1	1	0	0	0	3	1	0.904	0.635	0.635
0	1	1	0	0	1	0	1	3	1	0.842	0.633	0.700
0	0	1	1	1	0	1	0	4	1	0.903	0.626	0.635
1	0	1	0	1	1	0	0	2	1	0.889	0.620	0.620
0	1	0	1	1	1	1	0	2	1	0.893	0.614	0.614
0	0	0	0	1	0	0	0	2	1	0.872	0.611	0.611
1	0	0	0	0	1	0	0	2	1	0.876	0.604	0.604
0	1	1	1	1	0	1	1	3	1	0.870	0.603	0.664
1	0	0	0	0	0	1	0	6	1	0.833	0.597	0.603
0	1	1	1	0	0	0	0	3	1	0.888	0.583	0.583
1	1	0	0	1	0	1	0	2	1	0.892	0.572	0.572
0	1	0	0	1	1	0	0	3	1	0.845	0.568	0.568
0	1	0	1	0	0	1	0	4	1	0.856	0.565	0.602
0	1	0	1	0	1	0	1	2	1	0.866	0.564	0.564
1	0	0	0	1	0	1	0	4	1	0.846	0.541	0.541
0	1	1	1	1	1	0	0	2	1	0.878	0.540	0.540
0	1	1	1	0	1	0	0	3	1	0.872	0.533	0.538

1	0	0	0	1	1	1	0	4	1	0.827	0.532	0.532
1	0	0	0	1	0	1	1	2	1	0.819	0.526	0.581
0	0	1	0	1	1	0	0	3	1	0.820	0.495	0.530
1	1	0	0	1	1	0	0	2	1	0.806	0.491	0.491
1	1	0	0	1	1	1	0	2	1	0.856	0.489	0.489
1	1	1	1	0	0	1	1	2	1	0.870	0.489	0.503
0	1	0	0	1	0	0	0	3	1	0.845	0.479	0.479
1	0	0	0	0	1	1	0	4	1	0.811	0.452	0.452
1	1	0	1	0	1	1	0	2	1	0.825	0.448	0.448
0	0	0	0	1	0	1	0	5	0	0.782	0.440	0.486
0	1	0	0	1	0	1	0	2	0	0.821	0.417	0.417
0	0	1	0	1	0	1	0	3	0	0.810	0.404	0.419
1	0	1	0	1	1	1	0	2	0	0.827	0.374	0.374
1	0	1	0	1	0	1	0	3	0	0.838	0.369	0.379
0	0	0	0	0	0	1	0	3	0	0.734	0.330	0.330
0	0	0	0	1	1	1	0	2	0	0.775	0.304	0.304

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Appendix 3. Policy configurations for high pollution reduction performance.

Type	H1	H2		H3			H4		
		H2a	H2b	H3a	H3b	H3c	H4a	H4b	H4c
RE	●		⊗	⊗	⊗	⊗		⊗	⊗
MA		⊗	●		●	●	●	●	●



SU	⊗		⊗	●	⊗	●	⊗	⊗	●
IN	⊗	⊗	⊗	●	●	●			⊗
IF		●	●		⊗		⊗		⊗
SE	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
PR	⊗	⊗	⊗	⊗		⊗	⊗	⊗	
IV	●	●		●	●		●	●	●
Consistency	0.944	0.889	0.944	0.940	0.975	0.934	0.959	0.945	0.971
Raw Coverage	0.115	0.086	0.060	0.086	0.077	0.073	0.120	0.114	0.049
Unique Coverage	0.019	0.014	0.004	0.008	0.006	0.004	0.012	0.009	0.018

