

Internet Appendix for

Leviathan Inc. and Corporate Environmental Engagement

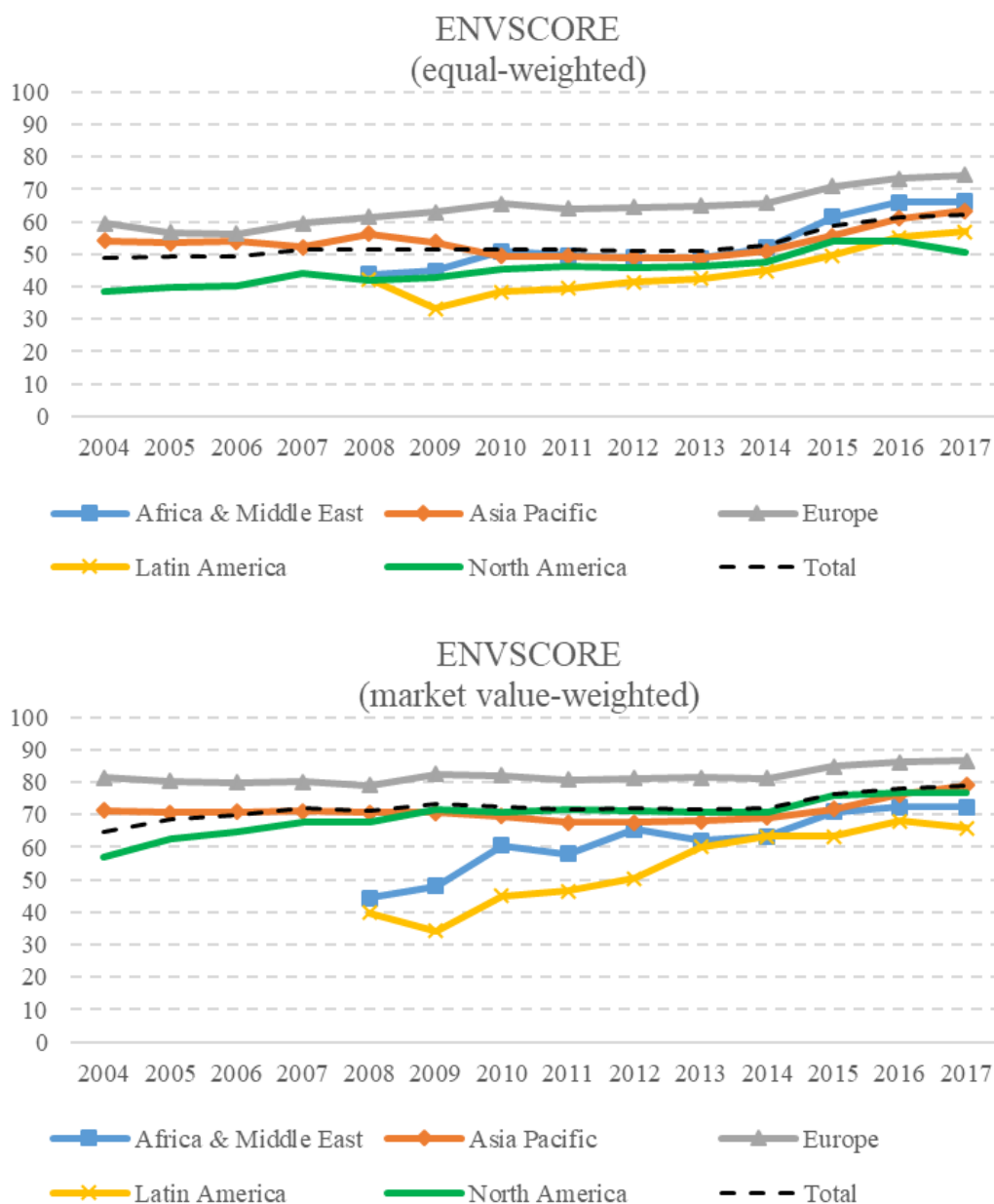


Figure IA.1 Average Environmental Engagement of Publicly Listed Firms, per Geographic Region and Year

This figure presents the time series patterns of the average of the ASSET4 environmental pillar scores (*ENVSCORE*) of public firms in the five geographical regions. The sample period is from 2004 to 2017. Panel A presents the equal-weighted averages, calculated with the pooled average score of public firms in a region in each year. Panel B shows value-weighted scores in which we calculate the average scores of public firms in a region in each year weighted by the lagged market capitalization.

