This supplementary material consists of two parts

Online Appendix Material (Part II) for

Untangling the Relationship between Corporate Political Ties and Low-carbon Innovation: The Moderating Roles of Prominence and Favorability

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Table S9. Fixed effect panel regression for low-carbon innovations using Channel 2 political ties

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
Channel2_PT	-0.0252	-0.0101	-0.0228	-0.0082	-0.0268*	-0.0112
	(0.0155)	(0.0083)	(0.0153)	(0.0081)	(0.0154)	(0.0083)
Channel2_PT^2	0.0077**	0.0034**	0.0070**	0.0028*	0.0080**	0.0036**
	(0.0032)	(0.0016)	(0.0030)	(0.0015)	(0.0031)	(0.0016)
Corporate prominence (CP)			0.0095	0.0135		
			(0.0161)	(0.0095)		
Channel2_PT×CP			-0.0185*	-0.0058		
			(0.0105)	(0.0062)		
Channel2_PT^2×CP			0.0061*	0.0029*		
			(0.0032)	(0.0017)		
Generalized favorability (GF)					0.0541***	0.0130
					(0.0196)	(0.0115)
Channel2_PT×GF					-0.0355**	-0.0102
					(0.0155)	(0.0091)
Channel2_PT^2×GF					0.0164***	0.0106***
					(0.0056)	(0.0036)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.161	0.115	0.162	0.116	0.162	0.116
Obs.	20680	20680	20680	20680	20680	20680

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon innovation patent applications, and Auth stands for low-carbon innovation patent grants. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S10. Fixed effect panel regression considering the alternative measurement of prominence

	(1)	(2)
	App	Auth
PT	-0.0195**	-0.0104**
	(0.0084)	(0.0048)
PT^2	0.0023***	0.0013***
	(0.0008)	(0.0005)
BSI_corporate prominence (BSI_CP)	0.0189***	0.0066***
	(0.0024)	(0.0016)
PT×BSI_CP	-0.0047***	-0.0033***
	(0.0017)	(0.0012)
PT^2×BSI_CP	0.0005***	0.0003**
	(0.0002)	(0.0001)
All controls included	Yes	Yes
Industry FE & Year FE	Yes	Yes
R^2	0.171	0.125
Obs.	14952	14952

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S11. Negative binomial panel regression for low-carbon innovations

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
PT	-0.0188	-0.0193**	-0.0212	-0.0132	-0.0191	-0.0195**
	(0.0313)	(0.0092)	(0.0312)	(0.0090)	(0.0309)	(0.0096)
PT^2	0.0050*	0.0026***	0.0053*	0.0018*	0.0046*	0.0025***
	(0.0028)	(0.0010)	(0.0028)	(0.0010)	(0.0027)	(0.0010)
Corporate prominence (CP)			0.0646	0.0775***		
			(0.0675)	(0.0231)		
PT×CP			-0.0471*	-0.0205*		
			(0.0273)	(0.0114)		
PT^2×CP			0.0043*	0.0024**		
			(0.0023)	(0.0012)		
Generalized favorability (GF)					0.3714	0.0879
					(0.2268)	(0.0881)
PT×GF					-0.5594**	-0.1766*
					(0.2276)	(0.0902)
PT^2×GF					0.1567***	0.0458**
					(0.0545)	(0.0214)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	20680	20680	20680	20680	20680	20680