Type	H5		H6	H7		H8		
	H5a	H5b	H6a	H7a	H7b	H8a	H8b	H8c
RE	●	●	●	⊗	⊗	●	●	●
MA	●	⊗	●	⊗	●		⊗	⊗
SU	●	⊗	●	●	●	●	⊗	●
IN		⊗	●	●	●	⊗	⊗	⊗
IF	●	●	⊗	●	●			⊗
SE	●	●	●		●	●	●	●
PR	⊗	⊗	●	●	●	⊗	⊗	●
IV	⊗	⊗	⊗	●	⊗	⊗		
Consistency	0.977	0.858	0.959	0.903	0.895	0.916	0.881	0.936
Raw Coverage	0.061	0.046	0.039	0.045	0.038	0.110	0.074	0.048
Unique Coverage	0.003	0.006	0.007	0.003	0.005	0.026	0.018	0.015
Overall Solution Coverage	0.592							

Overall Solution  
Consistency 0.902

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- 12 Note: ●=the presence of core condition; ⊗=the absence of core condition; ●=the presence of peripheral condition; ⊗=the absence of peripheral condition; Blank=the condition is optional and  
13 redundant. RE=regulatory instrument; MA=market instrument; SU=subsidy instrument; IN=independent innovation support instrument; IF=information provision instrument; SE=problem  
14 severity; IV=environmental goal priority; PR=enterprise innovation motivation.

Appendix 4. Policy configurations for high CO<sub>2</sub> abatement performance.

Type	S1				S2		S3			S4	S5	S6
	S1a	S1b	S1c	S1d	S2a	S2b	S3a	S3b	S3c			
RE	⊗	⊗	⊗	⊗	●	●	●	●	●	●	●	●
MA		⊗	●	●	⊗	⊗	⊗			●	●	●
SU	⊗	●	⊗	●	●	●	⊗	⊗	⊗	⊗	●	
IN	●	●	●	●			⊗	⊗	⊗		●	⊗
IF	⊗		●	●	⊗	⊗	●			⊗	⊗	
SE	●	●	●	●	●	●	●	●				●
IV	⊗	⊗	●	⊗	⊗	⊗	⊗		●	●	⊗	⊗
PR	⊗	⊗	⊗	●	⊗			⊗	⊗	⊗	●	⊗
Consistency	0.888	0.906	0.893	0.870	0.916	0.882	0.819	0.817	0.825	0.858	0.900	0.926
Raw coverage	0.091	0.103	0.053	0.042	0.119	0.105	0.077	0.163	0.171	0.110	0.056	0.103
Unique coverage	0.028	0.024	0.007	0.008	0.009	0.014	0.009	0.018	0.007	0.007	0.004	0.014
Type	S7				S8					S9	S10	
	S7a	S7b	S7c	S7d	S8a	S8b	S8c	S8d	S8e			
RE	⊗		⊗	⊗	⊗		⊗	⊗	⊗	●	●	
MA	●	⊗	●			●	●		●	⊗	●	
SU			●	⊗	●	●	●	●	⊗	●	●	
IN		⊗	⊗	⊗	●	●	●	●	●	⊗	●	
IF	⊗	●	⊗	●		●		●	⊗	⊗	⊗	
SE	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	
IV	●	●	●		●	⊗		●	●	●		

PR	⊗	⊗		⊗	⊗	⊗	⊗			●	●
Consistency	0.905	0.864	0.866	0.848	0.879	0.910	0.887	0.879	0.854	0.929	0.949
Raw coverage	0.125	0.114	0.063	0.110	0.122	0.078	0.107	0.118	0.093	0.047	0.066
Unique coverage	0.009	0.011	0.017	0.014	0.013	0.005	0.007	0.021	0.023	0.007	0.005
Overall Solution Coverage	0.720										
Overall Solution Consistency	0.833										

16 Note: ●=the presence of core condition; ⊗=the absence of core condition; ●=the presence of peripheral condition; ⊗=the absence of peripheral condition; Blank=the condition is optional and  
 17 redundant. RE=regulatory instrument; MA=market instrument; SU=subsidy instrument; IN=independent innovation support instrument; IF=information provision instrument; SE=problem  
 18 severity; IV=environmental goal priority; PR=enterprise innovation motivation.

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Appendix 5. Policy configurations for high pollution reduction performance (The frequency threshold is set at 4) .