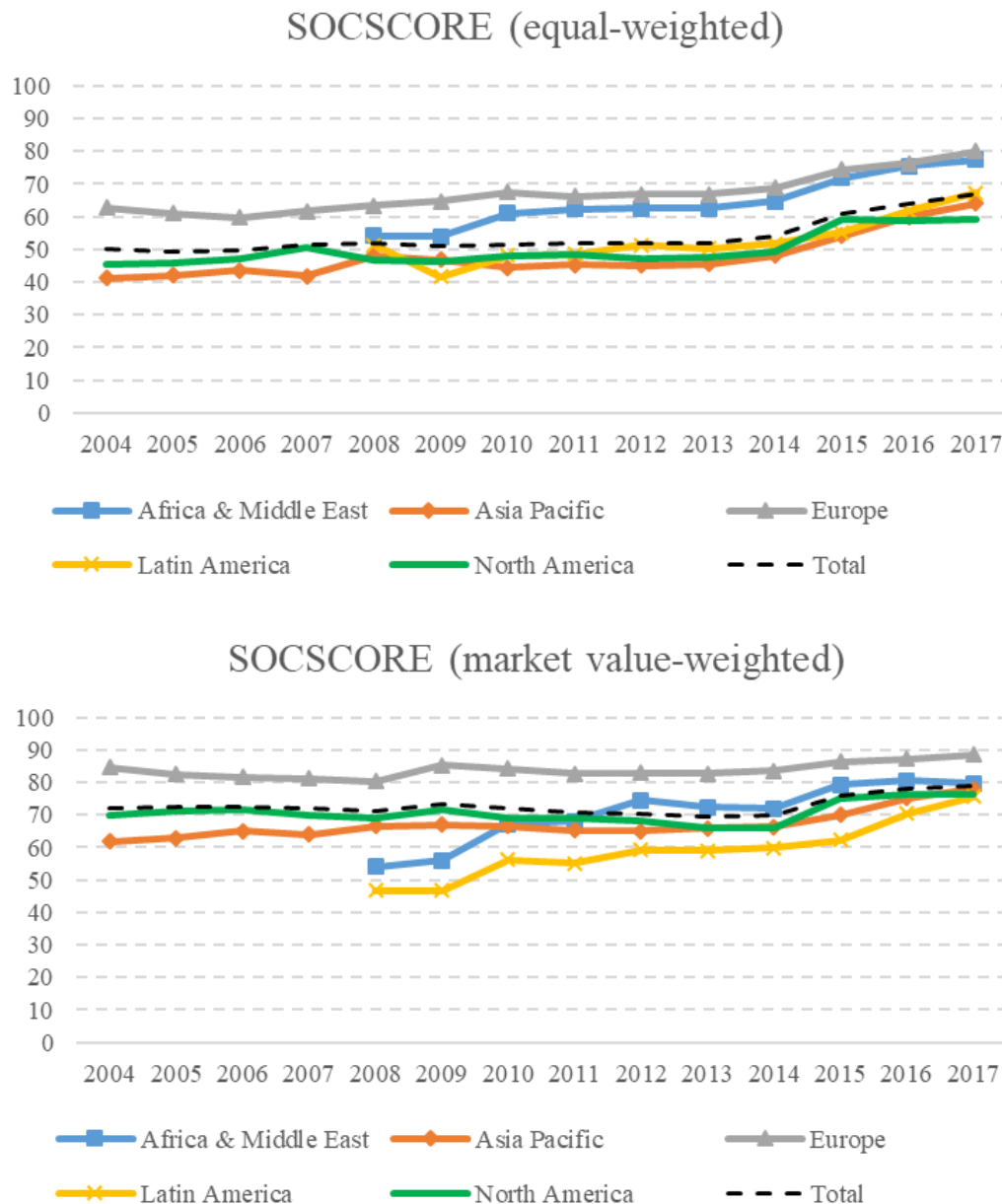


Figure IA.2 Average Social Scores of Publicly Listed Firms per Geographic Regions and Years

This figure presents the time series patterns of the average of social pillar scores (*SOCSCORE*) of public firms in the five geographical regions. The sample period is from 2004 to 2017. Panel A presents the equal-weighted averages, calculated with the simple average score of public firms in a region in each year. Panel B shows value-weighted scores in which we calculate the average scores of public firms in a region in each year weighted by the lagged market capitalization.

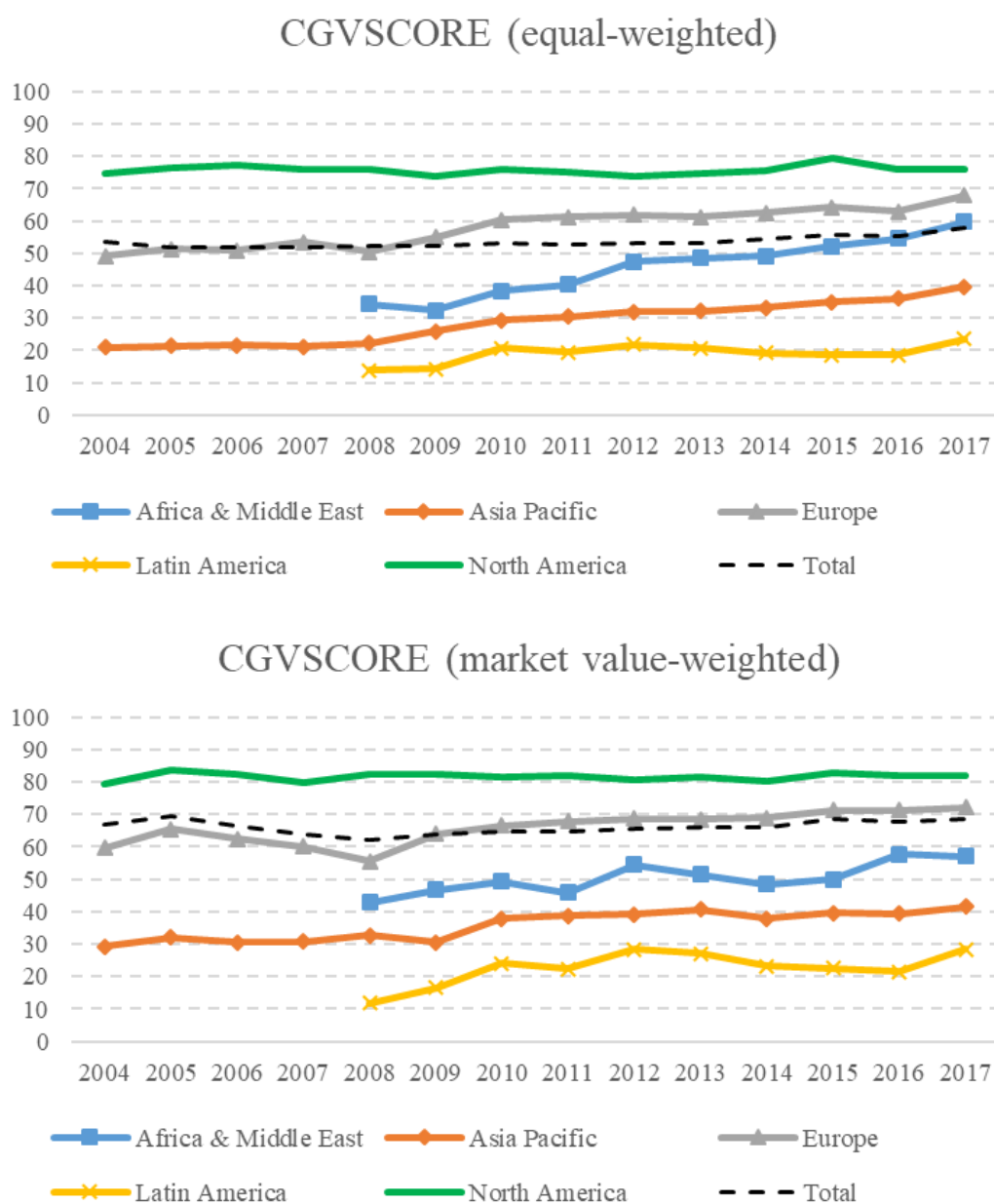


Figure IA.3 Average Corporate Governance Scores of Publicly Listed Firms per Geographic Regions and Years

This figure presents the time series patterns of the average of corporate governance pillar scores (CGVSCORE) of public firms in the five geographical regions. The sample period is from 2004 to 2017. Panel A presents the equal-weighted averages, calculated with the simple average score of public firms in a region in each year. Panel B shows value-weighted scores in which we calculate the average scores of public firms in a region in each year weighted by the lagged market capitalization.