Note: This table reports results by using negative binomial regressions. Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications (without logarithmic transformation), and Auth stands for low-carbon patent authorizations (without logarithmic transformation). * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S12. Fixed effect panel regression considering personal characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
Channel2_PT	-0.0155**	-0.0076*	-0.0155**	-0.0074*	-0.0169**	-0.0081*
	(0.0073)	(0.0041)	(0.0072)	(0.0040)	(0.0074)	(0.0041)
Channel2_PT^2	0.0021***	0.0010**	0.0021***	0.0010**	0.0021***	0.0010**
	(0.0007)	(0.0004)	(0.0007)	(0.0004)	(0.0007)	(0.0004)
Corporate prominence (CP)			0.0286**	0.0223***		
			(0.0128)	(0.0077)		
Channel2_PT×CP			-0.0196**	-0.0099**		
			(0.0080)	(0.0048)		
Channel2_PT^2×CP			0.0020**	0.0011**		
			(0.0008)	(0.0005)		
Generalized favorability (GF)					0.0162	0.0112
					(0.0435)	(0.0266)
Channel2_PT×GF					-0.0765*	-0.0625**
					(0.0424)	(0.0248)
Channel2_PT^2×GF					0.0256**	0.0180***
					(0.0099)	(0.0058)
Average Age	-0.0028*	-0.0010	-0.0027*	-0.0009	-0.0027*	-0.0010
	(0.0015)	(0.0008)	(0.0015)	(0.0008)	(0.0015)	(0.0008)
Gender	-0.0043	-0.0215	-0.0042	-0.0209	-0.0042	-0.0213

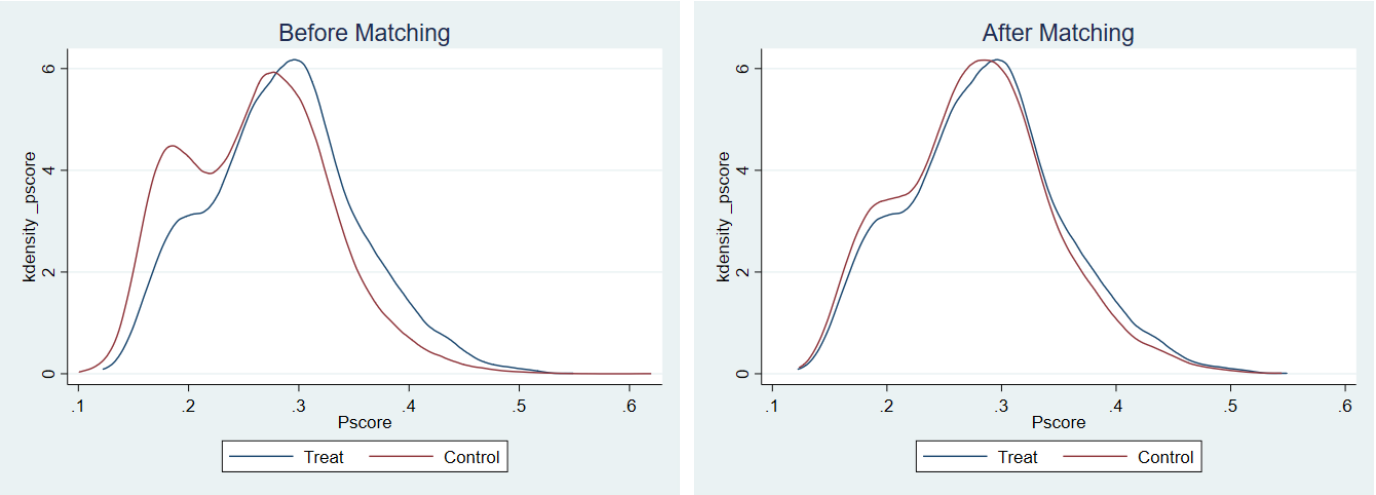
	(0.0312)	(0.0159)	(0.0309)	(0.0157)	(0.0312)	(0.0159)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.161	0.115	0.163	0.118	0.162	0.116
Obs.	20680	20680	20680	20680	20680	20680

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. The variable Gender is a dummy variable, which equals to one if one of the CEO or Chairman is female, otherwise, zero. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S13. Fixed effect panel regression for two-stage Heckman models