Type	H1			H2	H3			H4
	H1a	H1b	H1c	H2a	H3a	H3b	H3c	
RE	●	⊗	⊗	●	●		●	●
MA	⊗	●	⊗	●	●	●		⊗
SU		⊗	●	●	⊗	⊗	⊗	●
IN	⊗	●	⊗	●	⊗	●	⊗	⊗
IF	⊗	⊗	●	⊗		⊗	●	⊗
SE	⊗	⊗	⊗	⊗	●	●	●	⊗
IV	●	●	●	●	⊗	⊗	⊗	●
PR	⊗	⊗	⊗	●	⊗	⊗	⊗	
Consistency	0.079	0.048	0.063	0.039	0.071	0.090	0.081	0.078

Raw coverage	0.014	0.012	0.033	0.013	0.015	0.045	0.027	0.014
Unique coverage	0.904	0.893	0.932	0.959	0.956	0.974	0.931	0.926
Overall Solution Coverage	0.297							
Overall Solution Consistency	0.935							

22 Note: ●=the presence of core condition; ⊗=the absence of core condition; ●=the presence of peripheral condition; ⊗=the absence of peripheral condition; Blank=the condition is optional and  
23 redundant. RE=regulatory instrument; MA=market instrument; SU=subsidy instrument; IN=independent innovation support instrument; IF=information provision instrument; SE=problem  
24 severity; IV=environmental goal priority; PR=enterprise innovation motivation.

25 Appendix 6. Policy configurations for high CO<sub>2</sub> abatement performance (The frequency threshold is set at 4) .

Type	S1		S2		S3	S4
	S1c	S1d	S2a	S2b		
RE	●	⊗	⊗	⊗	●	●
MA	●	●	⊗	●	⊗	⊗
SU	⊗	⊗	●	⊗	⊗	●
IN	⊗	●		●	⊗	⊗
IF	⊗	⊗	●	⊗		⊗
SE	⊗	⊗	●	●	●	●
IV	⊗	⊗	⊗	⊗	⊗	
PR	●	●	⊗	⊗		⊗
Consistency	0.060	0.085	0.125	0.064	0.122	0.106
Raw coverage	0.024	0.044	0.070	0.021	0.064	0.051
Unique coverage	0.883	0.890	0.837	0.847	0.796	0.881
Overall Solution Coverage	0.371					
Overall Solution Consistency	0.828					

26 Note: ●=the presence of core condition; ⊗=the absence of core condition; ●=the presence of peripheral condition; ⊗=the absence of peripheral condition; Blank=the condition is optional and  
 27 redundant. RE=regulatory instrument; MA=market instrument; SU=subsidy instrument; IN=independent innovation support instrument; IF=information provision instrument; SE=problem  
 28 severity; IV=environmental goal priority; PR=enterprise innovation motivation.

Appendix 7. Policy configurations for high pollution reduction performance (increase the consistency level to 0.85) .

Type	H1				H2a	H2	H3		H4		H5	H6
	H1a	H1b	H1c	H1d								
RE	●		⊗		⊗	●	⊗	⊗	⊗	●	⊗	●
MA		●	●	⊗		⊗		●	●	●	⊗	⊗
SU	⊗	⊗	⊗		●		●	●	⊗	●	●	●
IN	⊗			⊗	●	⊗	●	⊗	●	●	●	⊗
IF		⊗		●		●	●	⊗	⊗	⊗	●	⊗
SE	●	●	●	●	●	●	●	●	●	●	●	
IV	⊗	⊗	⊗	⊗	⊗		⊗	⊗	⊗	⊗		●
PR	⊗	⊗	⊗	⊗	⊗	⊗				●	●	●
Consistency	0.115	0.120	0.114	0.086	0.086	0.084	0.082	0.049	0.077	0.041	0.045	0.048
Raw coverage	0.019	0.012	0.009	0.014	0.008	0.004	0.009	0.018	0.006	0.004	0.003	0.015
Unique coverage	0.944	0.959	0.945	0.889	0.940	0.937	0.931	0.971	0.975	0.954	0.903	0.936

  