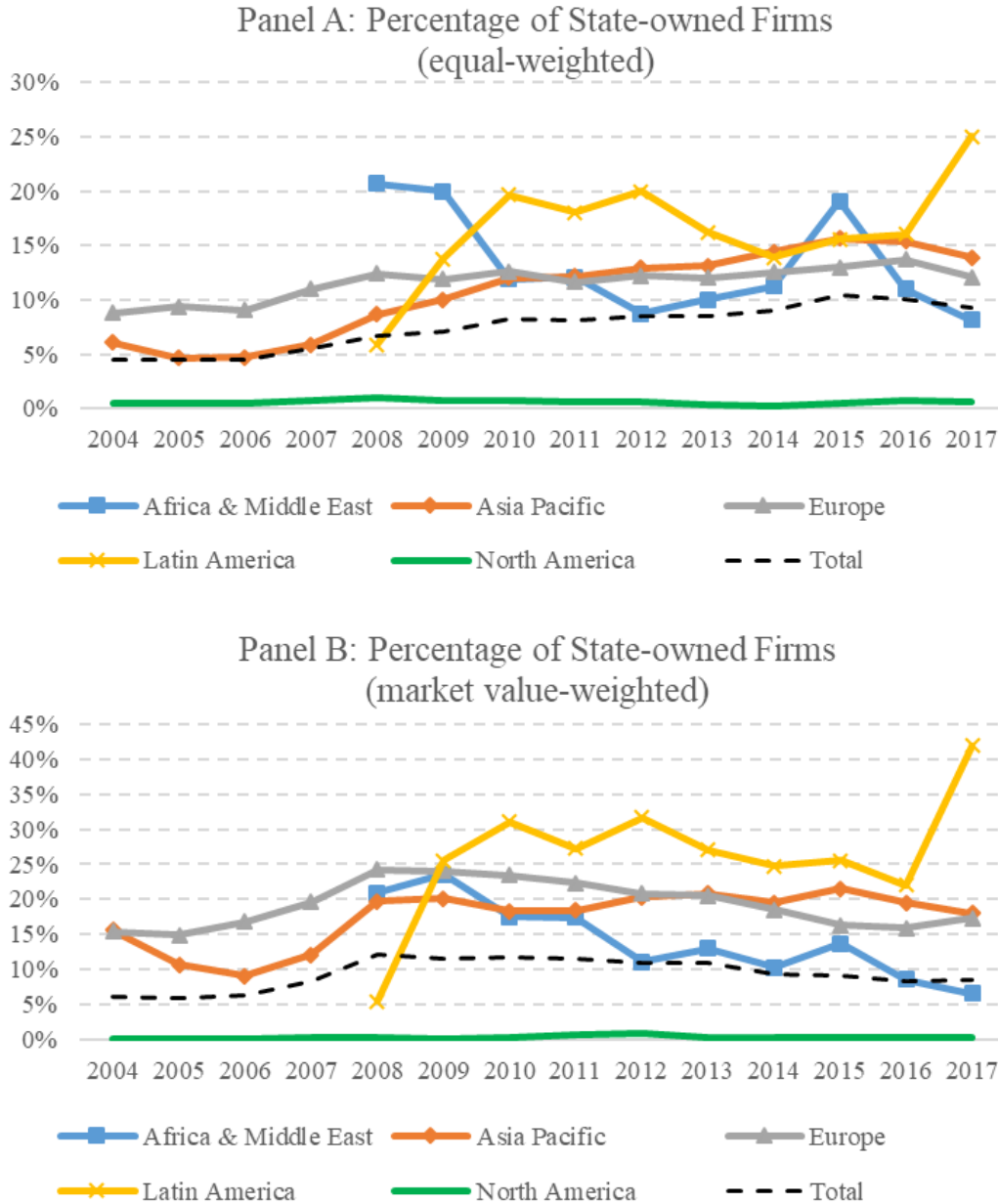


Figure IA. 4. Average State Ownership of Publicly Listed Firm, per Geographic Region and Year

This figure presents the time series patterns of the proportion of state-owned public firms in the five different regions. The sample period is from 2004 to 2017. Panel A presents the equal-weighted averages, in which we calculate the ratio of the number of state-owned firms among all public firms in a region in each year in our sample. Panel B shows value-weighted averages in which we calculate the average ratios of state-owned firms among all public firms in a region in each year in our sample weighted by the lagged market capitalization.

Table IA.1. Sample Data Distribution Across Years

This table presents the number of firm-year observations with available data on state-ownership dummy (*State_own*), environmental pillar score (*ENVSCORE* and sub-scores: emission reduction *ENER*, product innovation *ENPI*, resource reduction *ENRR*) across the sample years (2004–2017). In the rightmost column, we list the number of observations used in regression of Equation (1).