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
PT	-0.0159**	-0.0077*	-0.0159**	-0.0075*	-0.0173**	-0.0081**
	(0.0073)	(0.0041)	(0.0072)	(0.0040)	(0.0074)	(0.0041)
PT^2	0.0021***	0.0010**	0.0021***	0.0010**	0.0021***	0.0010**
	(0.0008)	(0.0004)	(0.0007)	(0.0004)	(0.0008)	(0.0004)
Corporate prominence (CP)			0.0291**	0.0227***		
			(0.0128)	(0.0076)		
PT×CP			-0.0196**	-0.0099**		
			(0.0080)	(0.0048)		
PT^2×CP			0.0020**	0.0011**		
			(0.0008)	(0.0005)		
Generalized favorability (GF)					0.0159	0.0115
					(0.0436)	(0.0267)
PT×GF					-0.0784*	-0.0635**
					(0.0424)	(0.0249)
PT^2×GF					0.0261***	0.0183***
					(0.0099)	(0.0058)
IMR	0.0522	-0.0310	0.0501	-0.0326	0.0567	-0.0282
	(0.0870)	(0.0499)	(0.0879)	(0.0507)	(0.0870)	(0.0499)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.161	0.115	0.163	0.118	0.162	0.116
Obs.	7392	7392	7392	7392	7392	7392

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.



(a) Before matching (*b*) After matching

Fig S1. Kernel density of propensity scores in the treatment and control group before (*a*) and after (*b*) matching

Table S14. Fixed effect panel regression result of PSM

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
PT	-0.0171**	-0.0092**	-0.0170**	-0.0090**	-0.0187**	-0.0099**
	(0.0077)	(0.0043)	(0.0076)	(0.0043)	(0.0078)	(0.0044)
PT^2	0.0022***	0.0012***	0.0021***	0.0012***	0.0022***	0.0012***
	(0.0008)	(0.0004)	(0.0008)	(0.0004)	(0.0008)	(0.0005)
Corporate prominence (CP)			0.0238*	0.0219***		
			(0.0134)	(0.0083)		
PT×CP			-0.0155*	-0.0104**		
			(0.0082)	(0.0049)		
PT^2×CP			0.0016**	0.0012**		
			(0.0008)	(0.0005)		
Generalized favorability (GF)					0.0399	0.0056
					(0.0519)	(0.0351)
PT×GF					-0.0902*	-0.0517*
					(0.0490)	(0.0300)
PT^2×GF					0.0296***	0.0165**
					(0.0113)	(0.0067)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.170	0.123	0.172	0.126	0.172	0.124
Obs.	14812	14812	14812	14812	14812	14812

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S15. Fixed effect panel regression result of 2SRI

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
PT	-0.0159**	-0.0077*	-0.0159**	-0.0075*	-0.0173**	-0.0081**
	(0.0073)	(0.0041)	(0.0072)	(0.0040)	(0.0074)	(0.0041)
PT^2	0.0021***	0.0010**	0.0021***	0.0010**	0.0021***	0.0010**
	(0.0008)	(0.0004)	(0.0007)	(0.0004)	(0.0008)	(0.0004)
Corporate prominence (CP)			0.0291**	0.0226***		

			(0.0128)	(0.0076)		
PT×CP			-0.0196**	-0.0099**		
			(0.0080)	(0.0048)		
PT^2×CP			0.0020**	0.0011**		
			(0.0008)	(0.0005)		
Generalized favorability (GF)					0.0161	0.0115
					(0.0436)	(0.0267)
PT×GF					-0.0786*	-0.0636**
					(0.0424)	(0.0249)
PT^2×GF					0.0262***	0.0183***
					(0.0100)	(0.0058)
Xuhat	-0.0010	-0.0001	-0.0010	-0.0001	-0.0010	-0.0001
	(0.0008)	(0.0005)	(0.0008)	(0.0005)	(0.0008)	(0.0005)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.161	0.115	0.163	0.118	0.162	0.116
Obs.	20680	20680	20680	20680	20680	20680