Type	H7			H8				H9		H10	H11	
	H8a	H8b	H8c	H10a	H10b	H11a	H11b					
RE	⊗		⊗	●	●	●	⊗		⊗	⊗	●	●
MA			⊗	●	●	●	⊗	●	●	⊗	⊗	⊗
SU		⊗		●	●	●	●	●	●	⊗	⊗	⊗
IN	●	⊗		⊗	●	●	●	●	●	⊗	⊗	⊗
IF	⊗	●	●	●		⊗	●	⊗		●		●
SE	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗				
IV	●	●	●	●	●	●	●	●	⊗	⊗	●	

PR	⊗	⊗	⊗	⊗	⊗	●	●	●	⊗	⊗	⊗	⊗
Consistency	0.096	0.091	0.117	0.061	0.110	0.039	0.038	0.069	0.073	0.060	0.074	0.083
Raw coverage	0.016	0.009	0.026	0.003	0.026	0.007	0.005	0.007	0.004	0.004	0.018	0.007
Unique coverage	0.887	0.885	0.859	0.977	0.916	0.959	0.895	0.925	0.934	0.944	0.881	0.904
Overall Solution Coverage	0.586											
Overall Solution Consistency	0.903											

30 Note: ●=the presence of core condition; ⊗=the absence of core condition; ●=the presence of peripheral condition; ⊗=the absence of peripheral condition; Blank=the condition is optional and  
31 redundant. RE=regulatory instrument; MA=market instrument; SU=subsidy instrument; IN=independent innovation support instrument; IF=information provision instrument; SE=problem  
32 severity; IV=environmental goal priority; PR=enterprise innovation motivation.





PR	⊗	⊗	⊗	⊗	⊗	●	●	●	⊗	●
Consistency	0.139	0.105	0.072	0.123	0.094	0.043	0.044	0.063	0.103	0.045
Raw Coverage	0.045	0.024	0.006	0.043	0.005	0.006	0.010	0.018	0.017	0.004
Unique Coverage	0.883	0.921	0.901	0.916	0.934	0.878	0.875	0.869	0.886	0.890
Overall Solution Coverage	0.592									
Overall Solution Consistency	0.867									

34 Note: ●=the presence of core condition; ⊗=the absence of core condition; ●=the presence of peripheral condition; ⊗=the absence of peripheral condition; Blank=the condition is optional and  
35 redundant. RE=regulatory instrument; MA=market instrument; SU=subsidy instrument; IN=independent innovation support instrument; IF=information provision instrument; SE=problem  
36 severity; IV=environmental goal priority; PR=enterprise innovation motivation.

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39 Appendix 9. Regression Analysis of the Influence of Complex Core Conditions and Configurations on CO<sub>2</sub> abatement.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	<i>S1a</i>	<i>S1b</i>	<i>S1c</i>	<i>S1d</i>	<i>S2a</i>	<i>S2b</i>	<i>S3a</i>	<i>S3b</i>	<i>S3c</i>	<i>S4</i>	<i>S5</i>	<i>S6</i>
<b>Configuration</b>												
<i>Configuration H<sub>i</sub></i>	0.186 (1.21)	0.072 (0.40)	0.449** (2.59)	0.138 (0.70)	0.207 (1.14)	0.102 (0.85)	0.101 (0.81)	0.104 (0.90)	0.027 (0.18)	0.065 (0.34)	0.211 (1.27)	0.160 (1.09)
<b>complex core condition</b>												
<i>RE*su</i>							0.106* (-1.75)	0.113* (-1.83)	0.109* (-1.79)	0.132* (-1.82)		
<i>RE*if</i>					0.011 (-0.19)	0.017 (-0.28)				0.017 (0.24)	0.028 (-0.47)	
<i>RE*MA</i>										0.052 (0.84)	0.041 (0.69)	0.024 (0.42)