Year	<i>State_own</i>	<i>ENVSCORE</i>	<i>ENER</i>	<i>ENPI</i>	<i>ENRR</i>	Number used in regressions
2004	4,284	1,824	1,824	1,824	1,824	1,234
2005	4,284	2,242	2,242	2,242	2,242	1,558
2006	4,264	2,255	2,255	2,255	2,255	1,594
2007	4,256	2,437	2,437	2,437	2,437	1,700
2008	4,258	2,931	2,931	2,931	2,931	2,050
2009	4,250	3,363	3,363	3,363	3,363	2,376
2010	4,240	3,983	3,983	3,983	3,983	2,739
2011	4,219	4,076	4,076	4,076	4,076	2,810
2012	4,202	4,152	4,152	4,152	4,152	2,910
2013	4,142	4,262	4,262	4,262	4,262	2,957
2014	4,323	4,386	4,386	4,386	4,386	2,830
2015	5,024	5,277	5,277	5,277	5,277	2,841
2016	5,061	6,152	6,152	6,152	6,152	3,096
2017	4,818	5,246	5,246	5,246	5,246	2,427
Total	61,625	52,586	52,586	52,586	52,586	33,122

Table IA.2. Comparisons by Countries

In this table, we present the averages of state ownership dummy (*State_own*), environmental pillar score (*ENVSCORE* and sub-scores: emission reduction *ENER*, product innovation *ENPI*, resource reduction *ENRR*), social pillar score (*SOCSCORE*), and corporate governance pillar score (*CGVSCORE*). We also conduct t-tests for the state-owned firms' average to be larger than non-state-owned firms' and report the p-value based on unequal variance.

Country	<i>ENER</i> All	<i>ENER</i> <i>State_own</i> =1	<i>ENER</i> <i>State_own</i> =0	p-value (1 > 0)	<i>ENPI</i> All	<i>ENPI</i> <i>State_own</i> =1	<i>ENPI</i> <i>State_own</i> =0	p-value (1 > 0)	<i>ENRR</i> All	<i>ENRR</i> <i>State_own</i> =1	<i>ENRR</i> <i>State_own</i> =0	p-value (1 > 0)
Total	53.48	60.03	52.93	0.00	50.59	53.10	50.38	0.00	53.65	59.00	53.20	0.00
AT	61.12	77.54	51.01	0.00	62.17	58.61	61.31	0.68	59.38	74.57	50.87	0.00
AU	41.86	55.05	41.28	0.00	35.18	33.53	34.94	0.61	41.53	64.00	40.96	0.00
BE	56.82	68.78	55.15	0.03	51.97	58.39	49.73	0.09	54.23	70.63	49.37	0.00
BR	45.26	52.27	43.90	0.03	38.00	52.67	34.84	0.00	46.93	62.65	44.01	0.00
CA	44.73	47.74	42.91	0.18	36.89	26.52	35.97	1.00	42.59	40.09	41.22	0.59
CH	59.22	77.75	55.74	0.00	54.97	71.82	51.35	0.00	60.41	73.59	56.76	0.00
CL	49.05	58.61	47.05	0.04	46.43	59.06	43.60	0.01	50.60	53.76	49.93	0.27
CN	30.02	33.57	20.56	0.00	37.47	39.44	32.25	0.02	28.14	31.83	18.28	0.00
CO	57.52	68.78	43.84	0.00	45.75	49.82	38.77	0.09	58.95	65.02	47.74	0.03
CZ	48.73	84.98	27.69	0.00	59.63	44.33	66.58	1.00	52.61	56.14	48.96	0.13
DE	69.21	68.64	66.71	0.29	68.97	59.20	67.94	0.99	68.74	71.20	65.96	0.05
DK	54.96	78.34	53.55	--	49.53	62.61	48.99	--	58.84	83.75	55.54	--
EG	23.75	16.69	23.70	0.94	28.89	22.05	27.39	0.95	25.08	12.72	24.17	1.00
ES	75.65	91.14	73.48	0.00	65.96	86.82	63.93	0.00	75.64	77.66	74.66	0.19
FI	73.19	88.71	66.11	0.00	77.60	85.60	73.49	0.00	72.41	77.53	68.84	0.00
FR	76.96	82.31	76.07	0.00	70.66	71.78	70.45	0.32	78.92	80.00	78.71	0.25
GB	64.45	70.78	62.22	0.01	49.06	50.67	47.62	0.22	64.21	69.45	62.27	0.03
GR	48.92	73.81	38.08	0.00	33.60	39.84	30.91	0.03	51.49	71.02	43.20	0.00
HK	39.78	45.88	38.27	0.00	42.18	48.71	40.34	0.00	45.67	51.70	44.30	0.00
HU	73.56	61.88	81.77	0.99	65.03	31.02	81.43	1.00	65.45	39.34	78.66	1.00
ID	52.68	58.30	42.03	0.01	40.86	45.79	29.16	0.00	48.62	51.46	44.64	0.15
IE	47.08	50.96	40.19	0.24	47.57	59.81	42.99	0.10	51.62	64.40	45.60	0.11
IL	42.87		42.87		46.57	58.95	41.84	--	52.50	77.75	46.72	--
IN	58.11	55.09	57.05	0.74	54.81	53.23	53.64	0.56	61.86	55.96	62.00	0.98
IT	52.69	84.19	34.87	0.00	51.87	75.36	37.40	0.00	55.42	78.69	41.06	0.00
JP	63.95	75.56	61.91	0.00	64.89	67.65	63.07	0.07	59.06	69.11	57.32	0.00
KR	62.19	70.77	59.73	0.00	65.50	66.12	63.88	0.27	57.08	59.38	55.02	0.12
MA	27.88	46.71	14.44	0.00	27.48	22.50	25.73	0.68	33.99	58.76	14.44	0.00
MX	43.53		43.53		31.41		31.41		43.81		43.81	
MY	50.30	56.68	44.50	0.00	41.31	50.04	33.19	0.00	48.45	55.84	41.57	0.00
NL	66.98	63.73	64.96	0.55	63.70	72.02	60.93	0.17	71.27	80.61	69.03	0.05
NO	62.57	85.86	49.50	0.00	66.58	86.74	57.56	0.00	57.37	74.85	45.62	0.00
NZ	43.82	54.59	38.64	0.00	44.53	54.48	39.01	0.00	39.96	42.49	37.74	0.18
PE	48.54		48.54		19.55		19.55		45.99		45.99	
PH	50.77	54.63	49.27	0.31	46.38	39.12	46.44	0.83	53.50	51.32	51.64	0.52
PL	44.79	56.54	34.12	0.00	37.72	37.81	37.55	0.47	41.46	48.08	32.29	0.00
PT	77.84	86.55	72.36	0.01	55.94	62.84	52.39	0.04	73.05	79.19	68.34	0.02
RU	56.03	58.62	53.69	0.08	39.56	46.71	33.22	0.00	56.42	62.92	50.63	0.00
SE	70.96	85.31	65.97	0.00	63.48	67.99	60.65	0.10	68.54	80.49	62.99	0.00
SG	42.22	51.92	34.02	0.00	41.54	46.92	37.06	0.00	45.50	56.37	36.21	0.00
TH	59.16	76.23	40.66	0.00	47.55	56.87	37.16	0.01	63.66	69.84	52.57	0.02
TR	58.68	45.28	63.09	1.00	57.30	42.69	62.01	1.00	58.67	45.67	63.27	1.00
US	45.41	25.07	43.10	1.00	47.10	23.79	45.45	1.00	47.71	21.50	45.10	1.00
ZA	60.59	64.67	57.87	0.04	44.38	45.95	42.60	0.20	64.26	74.18	62.00	0.00