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon innovation patent applications, and Auth stands for low-carbon innovation patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S16. Three-way fixed effects panel regression result considering industry, year and firm fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
PT	-0.0167**	-0.0081**	-0.0167**	-0.0080**	-0.0181**	-0.0086**
	(0.0073)	(0.0040)	(0.0072)	(0.0040)	(0.0073)	(0.0041)
PT^2	0.0022***	0.0011***	0.0022***	0.0011***	0.0022***	0.0011**
	(0.0007)	(0.0004)	(0.0007)	(0.0004)	(0.0007)	(0.0004)
Corporate prominence (CP)			0.0309**	0.0247***		
			(0.0129)	(0.0078)		
PT×CP			-0.0195**	-0.0098**		
			(0.0080)	(0.0049)		
PT^2×CP			0.0020**	0.0011**		
			(0.0008)	(0.0005)		
Generalized favorability (GF)					0.0177	0.0095
					(0.0436)	(0.0268)
PT×GF					-0.0802*	-0.0645***
					(0.0425)	(0.0249)
PT^2×GF					0.0265***	0.0187***
					(0.0100)	(0.0058)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Industry, Year & Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.159	0.112	0.161	0.115	0.160	0.113
Obs.	20680	20680	20680	20680	20680	20680

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon innovation patent applications, and Auth stands for low-carbon innovation patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S17. Three-way fixed effects panel regression result considering industry, year and province fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
PT	-0.0151**	-0.0072*	-0.0152**	-0.0071*	-0.0165**	-0.0077*
	(0.0073)	(0.0041)	(0.0072)	(0.0040)	(0.0073)	(0.0041)
PT^2	0.0020***	0.0010**	0.0020***	0.0010**	0.0020***	0.0010**
	(0.0007)	(0.0004)	(0.0007)	(0.0004)	(0.0007)	(0.0004)
Corporate prominence (CP)			0.0345***	0.0251***		
			(0.0126)	(0.0076)		
PT×CP			-0.0196**	-0.0101**		
			(0.0079)	(0.0048)		
PT^2×CP			0.0019**	0.0011**		
			(0.0008)	(0.0005)		
Generalized favorability (GF)					0.0178	0.0143
					(0.0434)	(0.0267)
PT×GF					-0.0769*	-0.0604**
					(0.0421)	(0.0250)
PT^2×GF					0.0255**	0.0174***
					(0.0099)	(0.0058)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Industry, Year & Province FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.170	0.124	0.173	0.126	0.172	0.125
Obs.	20680	20680	20680	20680	20680	20680

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S18. Panel regression result considering the heterogeneity in low-carbon patent applications

	(1)	(2)	(3)	(4)	(5)	(6)
	App_INV	App_INV	App_INV	App_UTL	App_UTL	App_UTL
PT	-0.0181**	-0.0179**	-0.0198***	-0.0184***	-0.0183***	-0.0196***
	(0.0074)	(0.0072)	(0.0074)	(0.0068)	(0.0066)	(0.0068)
PT^2	0.0023***	0.0022***	0.0023***	0.0024***	0.0024***	0.0024***
	(0.0008)	(0.0007)	(0.0008)	(0.0007)	(0.0007)	(0.0007)
Corporate prominence (CP)		0.0415***			0.0226**	
		(0.0133)			(0.0107)	
PT×CP		-0.0154*			-0.0196***	
		(0.0086)			(0.0071)	
PT^2×CP		0.0017**			0.0020***	
		(0.0009)			(0.0008)	
Generalized favorability (GF)			0.0063			-0.0079
			(0.0451)			(0.0383)
PT×GF			-0.1075**			-0.0537
			(0.0438)			(0.0383)
PT^2×GF			0.0351***			0.0192**

			(0.0102)			(0.0089)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.164	0.166	0.166	0.170	0.172	0.171
Obs.	20680	20680	20680	20680	20680	20680

Note: Robust standard errors clustered at the firm level are in parentheses. App_INV denotes the number of low-carbon invention patents applied, and App_UTL denotes the number of low-carbon utility model patents applied. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S19. Panel regression result considering the heterogeneity of low-carbon patent authorization