<i>Main effect</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year fixed</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Constant</i>	0.838*** (6.33)	0.857*** (6.10)	0.892*** (6.29)	0.854*** (6.26)	0.880*** (6.20)	0.876*** (6.23)	0.899*** (6.40)	0.890*** (6.33)	0.888*** (6.38)	0.869*** (6.19)	0.843*** (5.97)	0.851*** (5.98)
<i>N</i>	274	274	274	274	274	274	274	274	274	274	274	274
<i>R</i> <sup>2</sup>	0.236	0.231	0.242	0.232	0.237	0.233	0.247	0.248	0.245	0.250	0.236	0.235
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	
	<i>S7a</i>	<i>S7b</i>	<i>S7c</i>	<i>S7d</i>	<i>S8a</i>	<i>S8b</i>	<i>S8c</i>	<i>S8d</i>	<i>S8e</i>	<i>S9</i>	<i>S10</i>	
<b>Configuration</b>												
<i>Configuration H<sub>i</sub></i>	0.056 (0.36)	0.141 (0.98)	0.217 (1.04)	0.057 (0.38)	0.003 (0.02)	0.123 (0.93)	0.116 (0.98)	0.134 (1.33)	0.022 (0.18)	0.037 (0.34)	0.203 (1.49)	
<b>Complex core condition</b>												
<i>RE*su</i>												
<i>RE*if</i>						-0.123 (-0.93)			-0.016 (-0.26)		-0.028 (-0.46)	
<i>RE*MA</i>											0.035 (0.59)	
<i>Main effect</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year fixed</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Constant</i>	0.854*** (5.99)	0.837*** (5.57)	0.852*** (6.17)	0.877*** (5.73)	0.859*** (6.15)	0.858*** (6.24)	0.862*** (6.33)	0.877*** (6.38)	0.857*** (6.35)	0.867*** (6.13)	0.860*** (6.00)	
<i>N</i>	274	274	274	274	274	274	274	274	274	274	274	274
<i>R</i> <sup>2</sup>	0.231	0.234	0.236	0.231	0.230	0.232	0.233	0.234	0.230	0.231	0.236	

40 <sup>a</sup> Robust t-statistics are reported in parentheses

41 <sup>b</sup> \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

42 <sup>c</sup> RE=regulatory instrument; MA=market instrument; SU=subsidy instrument; IN=independent innovation support instrument; IF=information provision instrument; SE=problem severity;  
43 IV=environmental goal priority; PR=enterprise innovation motivation.

44 <sup>d</sup> The table reports the coefficients for configurations and complex core conditions, omitting the reporting of coefficients for individual policy instruments and individual societal context factors.