Table IA.2. (continued)

Country	SOCSCORE All	SOCSCORE State_own=1	SOCSCORE State_own=0	p-value (1 > 0)	CGVSCORE All	CGVSCORE State_own=1	CGVSCORE State_own=0	p-value (1 > 0)
Total	54.63	63.33	53.89	0.00	53.78	43.47	54.66	0.00
AT	59.73	84.83	47.36	0.00	42.05	54.76	34.86	0.00
AU	43.25	56.26	41.42	0.01	63.37	59.09	62.89	0.79
BE	56.29	70.36	51.13	0.00	57.04	60.55	53.86	0.05
BR	53.43	74.78	49.53	0.00	23.32	26.17	23.33	0.15
CA	42.65	31.26	39.95	0.97	75.87	74.53	74.98	0.55
CH	57.39	61.78	54.09	0.12	52.27	48.71	49.88	0.58
CL	54.97	62.61	53.35	0.11	11.78	12.93	11.51	0.20
CN	29.31	33.62	17.84	0.00	23.81	25.67	18.88	0.00
CO	72.10	79.97	61.21	0.02	31.05	36.23	24.99	0.05
CZ	71.15	72.78	69.92	0.19	18.69	24.65	14.98	0.00
DE	71.34	68.47	69.67	0.65	36.87	32.94	35.04	0.81
DK	52.11	47.67	48.11	--	45.91	39.26	43.12	--
EG	28.91	19.14	28.85	0.99	9.14	3.03	9.20	1.00
ES	81.68	95.58	80.31	0.00	51.01	53.55	49.47	0.10
FI	74.35	85.67	68.74	0.00	62.65	64.41	61.16	0.13
FR	79.29	85.47	78.22	0.00	58.15	63.03	57.26	0.00
GB	66.16	69.82	63.47	0.04	74.01	66.22	71.89	0.98
GR	48.40	70.23	38.96	0.00	17.83	24.42	15.09	0.00
HK	43.08	48.64	41.80	0.00	41.82	47.34	40.29	0.00
HU	77.90	51.42	90.65	1.00	35.29	32.22	37.72	0.95
ID	67.27	74.69	54.18	0.00	30.25	34.55	24.18	0.04
IE	47.59	50.95	40.07	0.20	67.78	59.20	64.08	0.65
IL	50.67	63.70	43.80	--	41.27	12.31	38.23	--
IN	61.87	62.85	59.77	0.12	34.39	21.81	36.31	1.00
IT	63.24	87.39	49.17	0.00	43.84	56.07	35.99	0.00
JP	50.68	63.27	47.26	0.00	10.96	13.48	11.00	0.04
KR	58.76	73.67	55.45	0.00	13.52	10.75	14.18	1.00
MA	53.88	80.81	32.75	0.00	6.30	11.09	2.93	0.00
MX	42.95		42.95		12.28		12.28	
MY	57.63	68.52	47.68	0.00	48.45	59.13	38.55	0.00
NL	76.82	92.45	74.79	0.00	66.15	72.81	65.37	0.00
NO	68.50	89.35	53.67	0.00	62.73	72.54	58.13	0.00
NZ	41.60	42.68	41.02	0.36	59.48	54.53	61.97	0.94
PE	36.56		36.56		50.36		50.36	
PH	53.51	64.77	49.61	0.04	40.01	25.98	40.17	0.99
PL	46.51	55.05	38.34	0.00	25.82	28.77	23.89	0.04
PT	79.60	88.29	74.52	0.00	57.30	54.18	58.43	0.73
RU	57.15	62.83	51.99	0.00	28.42	28.99	28.06	0.35
SE	65.62	84.83	58.62	0.00	60.53	63.99	59.09	0.08
SG	46.23	57.87	36.51	0.00	49.32	58.74	41.55	0.00
TH	69.55	84.00	51.22	0.00	47.75	51.80	38.99	0.05
TR	61.40	46.18	66.87	1.00	27.06	23.53	28.13	0.97
US	51.50	22.66	48.53	1.00	75.74	67.68	74.46	0.98
ZA	75.04	78.59	72.98	0.04	61.55	64.92	59.07	0.03

Table IA.3. Comparisons by Industries

This table presents the averages of state ownership dummy (*State_own*), environmental pillar score (*ENVSCORE* and sub-scores: emission reduction *ENER*, product innovation *ENPI*, resource reduction *ENRR*), social pillar score (*SOCSCORE*), and corporate governance pillar score (*CGVSCORE*) in ten different industries based on the ICBIN classification: Basic Materials, Consumer Goods, Consumer Services, Financials, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, and Utilities. We also conduct t-tests for the state-owned firms' average to be larger than non-state-owned firms' and report the p-value based on unequal variance.