	(1)	(2)	(3)	(4)	(5)	(6)
	Auth_INV	Auth_INV	Auth_INV	Auth_UTL	Auth_UTL	Auth_UTL
PT	-0.0114**	-0.0112**	-0.0121**	-0.0159**	-0.0158**	-0.0173***
	(0.0053)	(0.0051)	(0.0054)	(0.0066)	(0.0064)	(0.0066)
PT^2	0.0015***	0.0015***	0.0015***	0.0022***	0.0022***	0.0022***
	(0.0006)	(0.0005)	(0.0006)	(0.0007)	(0.0007)	(0.0007)
Corporate prominence (CP)		0.0269***			0.0241**	
		(0.0090)			(0.0103)	
PT×CP		-0.0122**			-0.0172**	
		(0.0062)			(0.0069)	
PT^2×CP		0.0015**			0.0019**	
		(0.0007)			(0.0007)	
Generalized favorability (GF)			0.0044			-0.0249
			(0.0301)			(0.0359)
PT×GF			-0.0841***			-0.0531
			(0.0284)			(0.0360)
PT^2×GF			0.0245***			0.0201**
			(0.0067)			(0.0085)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.123	0.126	0.124	0.167	0.169	0.168
Obs.	20680	20680	20680	20680	20680	20680

Note: Robust standard errors clustered at the firm level are in parentheses. Auth_INV denotes the number of low-carbon invention patents granted, and Auth_UTL denotes the number of low-carbon utility model patents granted. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S20. Panel regression result after excluding cases of firm migration

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
PT	-0.0160**	-0.0076*	-0.0160**	-0.0075*	-0.0173**	-0.0081*
	(0.0074)	(0.0041)	(0.0073)	(0.0040)	(0.0075)	(0.0042)
PT^2	0.0021***	0.0010**	0.0021***	0.0010**	0.0021***	0.0010**
	(0.0008)	(0.0004)	(0.0007)	(0.0004)	(0.0008)	(0.0004)
Corporate prominence (CP)			0.0308**	0.0230***		
			(0.0129)	(0.0077)		
PT×CP			-0.0199**	-0.0100**		
			(0.0081)	(0.0048)		
PT^2×CP			0.0020**	0.0011**		
			(0.0008)	(0.0005)		
Generalized favorability (GF)					0.0130	0.0085
					(0.0440)	(0.0270)
PT×GF					-0.0732*	-0.0612**
					(0.0429)	(0.0252)
PT^2×GF					0.0248**	0.0178***
					(0.0101)	(0.0058)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE, Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1627	0.1172	0.1649	0.1199	0.1640	0.1181
Obs.	19002	19002	19002	19002	19002	19002

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S21. Panel regression result controlling for firm migration

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
PT	-0.0158**	-0.0076*	-0.0158**	-0.0074*	-0.0171**	-0.0080*
	(0.0073)	(0.0041)	(0.0072)	(0.0040)	(0.0074)	(0.0041)
PT^2	0.0021***	0.0010**	0.0021***	0.0010**	0.0021***	0.0010**
	(0.0007)	(0.0004)	(0.0007)	(0.0004)	(0.0008)	(0.0004)
Corporate prominence (CP)			0.0291**	0.0226***		
			(0.0128)	(0.0076)		
PT×CP			-0.0197**	-0.0099**		
			(0.0080)	(0.0048)		
PT^2×CP			0.0020**	0.0011**		
			(0.0008)	(0.0005)		
Generalized favorability (GF)					0.0151	0.0109
					(0.0435)	(0.0267)
PT×GF					-0.0772*	-0.0628**
					(0.0424)	(0.0249)
PT^2×GF					0.0259***	0.0181***
					(0.0099)	(0.0058)
Firm_Migration	-0.0866**	-0.0659***	-0.0886**	-0.0668***	-0.0854**	-0.0651***
	(0.0363)	(0.0175)	(0.0363)	(0.0174)	(0.0363)	(0.0175)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes

Firm FE, Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1608	0.1155	0.1629	0.1181	0.1622	0.1164
Obs.	20680	20680	20680	20680	20680	20680

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S22. Panel regression result considering interactions with political turnover

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
PT×*Turnover_Headquarter*	-0.0244***	-0.0124***				
	(0.0077)	(0.0048)				
PT^2×*Turnover_Headquarter*	0.0028***	0.0015***				
	(0.0008)	(0.0005)				
PT×*Turnover_Operation*			-0.0235***	-0.0123***		
			(0.0077)	(0.0047)		
PT^2×*Turnover_Operation*			0.0027***	0.0015***		
			(0.0008)	(0.0005)		
PT×*Turnover_Headquarter&Operation*					-0.0247***	-0.0126***
					(0.0079)	(0.0049)
PT^2×*Turnover_Headquarter&Operation*					0.0028***	0.0015***
					(0.0008)	(0.0005)
Turnover_Headquarter	-0.0006	-0.0006				
	(0.0122)	(0.0078)				
Turnover_Operation			-0.0005	0.0011		
			(0.0122)	(0.0078)		
Turnover_Headquarter&Operation					0.0068	0.0041
					(0.0124)	(0.0079)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE, Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1588	0.1148	0.1586	0.1145	0.1587	0.1147
Obs.	20137	20137	20204	20204	20134	20134

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S23. Panel regression result after excluding cases of political turnover

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
PT	-0.0104	-0.0088**	-0.0095	-0.0075*	-0.0095	-0.0080*
	(0.0079)	(0.0043)	(0.0079)	(0.0043)	(0.0081)	(0.0044)
PT^2	0.0017**	0.0011**	0.0016**	0.0010**	0.0016**	0.0011**
	(0.0008)	(0.0005)	(0.0008)	(0.0005)	(0.0008)	(0.0005)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE, Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1624	0.1131	0.1633	0.1129	0.1658	0.1148
Obs.	10947	10947	11070	11070	10677	10677

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S24. Summary statistics of PT between SOEs and non-SOEs

	Mean	Min	Max	S.D.	C.V.	Obs.	Percent (%)	*T-statistics (Mean)*	*Z-statistics (Median)*
Non-SOEs	2.728	0	16	4.089	0.667	15335	63.047	12.82***	8.19***
SOEs	2.074	0	16	3.373	0.615	8988	36.953		

Note: The coefficient of variation (C.V.) represents the size of a standard deviation in relation to its mean which makes the variation between two groups directly comparable.

Table S25. Panel regression result of the sensitivity test

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
PT_*ST*	-0.0212***	-0.0103**	-0.0207***	-0.0096**	-0.0229***	-0.0108**
	(0.0081)	(0.0046)	(0.0077)	(0.0043)	(0.0081)	(0.0046)
PT_ST^2	0.0025***	0.0012***	0.0024***	0.0011***	0.0025***	0.0012***
	(0.0008)	(0.0005)	(0.0007)	(0.0004)	(0.0008)	(0.0005)
Corporate prominence (CP)			0.0282**	0.0221***		
			(0.0128)	(0.0076)		
PT_*ST*×CP			-0.0196**	-0.0098*		
			(0.0085)	(0.0053)		
PT_ST^2×CP			0.0019**	0.0011**		
			(0.0008)	(0.0005)		
Generalized favorability (GF)					0.0121	0.0097
					(0.0435)	(0.0267)
PT_*ST*×GF					-0.0748*	-0.0619**
					(0.0425)	(0.0249)
PT_ST^2×GF					0.0255**	0.0180***
					(0.0100)	(0.0058)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE, Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1612	0.1155	0.1632	0.1182	0.1626	0.1164
Obs.	20680	20680	20680	20680	20680	20680

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S26. Direct evidence on the helping hands of political ties