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Appendix 10. Regression analysis of the influences of the main effects and configurations on pollution reduction (**excluded the years 2008 and 2020**).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
	<i>H1</i>	<i>H2a</i>	<i>H2b</i>	<i>H3a</i>	<i>H3b</i>	<i>H3c</i>	<i>H4a</i>	<i>H4b</i>	<i>H4c</i>	<i>H5a</i>	<i>H5b</i>	<i>H6a</i>	<i>H7a</i>	<i>H7b</i>	<i>H8a</i>	<i>H8b</i>	<i>H8c</i>
<b>Configuration</b>																	
<i>H<sub>i</sub></i>	0.005*	0.047	0.106	0.028	0.221*	0.048	0.079	0.013	0.264*	0.201*	-0.439	0.11*	0.175	-0.023	0.095*	0.05	0.101
	(-0.12)	(-0.28)	(-0.85)	(-0.14)	(-1.86)	(-0.25)	(-1.57)	(-0.1)	(-1.87)	(-1.79)	(-1.29)	-1.01	-0.47	(-0.10)	-0.41	(-0.30)	(-0.81)
<b>Main effects</b>																	
<i>RE (core)</i>	0.111*	0.114**	0.105**	0.112**	0.118**	0.112**	0.107**	0.112**	0.128**	0.095*	0.136***	0.106**	0.113**	0.110**	0.095*	0.116**	0.106**
	(-1.83)	(-2.19)	(-2.06)	(-2.1)	(-2.2)	(-2.14)	(-2.09)	(-2.03)	(-2.34)	(-1.81)	(-2.6)	(-2.01)	(-2.26)	(-2.13)	(-1.92)	(-2.41)	(-2.04)
<i>MA</i>	0.067***	0.076**	0.077**	0.067**	0.054*	0.061**	0.054	0.066*	0.060**	0.046	0.076***	0.066**	0.072***	0.070**	0.062**	0.064***	0.075***
	(-2.6)	(-2.19)	(-2.45)	(-2.53)	(-1.85)	(-1.97)	(-1.35)	(-1.72)	(-2.2)	(-1.45)	(-2.92)	(-2.47)	(-2.72)	(-2.4)	(-2.04)	(-2.7)	(-2.74)
<i>SU</i>	0.133*	0.082	0.128	0.125*	0.128*	0.132*	0.146*	0.128	0.089	0.121	0.067	0.108	0.129	0.125	0.115	0.126	0.106
	(-1.69)	(-1.1)	(-1.64)	(-1.75)	(-1.65)	(-1.8)	(-1.77)	(-1.56)	(-1.16)	(-1.54)	(-0.95)	(-1.39)	(-1.63)	(-1.58)	(-1.16)	(-1.61)	(-1.33)
<i>IN (core)</i>	0.045	0.053	0.038	0.042	0.021	0.041	0.039	0.046	0.062	0.039	0.053	0.043	0.034	0.047	0.055	0.043	0.051
	(-0.89)	(-1.26)	(-0.84)	(-0.79)	(-0.4)	(-0.82)	(-0.79)	(-0.99)	(-1.34)	(-0.86)	(-1.24)	(-0.94)	(-0.63)	(-1.03)	(-1.3)	(-0.97)	(-1.15)
<i>IF (core)</i>	0	-0.002	0.008	0	0.011	0	0.011	0	0.014	-0.011	0.012	-0.002	-0.01	0	0.002	-0.002	0.003
	(-0.01)	(-0.04)	(-0.17)	((-0.01))	(-0.23)	(0)	(-0.22)	(-0.01)	(-0.28)	((-0.24))	(-0.25)	(-0.05)	(-0.18)	(-0.01)	(-0.03)	(-0.03)	(-0.07)
<i>SE (core:se)</i>	-0.291**	-0.202*	-0.296***	-0.276**	-0.270**	-0.293***	-0.302**	-0.277**	-0.236**	-0.303***	-0.167	-0.255**	-0.287**	-0.273**	-0.305**	-0.279**	-0.254**
	(-2.51)	(-1.77)	(-2.62)	(-2.39)	(-2.31)	(-2.60)	(-2.56)	(-2.40)	(-2.05)	(-2.62)	(-1.45)	(-2.22)	(-2.51)	(-2.34)	(-2.46)	(-2.51)	(-2.21)
<i>IV</i>	0.093	0.024	0.097	0.088	0.093	0.098	0.113	0.086	0.064	0.091	0.014	0.062	0.102	0.083	0.094	0.087	0.064
	(-1.11)	(-0.29)	(-1.33)	(-1.24)	(-1.20)	(-1.36)	(-1.44)	(-1.16)	(-0.84)	(-1.25)	(-0.17)	(-0.82)	(-1.35)	(-1.09)	(-1.27)	(-1.19)	(-0.86)
<i>PR</i>	-0.114*	-0.092*	-0.115**	-0.107**	-0.102*	-0.109*	-0.109*	-0.110*	-0.117**	-0.106*	-0.106*	-0.113**	-0.130**	-0.108*	-0.099	-0.116*	-0.117**
	(-1.90)	(-1.78)	(-2.00)	(-1.98)	(-1.80)	(-1.95)	(-1.78)	(-1.80)	(-2.27)	(-1.79)	(-1.86)	(-2.02)	(-2.21)	(-1.71)	(-1.35)	(-1.94)	(-2.30)
<b>Year fixed</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Constant</b>	1.067***	0.993***	1.081***	1.056***	1.058***	1.072***	1.077***	1.056***	1.016***	1.084***	0.977***	1.043***	1.072***	1.052***	1.076***	1.065***	1.034***
	(-8.01)	(-7.48)	(-8.38)	(-7.73)	(-8.05)	(-8.07)	(-8.04)	(-7.92)	(-7.63)	(-8.36)	(-7.53)	(-7.81)	(-7.88)	(-7.81)	(-8.04)	(-7.97)	(-7.78)
<i>N</i>	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254
<i>R<sup>2</sup></i>	0.206	0.195	0.209	0.205	0.209	0.207	0.211	0.209	0.182	0.201	0.209	0.205	0.206	0.201	0.203	0.207	0.207