Industry	Obs	<i>State_own</i>	<i>ENVSCORE</i>	<i>ENVSCORE</i>	<i>ENVSCORE</i>	p-value	<i>ENER</i>	<i>ENER</i>	<i>ENER</i>	p-value
			All	<i>State_own</i> =1	<i>State_own</i> =0		All	<i>State_own</i> =1	<i>State_own</i> =0	
						(1 > 0)				(1 > 0)
Basic Materials	3,526	0.070	56.74	64.08	56.25	0.00	59.87	66.23	59.40	0.00
Consumer Goods	3,770	0.026	63.29	56.80	63.55	0.98	61.94	59.55	62.14	0.79
Consumer Services	4,663	0.030	43.61	57.85	43.34	0.00	44.17	61.82	43.79	0.00
Financials	5,363	0.092	44.99	47.84	44.81	0.02	43.13	41.15	43.44	0.94
Health Care	1,955	0.017	43.88	29.06	44.39	1.00	44.91	35.97	45.34	0.95
Industrials	6,558	0.065	61.20	55.15	61.68	1.00	58.84	57.63	58.97	0.81
Oil & Gas	2,457	0.135	47.69	66.88	44.73	0.00	53.46	71.06	50.75	0.00
Technology	2,317	0.024	53.96	66.71	53.80	0.00	50.42	66.03	50.15	0.00
Telecommunications	862	0.381	59.87	65.20	57.03	0.00	59.10	64.04	56.50	0.00
Utilities	1,651	0.292	65.85	64.74	66.40	0.88	70.68	68.24	71.82	1.00

Industry	<i>ENPI</i>	<i>ENPI</i>	<i>ENPI</i>	p-value	<i>ENRR</i>	<i>ENRR</i>	<i>ENRR</i>	p-value
	All	<i>State_own</i> =1	<i>State_own</i> =0		All	<i>State_own</i> =1	<i>State_own</i> =0	
				(1 > 0)				(1 > 0)
Basic Materials	49.43	53.70	49.26	0.02	56.84	64.66	56.27	0.00
Consumer Goods	60.22	47.41	60.69	1.00	62.72	58.53	62.86	0.91
Consumer Services	37.86	42.37	37.83	0.02	48.54	62.11	48.29	0.00
Financials	44.94	52.09	44.30	0.00	46.23	47.92	46.15	0.13
Health Care	38.79	24.73	39.20	1.00	48.22	31.67	48.75	1.00
Industrials	61.60	47.40	62.67	1.00	58.21	55.82	58.42	0.96
Oil & Gas	41.06	53.89	39.08	0.00	47.50	66.58	44.55	0.00
Technology	57.11	64.88	57.07	0.04	52.94	68.18	52.72	0.00
Telecommunications	55.78	59.63	53.77	0.00	60.17	65.85	57.04	0.00
Utilities	58.04	58.37	57.94	0.39	59.76	59.92	59.78	0.46

Industry	<i>SOCSCORE</i>	<i>SOCSCORE</i>	<i>SOCSCORE</i>	p-value	<i>CGVSCORE</i>	<i>CGVSCORE</i>	<i>CGVSCORE</i>	p-value
	All	<i>State_own</i> =1	<i>State_own</i> =0		All	<i>State_own</i> =1	<i>State_own</i> =0	
				(1 > 0)				(1 > 0)
Basic Materials	54.83	67.16	53.88	0.00	55.03	50.84	55.36	0.98
Consumer Goods	59.74	54.82	59.87	0.94	47.03	45.60	47.22	0.68
Consumer Services	49.81	64.84	49.55	0.00	54.71	51.87	54.99	0.88
Financials	48.96	54.50	48.54	0.00	49.55	38.84	50.76	1.00
Health Care	52.38	39.21	52.98	1.00	58.17	39.05	58.71	1.00
Industrials	57.66	56.24	57.81	0.87	52.55	42.90	53.29	1.00
Oil & Gas	51.40	68.42	48.77	0.00	64.14	40.34	67.94	1.00
Technology	54.49	64.21	54.37	0.01	58.64	51.36	59.01	0.97
Telecommunications	66.19	71.65	63.27	0.00	52.89	50.02	55.05	0.99
Utilities	64.25	70.04	62.07	0.00	55.60	40.19	61.96	1.00

Table IA.4. Comparisons by Sample Years

This table presents the averages of state ownership dummy (*State_own*), environmental pillar score (*ENVSCORE* and sub-scores: emission reduction *ENER*, product innovation *ENPI*, resource reduction *ENRR*), social pillar score (*SOCSCORE*), and corporate governance pillar score (*CGVSCORE*) in each year from 2004 to 2017. We also conduct t-tests for the state-owned firms' average to be larger than non-state-owned firms' and report the p-value based on unequal variance.

Year	Obs	<i>State_own</i>	<i>ENVSCORE</i> All	<i>ENVSCORE</i> <i>State_own</i> =1	<i>ENVSCORE</i> <i>State_own</i> =0	p-value (1 > 0)	<i>ENER</i> All	<i>ENER</i> <i>State_own</i> =1	<i>ENER</i> <i>State_own</i> =0	p-value (1 > 0)
2004	1,234	0.045	48.96	57.26	48.57	0.02	48.56	56.16	48.20	0.03
2005	1,558	0.045	49.14	58.21	48.71	0.01	49.01	57.56	48.61	0.01
2006	1,594	0.045	49.48	57.34	49.18	0.02	49.34	56.02	49.10	0.04
2007	1,700	0.055	51.29	60.50	50.75	0.00	51.06	61.26	50.44	0.00
2008	2,050	0.067	51.63	57.88	51.19	0.01	51.41	59.26	50.84	0.00
2009	2,376	0.070	51.35	54.28	51.13	0.11	51.22	56.72	50.81	0.01
2010	2,739	0.082	51.42	53.52	51.20	0.15	51.42	55.21	51.03	0.03
2011	2,810	0.082	51.42	54.64	51.19	0.06	51.51	56.25	51.15	0.01
2012	2,910	0.085	51.19	54.00	50.92	0.08	51.42	55.89	51.01	0.01
2013	2,957	0.085	51.23	56.69	50.87	0.00	51.56	58.08	51.09	0.00
2014	2,830	0.090	52.82	56.42	52.63	0.04	52.97	57.41	52.66	0.01
2015	2,841	0.105	58.62	61.22	58.31	0.06	58.51	62.24	58.08	0.01
2016	3,096	0.101	61.28	68.16	61.03	0.00	60.94	67.63	60.69	0.00
2017	2,427	0.093	62.03	72.81	62.31	0.00	61.85	70.72	62.33	0.00