	Information Asymmetry (ASY)	Government Subsidies (GS)
	(1)	(2)
PT	-0.0011***	0.0000**
	(0.0004)	(0.0000)
All controls included	Yes	Yes
Industry FE & Year FE	Yes	Yes
R^2	0.567	0.102
Obs.	20680	20680

Note: Robust standard errors clustered at the firm level are in parentheses. ASY is measured by referring to Amihud [17], Amihud et al. [18] and Pástor & Stambaugh [19]; GS is calculated as the ratio of total monetary subsidies to total assets, as suggested by Yu et al. [7]. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S27. Fixed effect panel regression results considering ownership structure

	App		Auth	
	Non-SOEs	SOEs	Non-SOEs	SOEs
PT	-0.0168**	-0.0160	-0.0099**	-0.0049
	(0.0083)	(0.0137)	(0.0048)	(0.0079)
PT^2	0.0017**	0.0032**	0.0010**	0.0013
	(0.0008)	(0.0016)	(0.0005)	(0.0010)
All controls included	Yes	Yes	Yes	Yes
Industry FE & Year FE	Yes	Yes	Yes	Yes
Fisher's Permutation test (Non-SOEs versus SOEs)	-0.0015***		-0.0003*	
R^2	0.133	0.095	0.223	0.161
Obs.	12851	12851	7829	7829

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S28. The moderating effect of corporate prominence when generalized favorability is high (vs. low)

	High generalized favorability		Low generalized favorability	
	(1)	(2)	(3)	(4)
	App	Auth	App	Auth
PT	-0.0166*	-0.0098*	-0.0161**	-0.0042
	(0.0089)	(0.0050)	(0.0082)	(0.0047)
PT^2	0.0023**	0.0014***	0.0019**	0.0005
	(0.0009)	(0.0005)	(0.0008)	(0.0005)
Corporate prominence (CP)	0.0382**	0.0188*	0.0195	0.0251***
	(0.0175)	(0.0100)	(0.0141)	(0.0089)
PT×CP	-0.0206**	-0.0151**	-0.0170*	-0.0029
	(0.0103)	(0.0069)	(0.0090)	(0.0052)
PT^2×CP	0.0020*	0.0018**	0.0017*	0.0002
	(0.0011)	(0.0008)	(0.0009)	(0.0005)
All controls included	Yes	Yes	Yes	Yes
Industry FE & Year FE	Yes	Yes	Yes	Yes
R^2	0.173	0.131	0.149	0.107
Obs.	11138	11138	9542	9542

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth

stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

Table S29. The moderating effect of generalized favorability when corporate prominence is high (vs. low)

	High corporate prominence		Low corporate prominence	
	(1)	(2)	(3)	(4)
	App	Auth	App	Auth
PT	-0.0273**	-0.0130**	-0.0054	-0.0018
	(0.0107)	(0.0062)	(0.0065)	(0.0032)
PT^2	0.0031***	0.0016**	0.0009	0.0003
	(0.0011)	(0.0006)	(0.0006)	(0.0003)
Generalized favorability (GF)	0.0001	-0.0090	0.0520	0.0492*
	(0.0616)	(0.0389)	(0.0510)	(0.0295)
PT×GF	-0.0542	-0.0325	-0.1006**	-0.0923***
	(0.0620)	(0.0389)	(0.0478)	(0.0248)
PT^2×GF	0.0249*	0.0129	0.0253**	0.0218***
	(0.0149)	(0.0093)	(0.0108)	(0.0056)
All controls included	Yes	Yes	Yes	Yes
Industry FE & Year FE	Yes	Yes	Yes	Yes
R^2	0.201	0.153	0.106	0.054
Obs.	10454	10454	10226	10226

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

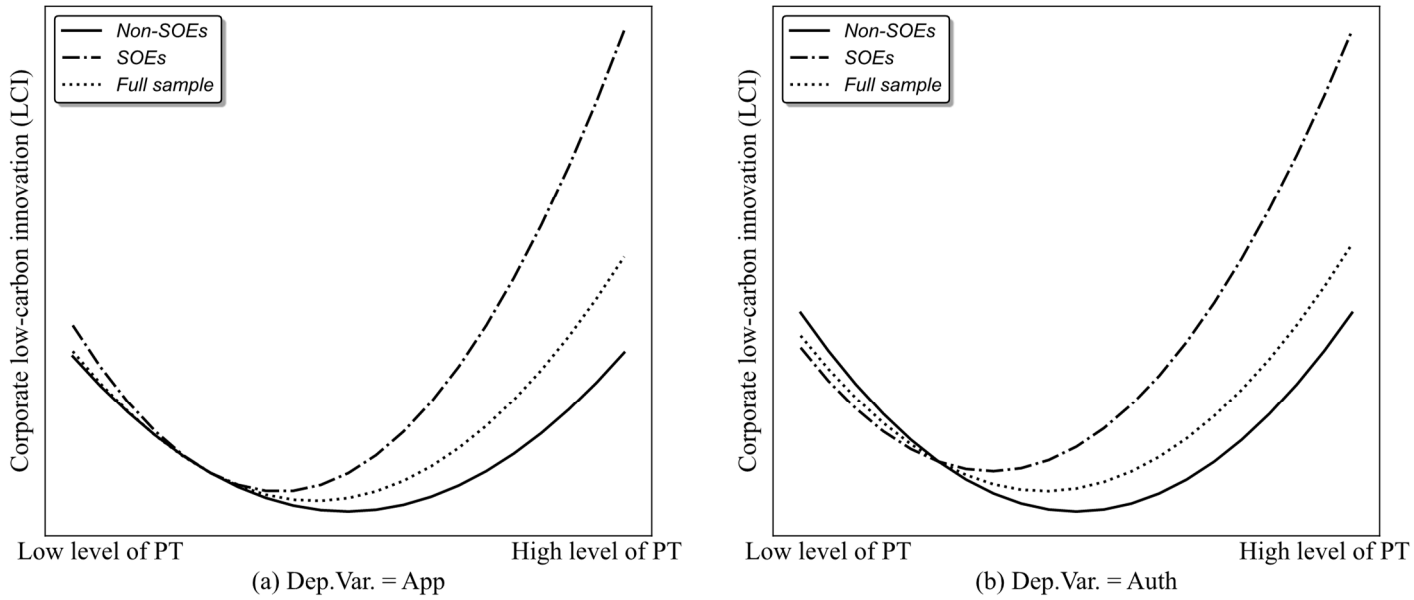


Fig S2. The U-shaped relationship between PT and LCI for SOEs and Non-SOEs. Note: App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations.

Table S30. Fixed effects panel regression considering the heterogeneity in environmental regulatory stringency

	(1)	(2)	(3)	(4)	(5)	(6)
	App	Auth	App	Auth	App	Auth
PT×*High_Envir_Reg*	-0.0323***	-0.0174***			-0.0312***	-0.0165***
	(0.0105)	(0.0059)			(0.0108)	(0.0060)
PT^2×*High_Envir_Reg*	0.0033***	0.0017**			0.0033***	0.0017**
	(0.0012)	(0.0007)			(0.0012)	(0.0007)
PT×*Low_Envir_Reg*			-0.0048	-0.0013	-0.0069	-0.0026
			(0.0079)	(0.0046)	(0.0081)	(0.0047)
PT^2×*Low_Envir_Reg*			0.0012	0.0008*	0.0014*	0.0008*
			(0.0008)	(0.0005)	(0.0008)	(0.0005)
All controls included	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE, Industry FE & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1599	0.1146	0.1594	0.1146	0.1612	0.1158
Obs.	20680	20680	20680	20680	20680	20680

Note: Robust standard errors clustered at the firm level are in parentheses. App stands for low-carbon patent applications, and Auth stands for low-carbon patent authorizations. * $p < .10$, ** $p < .05$, *** $p < .01$. The regression coefficients reported in this table are unstandardized.

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