	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<i>N</i>	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254

56 <sup>a</sup> Robust t-statistics are reported in parentheses

57 <sup>b</sup> \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

58 <sup>c</sup> RE=regulatory instrument; MA=market instrument; SU=subsidy instrument; IN=innovation support instrument; IF=information provision instrument; SE=problem severity; IV=environmental  
59 goal priority; PR=enterprise innovation motivation.

60

Appendix 13. Regression Analysis of the Influence of Complex Core Conditions and Configurations on CO<sub>2</sub> abatement (**ordered logit model**).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	<i>S1a</i>	<i>S1b</i>	<i>S1c</i>	<i>S1d</i>	<i>S2a</i>	<i>S2b</i>	<i>S3a</i>	<i>S3b</i>	<i>S3c</i>	<i>S4</i>	<i>S5</i>	<i>S6</i>
<b>Configuration</b>												
<i>Configuration H<sub>i</sub></i>	0.947 (-0.57)	0.781 (-0.57)	1.729* (-3.59)	0.164 (-0.11)	0.401 (-0.34)	0.384 (-0.41)	0.122 (-0.12)	0.866 (-0.84)	0.422 (-0.34)	0.202 (-0.12)	2.129* (-1.73)	2.208 (-1.48)
<b>complex core condition</b>												
<i>RE*su</i>							1.358*** (-2.79)	1.403*** (-2.84)	1.360*** (-2.80)	1.754*** (-3.45)		
<i>RE*if</i>					0.213 (-0.48)	0.206 (-0.46)				0.723 (-1.63)	0.223 (-0.5)	
<i>RE*MA</i>										0.345 (-0.67)	-0.013 (-0.03)	-0.01 (-0.02)
<b>Main effect</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Year fixed</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Wald-test</b>	69.63***	68.48***	72.27***	68.46***	70.53***	70.50***	77.19***	77.46***	77.39***	89.15***	71.89***	66.91***
<i>p-value</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>N</i>	254	254	254	254	254	254	254	254	254	254	254	254
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	
	<i>S7a</i>	<i>S7b</i>	<i>S7c</i>	<i>S7d</i>	<i>S8a</i>	<i>S8b</i>	<i>S8c</i>	<i>S8d</i>	<i>S8e</i>	<i>S9</i>	<i>S10</i>	
<b>Configuration</b>												
<i>Configuration H<sub>i</sub></i>	1.246 (-0.85)	0.523 (-0.52)	2.476 (-1.08)	0.275 (-0.21)	1.252 (-1.31)	2.294* (-1.73)	2.325** (-2.22)	0.15 (-0.16)	0.464 (-0.34)	0.578 (-0.53)	1.802 (-1.46)	
<b>Complex core condition</b>												
<i>RE*su</i>												
<i>RE*if</i>										0.219 (-0.49)	0.209 (-0.47)	
<i>RE*MA</i>											0.079 (-0.15)	
<b>Main effect</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Year fixed</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>wald-test</b>	67.02***	67.83***	68.09***	67.83***	68.32***	68.03***	71.05***	68.16***	68.53***	71.35***	73.42***	
<i>p-value</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<i>N</i>	254	254	254	254	254	2540	254	254	254	254	254	

<sup>a</sup> Robust t-statistics are reported in parentheses



63           <sup>b</sup> \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

64           <sup>c</sup> RE=regulatory instrument; MA=market instrument; SU=subsidy instrument; IN=innovation support instrument; IF=information provision instrument; SE=problem severity; IV=environmental  
65 goal priority; PR=enterprise innovation motivation.

66           <sup>d</sup> The table reports the coefficients for configurations and complex core conditions, omitting the reporting of coefficients for individual policy instruments and individual societal context factors.

67