Year	<i>ENPI</i> All	<i>ENPI</i> <i>State_own</i> =1	<i>ENPI</i> <i>State_own</i> =0	p-value (1 > 0)	<i>ENRR</i> All	<i>ENRR</i> <i>State_own</i> =1	<i>ENRR</i> <i>State_own</i> =0	p-value (1 > 0)
2004	46.30	52.26	46.02	0.05	48.58	57.90	48.13	0.01
2005	46.72	46.91	46.72	0.48	48.66	61.95	48.03	0.00
2006	47.22	49.37	47.19	0.27	49.25	59.87	48.80	0.00
2007	49.34	53.53	49.10	0.09	51.23	60.69	50.68	0.00
2008	49.99	53.48	49.79	0.10	51.72	57.21	51.32	0.02
2009	49.71	48.90	49.78	0.63	51.28	54.37	51.05	0.10
2010	49.35	49.09	49.36	0.55	51.55	53.02	51.38	0.23
2011	49.33	49.86	49.31	0.40	51.63	54.51	51.41	0.08
2012	48.96	49.14	48.95	0.46	51.75	54.01	51.55	0.12
2013	48.98	51.52	48.90	0.11	51.57	56.46	51.24	0.01
2014	50.39	52.10	50.43	0.22	53.01	55.60	52.84	0.09
2015	54.19	54.18	54.19	0.50	58.76	60.28	58.58	0.18
2016	55.53	58.95	55.59	0.04	61.59	67.06	61.45	0.00
2017	56.26	64.33	56.60	0.00	62.15	71.82	62.41	0.00

Year	<i>SOCSCORE</i> All	<i>SOCSCORE</i> <i>State_own</i> =1	<i>SOCSCORE</i> <i>State_own</i> =0	p-value (1 > 0)	<i>CGVSCORE</i> All	<i>CGVSCORE</i> <i>State_own</i> =1	<i>CGVSCORE</i> <i>State_own</i> =0	p-value (1 > 0)
2004	49.96	60.43	49.46	0.00	53.59	41.88	54.15	1.00
2005	49.29	61.80	48.70	0.00	51.94	45.65	52.23	0.96
2006	49.91	62.68	49.35	0.00	51.92	44.44	52.35	0.98
2007	51.27	61.77	50.63	0.00	51.87	44.03	52.33	0.99
2008	51.83	59.90	51.24	0.00	52.36	36.88	53.49	1.00
2009	51.23	58.84	50.67	0.00	52.42	36.82	53.65	1.00
2010	51.57	58.34	50.93	0.00	53.35	38.03	54.70	1.00

2011	51.81	60.44	51.12	0.00	52.95	39.16	54.26	1.00
2012	51.68	60.01	50.93	0.00	53.34	44.00	54.30	1.00
2013	51.90	61.78	51.12	0.00	53.21	42.44	54.38	1.00
2014	53.88	62.25	53.18	0.00	54.32	43.85	55.48	1.00
2015	61.00	65.28	50.50	0.00	55.76	46.35	56.86	1.00
2016	63.86	69.77	63.74	0.00	55.23	48.65	56.24	1.00
2017	66.86	74.16	67.69	0.00	58.06	53.44	59.68	1.00

Table IA.5: Using Change in Environmental Scores as Dependent Variables in Baseline Regressions

This table reports the results from regressing measures of firm-level environmental engagement on a state ownership dummy (*State_own*) and other control variables as well as industry-year fixed effects and country fixed effects. The firm-level environmental engagement is measured by the change in environmental pillar score ($\Delta ENVSCORE$, and its sub-scores, $\Delta ENER$, $\Delta ENPI$, and $\Delta ENRR$) from ASSET4. Control variables include the ratio of institutional ownership (*Inst_own*), market capitalization in logarithm ($Ln(MarketCap)$), leverage ratio (*Leverage*), market-to-book ratio (*MTB*), return on assets (*ROA*), GDP per capita in logarithm ($Ln(GDP)$), and the Herfindahl-Hirschman Index of a firm's industry (Industry HHI). All control variables are winsorized at the 5th and 95th percentiles. *State_own* and other control variables (except $Ln(GDP)$) are lagged by one year. The sample period is 2004-2017. The changes in environmental pillar scores are measured by one-year lag in Columns (1)—(4), and by three-year lags in Columns (5)—(8). Detailed definitions of all variables are in Appendix 2. Robust standard errors are clustered at the firm level and reported in parentheses. ***, **, and * denote $p < 0.01$, $p < 0.05$, and $p < 0.1$, respectively.

Dependent variable =	(1) $\Delta ENVSCORE$ ($t+1$) - t	(2) $\Delta ENER$ ($t+1$) - t	(3) $\Delta ENPI$ ($t+1$) - t	(4) $\Delta ENRR$ ($t+1$) - t	(5) $\Delta ENVSCORE$ ($t+1$) - Ave (t , $t-1$, $t-2$)	(6) $\Delta ENER$ ($t+1$) - Ave (t , $t-1$, $t-2$)	(7) $\Delta ENPI$ ($t+1$) - Ave (t , $t-1$, $t-2$)	(8) $\Delta ENRR$ ($t+1$) - Ave (t , $t-1$, $t-2$)
State_own	0.598** (0.247)	0.451* (0.264)	0.378 (0.257)	0.596** (0.282)	1.017** (0.483)	0.999** (0.496)	0.455 (0.525)	0.903* (0.522)
Institution_own	1.082*** (0.399)	0.717* (0.422)	0.786* (0.435)	1.298*** (0.480)	2.051*** (0.788)	1.435* (0.826)	1.613* (0.862)	2.229** (0.912)
Ln(MarketCap)	-0.114** (0.0528)	-0.0835 (0.0540)	0.120** (0.0553)	-0.139** (0.0605)	-0.336*** (0.104)	-0.282*** (0.104)	0.229** (0.109)	-0.440*** (0.116)
Leverage	-0.00142 (0.00380)	0.00173 (0.00395)	-0.00711* (0.00391)	0.00165 (0.00441)	-0.00477 (0.00720)	0.00179 (0.00736)	-0.0139* (0.00768)	-0.00155 (0.00831)
Market-to-Book	-0.00505 (0.0362)	0.0762** (0.0381)	-0.0947** (0.0404)	-0.0177 (0.0430)	-0.0396 (0.0625)	0.0970 (0.0651)	-0.193*** (0.0701)	-0.0408 (0.0725)
ROA	0.0210* (0.0109)	0.0135 (0.0118)	0.0143 (0.0130)	0.0203 (0.0133)	0.0638*** (0.0189)	0.0585*** (0.0196)	0.0188 (0.0209)	0.0751*** (0.0221)
Ln(GDP)	1.708** (0.700)	1.794** (0.733)	0.894 (0.790)	2.028** (0.830)	0.538 (1.277)	1.281 (1.333)	-0.173 (1.463)	0.897 (1.511)
Industry HHI	-0.656** (0.332)	-0.440 (0.343)	-0.446 (0.355)	-0.669* (0.387)	-1.190* (0.686)	-0.970 (0.696)	-1.042 (0.735)	-1.155 (0.755)
Observations	30,727	30,727	30,727	30,727	24,479	24,479	24,479	24,479
R-squared	0.103	0.092	0.092	0.090	0.148	0.124	0.132	0.129
TRBC Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table IA.6. Including CGVSCORE to Control for Agency Costs

This table reports the results from regressing measures of firm-level environmental engagement on a state ownership dummy (*State_own*) and other control variables as well as industry-year fixed effects and country fixed effects. The firm-level environmental engagement is measured by the environmental pillar score (*ENVSCORE*, and its sub-scores, *ENER*, *ENPI*, and *ENRR*) from ASSET4 and the logarithm of CO₂ emission in tonnes at the company level (scaled by total assets and winsorized at the 1th and 99th percentiles). For CO₂ emission tests, we require each firm to have CO₂ emission data for at least three years. We also include the firm-level corporate governance pillar score (*CGVSCORE* from ASSET4) to measure a firm's corporate governance quality. The control variables are the same as Table 4, but we omit the coefficients of the control variables for brevity. All control variables are winsorized at the 5th and 95th percentiles, and are in year *t*-1 (except for *Ln(GDP)* and *Industry HHI* that are in year *t* and unwinsorized). Detailed definitions of all variables are in Appendix 2. Robust standard errors are clustered at the firm level and reported in parentheses. ***, **, and * denote $p < 0.01$, $p < 0.05$, and $p < 0.1$, respectively.

Dependent variable =	(1) ENVSCORE	(2) ENER	(3) ENPI	(4) ENRR	(10) Ln(CO ₂ /Assets)
State_own	3.149*** (1.219)	1.933 (1.221)	2.419* (1.338)	3.739*** (1.263)	-0.199* (0.108)
CGVSCORE	0.509*** (0.0142)	0.507*** (0.0144)	0.331*** (0.0156)	0.519*** (0.0146)	0.0035** (0.0013)
Institution_own	-8.756*** (2.126)	-8.480*** (2.179)	-9.685*** (2.271)	-6.512*** (2.221)	-0.275 (0.180)
Ln(MarketCap)	10.55*** (0.308)	10.36*** (0.315)	8.069*** (0.335)	10.18*** (0.315)	-0.0245 (0.0271)
Leverage	0.0632*** (0.0200)	0.0829*** (0.0200)	0.00856 (0.0204)	0.0693*** (0.0209)	0.007*** (0.0018)
Market-to-Book	-0.958*** (0.146)	-1.070*** (0.153)	-0.490*** (0.155)	-0.970*** (0.154)	-0.0255* (0.0138)
ROA	-0.271*** (0.0389)	-0.225*** (0.0403)	-0.310*** (0.0403)	-0.220*** (0.0415)	0.0074** (0.0037)
Ln(GDP)	-1.162 (1.529)	-4.017** (1.585)	-1.028 (1.615)	0.463 (1.694)	-0.666*** (0.123)
Industry HHI	-3.289 (2.227)	-1.709 (2.255)	-2.940 (2.391)	-3.813* (2.249)	0.151 (0.166)
Observations	33,122	33,122	33,122	33,122	15,931
R-squared	0.573	0.551	0.496	0.499	0.773
TRBC Industry-year FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes

Table IA.7. Using *Government held* with Firm Fixed Effects

This table reports the results from regressing measures of firm-level environmental engagement on a continuous variable *Government_held* which measures the percentage of free-float shares held by the government if they are above the 5% threshold, and other control variables as well as year fixed effects and firm fixed effects. The firm-level environmental engagement is measured by the environmental pillar score (*ENVSCORE*, and its sub-scores, *ENER*, *ENPI*, and *ENRR*) from ASSET4. The control variables are the same as Table 4, but we omit the coefficients of the control variables for brevity. All control variables are winsorized at the 5th and 95th percentiles, and are in year $t-1$ (except for *Ln(GDP)* and *Industry HHI* that are in year t and unwinsorized). Detailed definitions of all variables are in Appendix 2. Robust standard errors are clustered at the firm level and reported in parentheses. ***, **, and * denote $p < 0.01$, $p < 0.05$, and $p < 0.1$, respectively.

<i>Dependent variable:</i>	(1) ENVSCORE	(2) ENER	(3) ENPI	(4) ENRR
Government_held	0.072** (0.030)	0.055* (0.029)	0.056 (0.037)	0.071** (0.031)
Institution_own	-2.401 (2.084)	-2.081 (2.134)	1.930 (2.418)	-6.065*** (2.352)
Ln(MarketCap)	2.826*** (0.350)	2.985*** (0.368)	1.070*** (0.404)	3.353*** (0.404)
Leverage	0.064*** (0.018)	0.081*** (0.019)	0.002 (0.020)	0.075*** (0.020)
Market-to-Book	-0.541*** (0.111)	-0.465*** (0.113)	-0.147 (0.123)	-0.648*** (0.127)
ROA	-0.050** (0.024)	-0.043* (0.025)	0.007 (0.028)	-0.059** (0.028)
Ln(GDP)	8.854*** (1.364)	6.381*** (1.395)	4.981*** (1.549)	10.84*** (1.593)
Industry HHI	-2.940 (2.864)	-1.674 (3.120)	2.423 (3.290)	-6.173* (3.431)
Observations	32,737	32,737	32,737	32,737
R-squared	0.845	0.832	0.796	0.791
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes