Leviathan Inc. and Corporate Environmental Engagement

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▸ *Leviathan Inc. and Corporate Environmental Engagement*

Leviathan *= something that is very large and powerful / a sea monster in scriptural accounts / the political state (source: Merriam-Webster)*

Leviathan Inc. *= state being a major investor in firms listed in stock exchanges (SOE) … a.k.a. "State Capitalism"*

The Economist (2010): " … Western politicians cannot fail to be influenced by the success of emerging countries like ***Brazil****,* ***India*** *and* ***China****, where a big role for the state in business seems to be working wonders.* ***Nine of the world's 30 largest listed firms are emerging-market companies that count the state as their dominant shareholder****. (…)"*

Forbes GLOBAL 2000 WORLD'S TOP COMPANIES

2010: China (4), France (2), Russia (1), Brazil (1), Italy (1)

RANK	COMPANY
1	JPMorgan Chase
2	General Electric
3	Bank of America
4	ExxonMobil
5	ICBC
6	Banco Santander
7	Wells Fargo
8	HSBC Holdings
8	Royal Dutch Shell
10	BP
11	BNP Paribas
12	PetroChina
13	AT&T
14	Wal-Mart Stores
15	Berkshire Hathaway
16	Gazprom
17	China Construction Bank
18	Petrobras-Petróleo Br
19	Total
20	Chevron
21	Barclays
22	Bank of China
23	Allianz
24	GDF Suez
25	E.ON
25	Goldman Sachs Group
27	EDF Group
28	AXA Group
29	Lloyds Banking Group
29	Procter & Gamble
31	ENI

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*The Economist (2010): "**Governments seem to have forgotten that picking industrial winners nearly always fails."***

Example:

Private Sector *vs. "Leviathan Inc."*

WWW (US)

iPhone, etc.

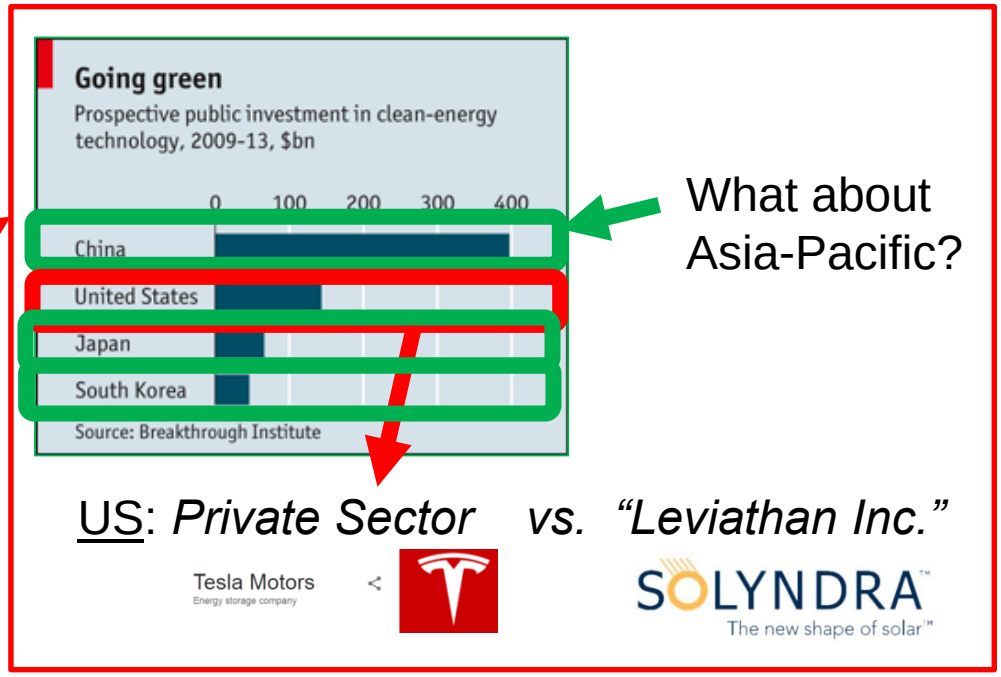
Minitel (France)

2009: shut down!

Leviathan Inc. and Corporate Environmental Engagement

Corporate Environmental Engagement = latest race is on "**green-tech**"? (transition from dirty to clean technology, reducing fossil fuel emissions and limiting climate change)

Climate change could be case of market failure so state ownership could be a way to pursue "public interest"?



Leviathan Inc. and Corporate Environmental Engagement

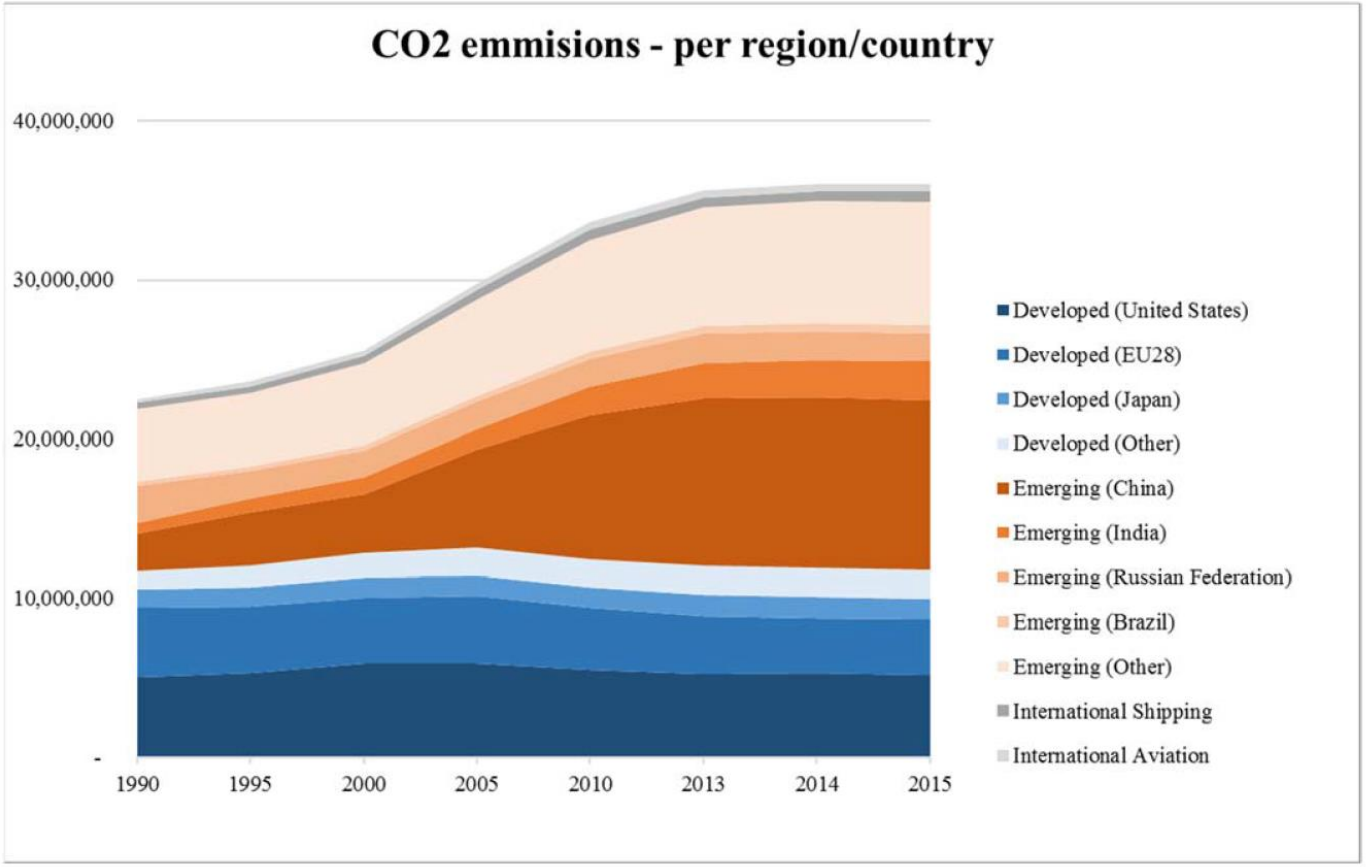


Figure 1. Total CO2 Emissions Over Time, per Region/Country

This figure presents the 1990-2015 time series of country-specific CO2 emission totals of fossil fuel use and industrial processes. Source: Emission Database for Global Atmospheric Research (EDGAR) 4.3.2, European Commission, Joint Research Centre (JRC)/PBL Netherlands Environmental Assessment Agency.

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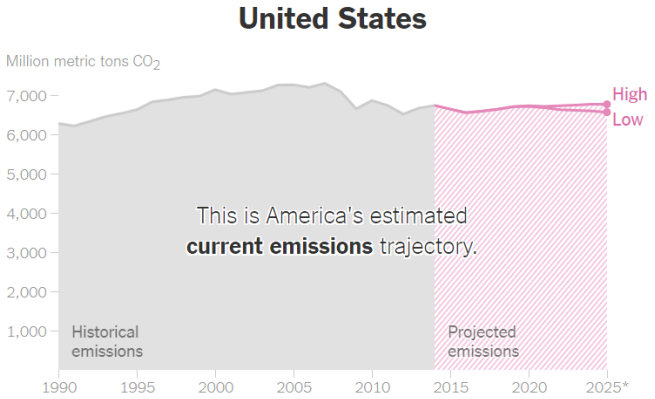
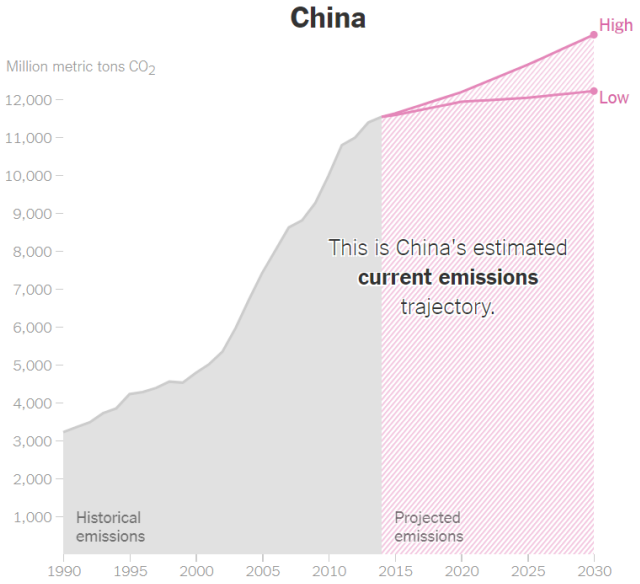
The New York Times
https://www.nytimes.com/interactive/2017/11/06/climate/world-emissions-goals-far-off-course.html?_r=1

2015: Paris climate change agreement to "*[hold] the increase in the global average temperature to well below 2 °C above pre-industrial levels*". drafted by BASIC countries (Brazil, South Africa, India and China) and the U.S.

2016: ratified at G20 Hangzhou Summit on "Green finance"

Ban Ki-Moon (UN) Xi Jinping (China) Barack Obama (US)





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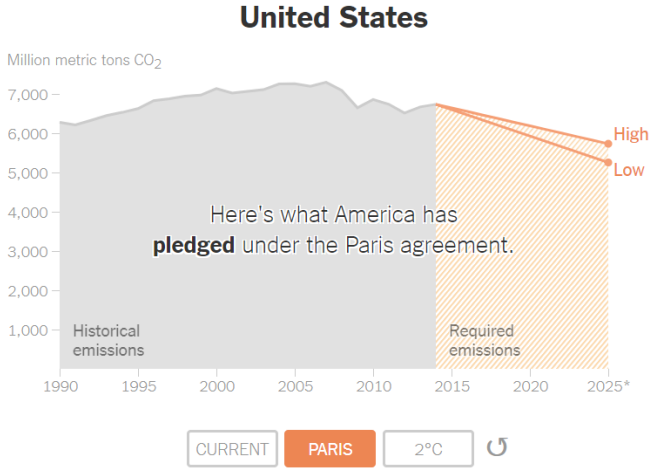

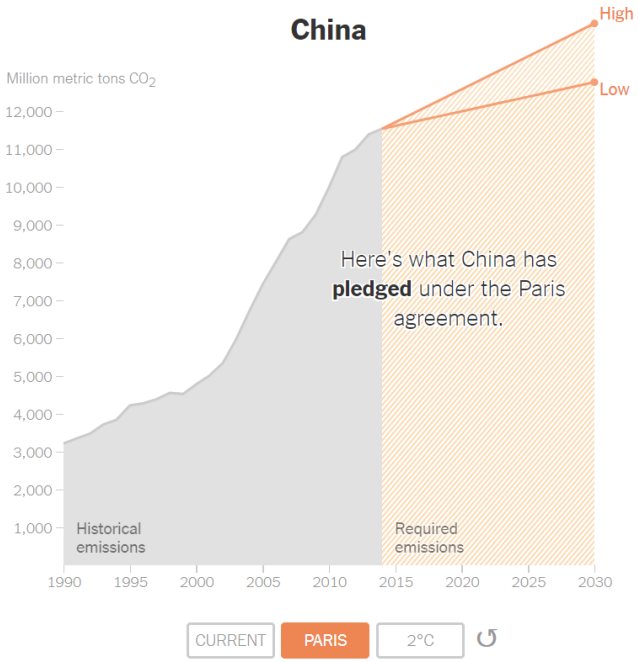

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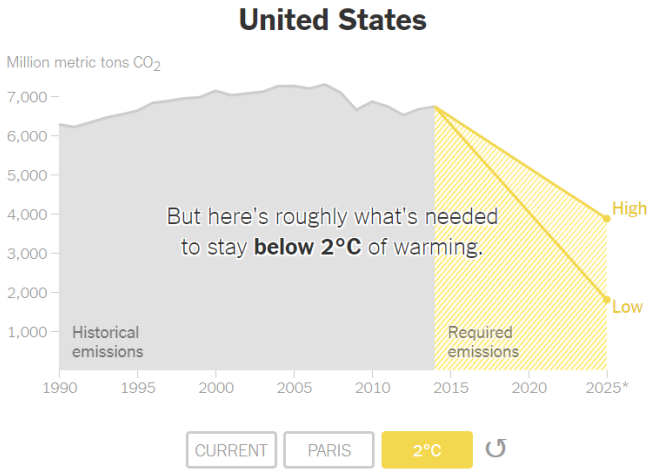

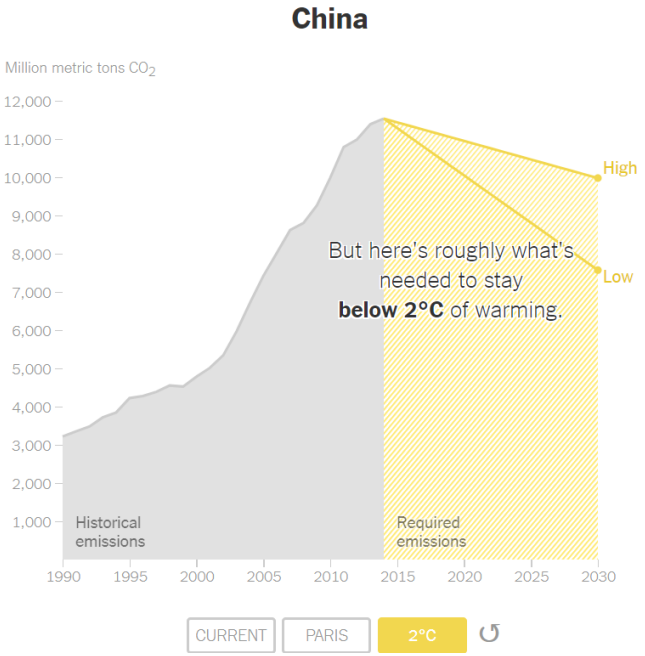

▸ *Leviathan Inc. and Corporate Environmental Engagement*

The Invisible (or Visible?) Hand of State Control

▸ "**Visible Hand**" = green industrial policy: Rodrik (2014) "…strong in theory, ambiguous in practice!"

Source: Rodrik, "Green industrial policy" (Oxford Review of Economic Policy 2014)

US:
-Laws: Clean Air Act; National Energy Conservation Policy Act; …
-Tools: Tax Credits (PTCs/ITCs), EPA standards for GHG emissions, Loan guarantees, R&D grants, …
-Programs: DOE Wind, Solar, Bioenergy, Geothermal Technology, Hydrogen & Fuel Cell Technologies, … Renewable portfolio standards (RPS) in a majority of states, …

Germany:
-Laws: Energy Transition (out of nuclear), Energy Concept (GHG emissions), EU Energy and Climate Package (20/20/20), …
-Tools: R&D funding, Feed-in tariff, Concessional lending/subsidies , Quotas
-Programs: Sixth Energy Research Program, EKF, KfW, …

China:
- Laws: Renewable Energy Law (2006), 12th Five Year Plan (2011–2015): energy efficiency, carbon emissions reduction, and new energies are priorities, …
- Tools: Feed-in tariffs for solar, wind, Fiscal incentives to support R&D or manufacturing in renewable energies, …
- Programs: Pilot cap-and-trade in provinces(256mln people, 3.5% of global economy), …

India:
- Laws: National Action Plan on Climate Change (2008), …
- Tools: Renewable Energy Certificates for wind, solar, and biomass power plants (but market near collapse), Generation-based Incentives for wind and solar , …
- Programs: National Mission for Enhanced Energy Efficiency. National Clean Energy Fund (funded by coal tax), …

▸ "**Invisible Hand**" = state ownership could be a way of providing public goods and a solution to market failures ("social view")

China: ICBC, 中国建设银行, PetroChina, 中国银行 BANK OF CHINA

France: EDF, GDF SUEZ

Russia: GAZPROM

Brazil: PETROBRAS

Italy: eni

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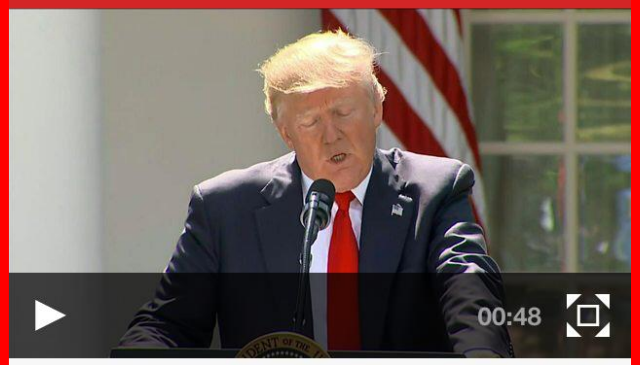

President Trump says the Paris climate accord "disadvantages" US

Paris climate deal: Trump announces US will withdraw

June, 2017:

President Donald Trump has announced that the US is withdrawing from the 2015 Paris climate agreement.

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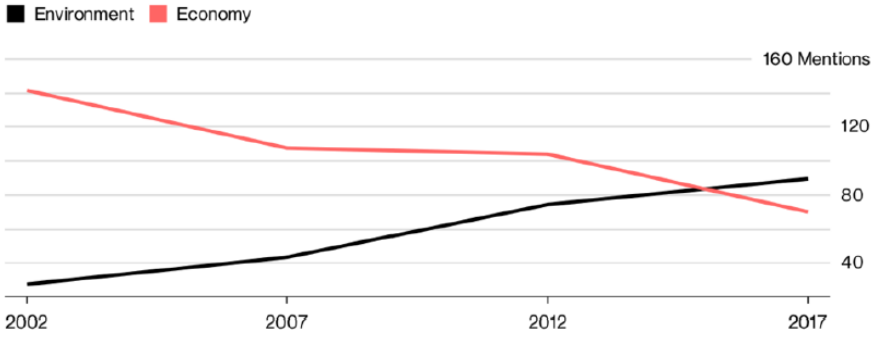
The Invisible (or Visible?) Hand of State Control

Xi's Speech Had 89 Mentions of the 'Environment,' Just 70 of the 'Economy'

Bloomberg News
October 18, 2017, 6:37 AM EDT

Xi's China Green Dream

Mentions of the environment in party congress speeches growing vs. the economy



Note: Environmental references include 'environment,' 'environmental protection,' 'green,' and 'ecosystem.'
Source: Bloomberg Intelligence

Bloomberg

Rodrik (2014) "…strong in theory,

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Source: Rodrik, "Green industrial policy" (Oxford Review of Economic Policy 2014)

China:
- Laws: Renewable Energy Law (2006), 12th Five Year Plan (2011–2015): energy efficiency, carbon emissions reduction, and new energies are priorities, …
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…be a way of providing public goods and a solution to market failures ("public interest" theory)

- **China:** ICBC
- **France:** EDF
- **Russia:**
- **Brazil:** PETROBRAS
- **Italy:** eni

This study:

- International data on state control and ownership (BvD ORBIS, manual) & Environmental Engagement ASSET4 (also MSCI, Sustainalytics)
- Sample period: 2004-2014
- 45 countries

Main Findings:

- **Positive association between SOE and Environmental scores**
- **Time Variation**: post- vs. pre-Copenhagen Accord (12/2009) Fukushima (3/2011) + changes in government political orientation (causation?)
- Effects are stronger for firms …
  - in **oil & gas industry** from **emerging economies** (Asia-Pacific and Latin America), **countries lacking energy resources** and in **conflict with neighboring countries**
  - with **direct domestic** state ownership, rather than being invested by SWF

… other blockholder types are not associated with Environmental scores.

▸ Literature on State SOEs:

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- **Agency view :** SOE managers are chosen for political reasons, have low-powered incentives, not transparent, poor monitoring by boards packed with politicians. (La Porta and Lopez-de-Silanes, 1999; Megginson, 2003), governments bail out inefficient firms (Kornai, 1979, Shleifer & Vishny, 1998) and lead to inefficient capital allocation (Chen, Jiang, Ljunqvist, Lu and Zhou (2017)).

  [Political view: SOEs are captured by politicians to fulfil their political agenda, namely to pursue their political career objectives (Shleifer and Vishny (1994), Sapienza (2004)), rather than maximizing social welfare.**]**

- **Social view:** SOEs can be effective in addressing environmental externalities
  - Private sector: maximize profits
  - Public sector: deal with externalities and market failures generated by the private sector during profit maximization

▸ Literature on Environmental, Social and Governance (ESG) < SKIP >

- Positive effects on shareholder value: Godfrey, Merrill & Hansen (2009), Servaes &Tamayo (2013), Hong & Liskovich (2015), Ferrell, Liang & Renneboog (2016), Lins, Servaes, and Tamayo (2017)
- Negative effects: Masulis and Reza (2015), Cheng, Hong, and Shue (2016)

▸ Literature on (institutional) ownership and ESG

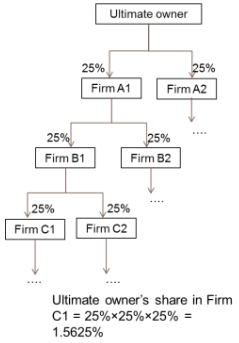
- US evidence: shareholder proposals and voting (Del Guercio & Tran (2012)) and private engagements (Dimson, Karakas, and Li (2015))
- International evidence: Hopner, Oikonomou, Sautner, Starks, and Zhou (2016)
  - Foreign institutional investors impact positively **G** (Aggarwal, Erel, Ferreira, and Matos (2011))
  - Foreign institutional investors impact **E&S** only when they come from countries with high E&S social norms, with firms from the Americas having no significant impact (Dyck, Lins, Roth & Wagner (2016))

Sample of publicly-listed firms in 45 countries (2004-2014)

- **State control and ownership** data:

-> Main variable (BvD ORBIS):

State_own = *dummy variable that equals 1 if the ultimate owner is the government or a public authority, and 0 otherwise (at least **25%** of voting rights throughout the pyramid ownership chain).*



… cross-checked **manually** with FACTSET and public sources

- example: Zijin Mining is majority owned (>25%) by Minxi Xinghang State-Owned Assets Investment Co. Ltd., which is a private company controlled by the Chinese government

… 3,624 => 4,861 firm-year observations are SOEs (State_own = 1)

-> Alternative variable (DATASTREAM):

Government_held = *the % of floating shares held directly by government (if > 5%)*

… but lower quality (and only first-layer of ownership)!

- **State ownership** data:

Forbes Global 2000 firms: (2010)

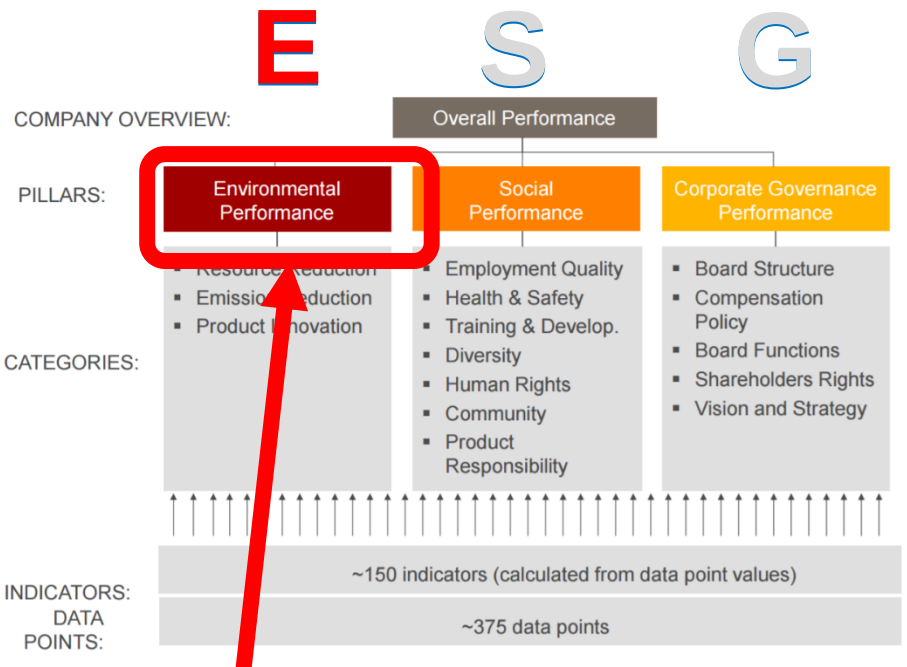
forbes_rank	GUO_state	government_held	ENVSCORE
01_JPMorgan Chas	0	0	92.5
02_General Elect	0	0	95.1
03_Bank of Ameri	0	0	77.5
04_ExxonMobil	0	0	94.2
05_ICBC	1	47	87.9
06_Banco Santand	0	0	93.2
07_Wells Fargo	0	0	91.9
08_HSBC Holdings	0	0	93.4
09_Royal Dutch S	0	0	89.7
10_BP	0	0	89.9
11_BNP Paribas	0	11	93.0
12_PetroChina	1	0	57.5
13_AT&T	0	0	92.7
14_Wal-Mart Stor	0	0	86.6
15_Berkshire Hat	0	0	9.4
16_Gazprom	1	49	82.0
17_China Constru	1	6	53.3
18_Petrobras	1	56	91.7
19_Total	0	0	89.7
20_Chevron	0	0	90.4
21_Barclays	0	7	94.1
22_Bank of China	1	0	79.6
23_Allianz	0	0	93.5
24_GDF Suez	1	36	90.1
25_E ON	0	0	91.6
26_Goldman Sachs	0	0	92.1
27_EDF Group	1	84	92.9
28_AXA Group	0	0	93.4
29_Lloyds	1	41	90.0
30_Proctor & Gam	0	0	94.7
31_ENI	1	20	89.0

…

If State_own =1

: manual corrections

- **ESG** data: Thomson Reuter's ASSET4 (ex: Liang and Renneboog (2017))



Source: http://www.trcri.com/

ENVSCORE: "*The environmental pillar measures a **company's impact on living and non-living natural systems**, including the air, land and water, as well as complete ecosystems. It reflects how well a company uses best management practices to avoid environmental risks and capitalize on environmental opportunities in order to generate long term shareholder value.*"

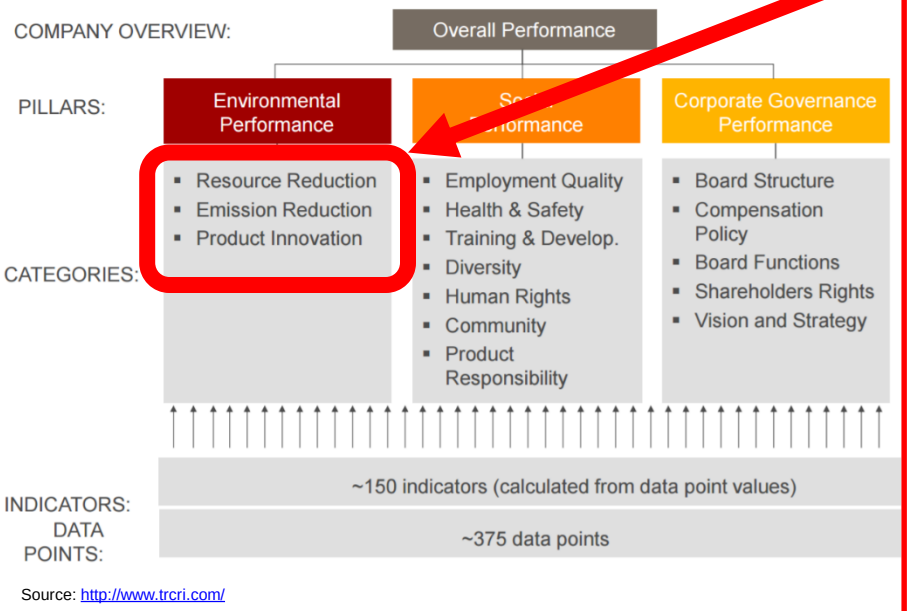
ENVSCORE (environmental scores)

SOCSCORE (for social scores)

CGVSCORE (corporate governance scores)

Note: all scores are industry-demeaned (range: 0 to 100 , mean = 50), universe = 4,500 firms in major indices, sources = companies & public/media/NGOs

▸ **ESG** data: THOMSON REUTERS (previously known as “ASSET4”)



Source: http://www.trcri.com/

▸ ENER (emission reduction): *measures a company's management commitment and effectiveness towards **reducing environmental emission** in the production and operational processes. It reflects a company's capacity to reduce air emissions (greenhouse gases, F-gases, ozone-depleting substances, NOx and SOx, etc.), waste, hazardous waste, water discharges, spills or its impacts on biodiversity and to partner with environmental organisations to reduce the environmental impact of the company in the local or broader community.*

▸ ENPI (product innovation): *measures a company's management commitment and effectiveness **towards supporting the research and development** of eco-efficient products or services. It reflects a company's capacity to reduce the environmental costs and burdens for its customers, and thereby creating new market opportunities through new environmental technologies and processes or eco-designed, dematerialized products with extended durability.*

▸ ENRR (resource reduction category):

*measures a company's management commitment and effectiveness towards achieving **an efficient use of natural resources** in the production process. It reflects a company's capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management.*

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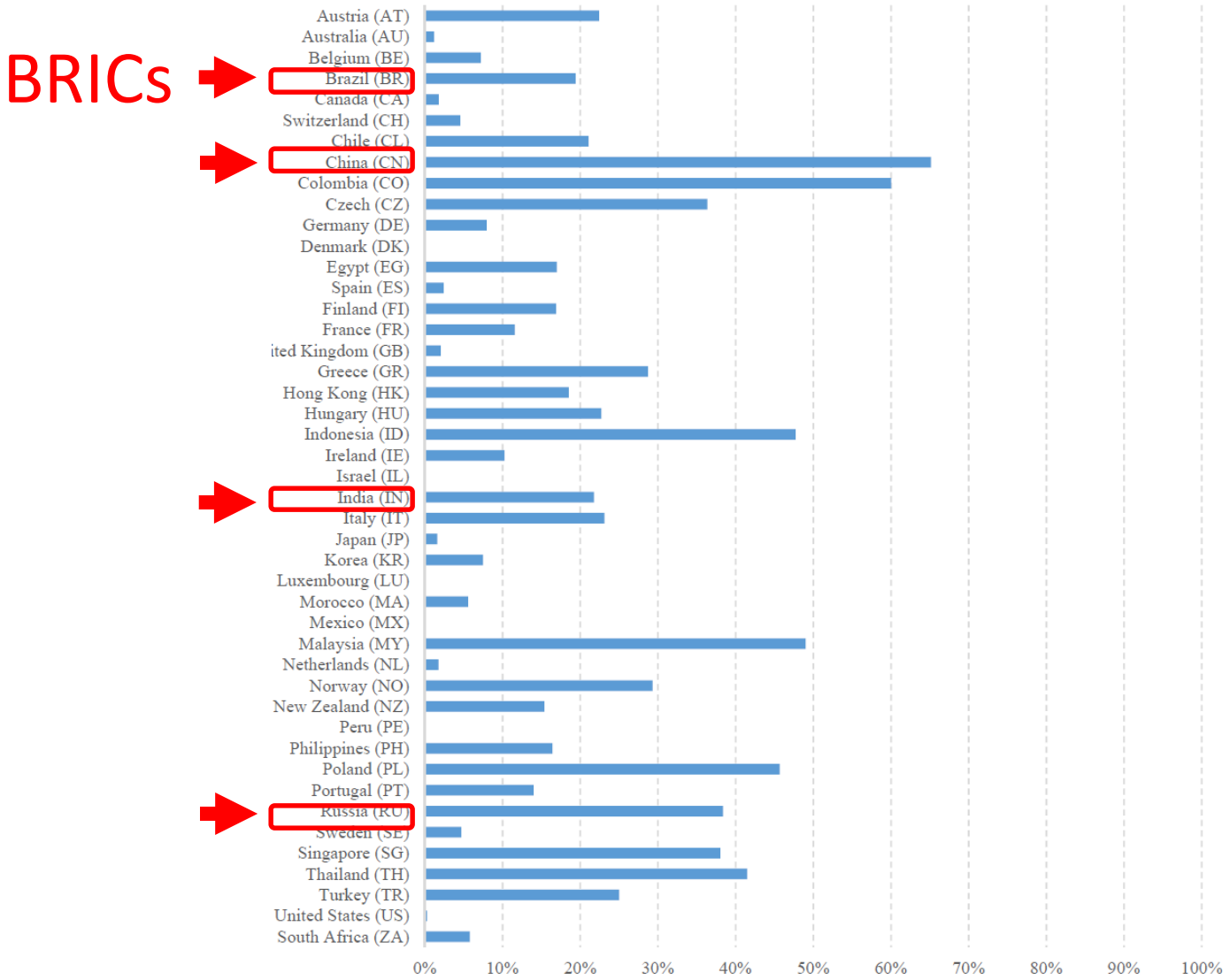
Table 1. Forbes Top-Ranked Global Companies, 2010

Forbes Rank 2010	Country	*State_own*	*ENVSCORE*				*SOCSCORE*	*CGVSCORE*
				ENER	*ENPI*	*ENRR*		
1. JPMorgan Chase	US	0	92.50	76.57	97.25	87.06	66.48	72.70
2. General Electric	US	0	95.06	94.53	97.69	95.05	90.78	94.49
3. Bank of America	US	0	77.54	48.28	86.94	80.64	67.41	82.06
4. ExxonMobil	US	0	94.19	92.48	94.75	93.17	91.67	86.78
5. ICBC	**CN**	1	**87.86**	**72.09**	**95.19**	**85.65**	**78.27**	**78.98**
6. Banco Santander	ES	0	93.21	92.03	87.77	93.30	95.23	89.16
7. Wells Fargo	US	0	91.92	93.11	88.13	84.08	59.39	82.47
8. HSBC Holdings	GB	0	93.40	93.63	87.41	93.41	86.73	84.91
9. Royal Dutch Shell	GB	0	89.69	79.54	89.40	92.34	78.23	87.56
10. BP	GB	0	89.86	89.45	75.50	89.25	87.12	83.28
11. BNP Paribas	FR	0	93.04	87.99	97.34	90.84	94.07	90.89
12. PetroChina	**CN**	1	**57.50**	**64.25**	**15.44**	**75.30**	**81.13**	**19.74**
13. AT&T	US	0	92.71	93.39	88.22	88.37	79.26	91.63
14. Wal-Mart Stores	US	0	86.55	69.81	71.89	88.95	75.46	94.06
15. Berkshire Hathaway	US	0	9.36	9.39	14.92	8.92	3.75	63.05
16. Gazprom	**RU**	1	**81.95**	**91.28**	**53.11**	**79.10**	**76.46**	**6.99**
17. China Construction Bank	**CN**	1	**53.33**	**34.44**	**87.36**	**35.94**	**81.45**	**28.92**
18. Petrobras	**BR**	1	**91.67**	**90.93**	**84.42**	**88.34**	**93.80**	**34.01**
19. Total	FR	0	89.70	77.73	87.75	83.24	83.63	65.24
20. Chevron	US	0	90.42	86.96	87.89	82.06	63.51	77.78
21. Barclays	GB	0	94.11	90.95	94.89	92.44	93.23	86.60
22. Bank of China	**CN**	1	**79.61**	**37.93**	**95.50**	**88.15**	**82.44**	**49.77**
23. Allianz	DE	0	93.50	93.66	88.13	93.40	93.40	78.88
24. GDF Suez	**FR**	1	**90.06**	**92.34**	**88.28**	**78.89**	**95.71**	**76.96**
25. E ON	DE	0	91.60	94.91	85.84	84.94	96.59	29.78
26. Goldman Sachs	US	0	92.12	78.15	87.37	93.51	53.77	74.37
27. EDF Group	**FR**	1	**92.86**	**84.90**	**97.53**	**88.77**	**96.13**	**33.16**
28. AXA Group	FR	0	93.39	85.18	95.44	93.31	94.37	82.90
29. Lloyds	**GB**	1	**90.01**	**92.48**	**69.86**	**92.90**	**93.20**	**73.90**
30. Procter & Gamble	US	0	94.69	92.76	97.41	93.50	92.54	81.51
31. ENI	**IT**	1	**89.02**	**83.41**	**81.75**	**84.79**	**96.11**	**59.61**

Figure 2. Average State Ownership of Publicly-listed Firms, per Country



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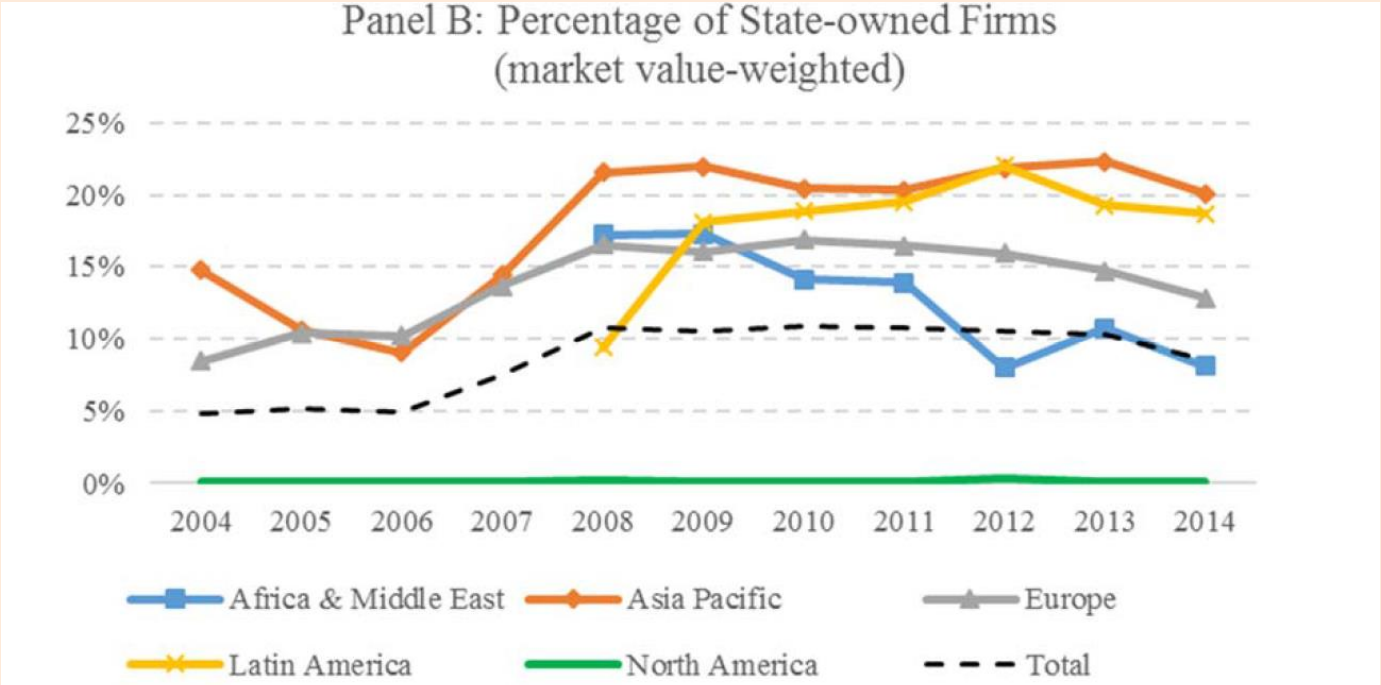
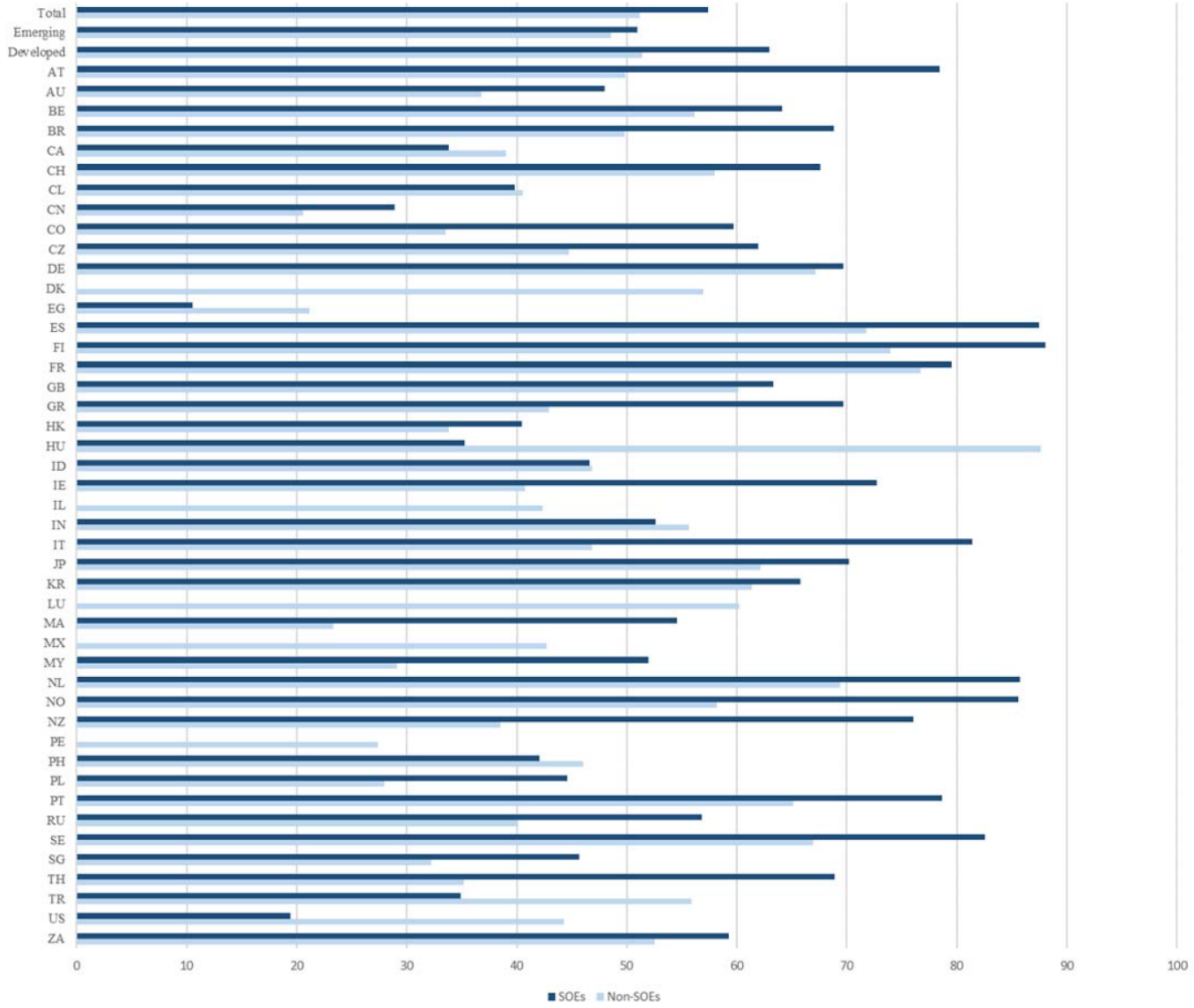


Figure IA. 4. Average State Ownership of Publicly-listed Firms, per Geographic Region and Year

Figure 3. Average Environmental Scores (ENVSCORE) of SOEs and Non-SOEs, per Country



▸ T2: Univariate Tests (*State_own* = 1) vs. (*State_own* = 0):

Country	Obs	*State_own*	*ENVSCORE*	*State_own*		p-value
				=1	=0	(1 - 0)
Total	28,890	0.066	51.51	57.4	51.1	0.00
Emerging	3,558	0.248	49.20	50.9	48.6	0.00**
Developed	25,332	0.040	51.83	62.9	51.4	0.00***

-> Internet Appendix: SOEs better environmental performance in 31 out of 45 countries of the sample!

▸ T4: Baseline Regression:

unit of observation = (firm *i* , country *j* , year *t*)

$$Environmental_{i,j,t} = \alpha + \beta\ State\_Own_{i,j,t} + \gamma\ Controls_{i,j,t} + Fixed\ Effects,$$

Environmental $_{i,j,t}$: ***ENVSCORE*** and sub-scores ***ENER*** (emission), ***ENPI*** (product), and ***ENRR*** (resource)

StateOwn $_{i,j,t}$: SOE dummy

Controls $_{i,j,t}$: institutional ownership, total assets in log, leverage, market-to-book ratio, ROA, GPD per capita

Standard errors clustered at the firm level

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Table 2. Univariate Tests of State Ownership and Environmental Performance

Panel A: Univariate Comparisons by Country

Country	Unique firm no.	Obs	*State_own*	*ENVSCORE*	*State_own* =1	=0	*p-value* (1 - 0)		*ENER*	*ENPI*	*ENRR*	*SOCSCORE*	*CGVSCORE*
Total	4,009	28,890	0.066	51.51	57.40	51.13	0.00		51.45	49.16	51.72	52.07	53.36
Emerging		3,558	0.248	49.20	50.94	48.58	0.00	**	50.08	45.09	50.81	55.50	29.05
Developed		25,332	0.040	51.83	62.94	51.41	0.00	***	51.64	49.73	51.85	51.59	56.77
AT	18	167	0.224	56.65	78.42	49.88	0.00	***	54.98	55.25	53.66	56.08	33.32
AU	350	1,855	0.012	36.91	47.95	36.80	0.07	*	40.15	34.69	39.16	39.30	63.42
BE	27	237	0.072	56.50	64.10	56.13	0.34		56.53	50.74	56.67	52.96	50.56
BR	83	401	0.194	53.51	68.79	49.78	0.00	***	52.50	46.89	56.34	64.11	27.24
CA	265	1,635	0.018	39.01	33.81	38.98	0.27		42.09	36.23	40.45	39.72	73.74
CH	66	485	0.046	58.41	67.57	57.95	0.15		57.15	54.97	58.25	56.61	47.10
CL	20	115	0.211	40.19	39.81	40.54	0.91		39.43	39.81	43.05	44.91	9.26
CN	44	218	0.651	26.01	28.92	20.58	0.00	***	24.39	38.47	23.13	25.40	24.59
CO	7	26	0.600	48.77	59.70	33.50	0.02	**	54.64	38.17	50.86	71.34	28.21
CZ	3	22	0.364	51.00	61.92	44.76	0.00	***	46.32	51.33	51.43	70.32	18.27
DE	89	734	0.079	67.38	69.65	67.11	0.45		64.75	65.09	66.30	68.48	34.59
DK	24	227	0.000	57.10		56.94			54.92	54.79	58.09	54.07	38.02
EG	11	55	0.170	19.55	10.55	21.15	0.00		21.37	25.05	20.67	27.24	8.64
ES	55	420	0.024	71.90	87.47	71.75	0.00	***	71.62	60.63	72.95	78.12	50.24
FI	27	244	0.169	76.11	88.02	73.94	0.00	***	69.22	78.39	71.03	70.35	60.87
FR	99	901	0.116	76.93	79.53	76.67	0.24		74.56	70.22	76.66	78.17	55.07
GB	361	2,893	0.020	60.14	63.34	60.10	0.39		62.80	48.16	62.88	63.31	73.89
GR	22	192	0.287	50.25	69.69	42.92	0.00	***	53.39	37.45	55.32	50.69	17.72
HK	142	920	0.185	34.69	40.49	33.78	0.00	***	33.12	36.85	37.07	35.98	36.48
HU	4	22	0.227	75.69	35.23	87.58	0.00		76.63	70.86	71.43	78.51	41.16
ID	31	139	0.477	46.41	46.58	46.82	0.96		51.94	37.26	48.70	62.82	26.03
IE	14	117	0.103	44.03	72.69	40.76	0.00	***	45.64	41.01	45.12	36.74	64.48
IL	14	82	0.000	42.73		42.34			37.24	40.99	49.35	45.73	37.17
IN	75	362	0.218	54.98	52.61	55.62	0.44		54.42	48.83	59.16	58.84	29.11
IT	48	426	0.231	55.00	81.41	46.84	0.00	***	53.93	52.84	56.28	64.23	43.97
JP	416	3,939	0.016	62.23	70.17	62.12	0.03	**	61.94	63.09	57.26	47.32	11.96
KR	109	564	0.075	61.73	65.77	61.34	0.31		61.18	63.98	56.14	57.05	13.79
LU	3	18	0.000	60.19		60.19			52.85	57.76	60.94	50.93	58.92
MA	3	19	0.056	27.30	54.56	23.33	-		25.57	27.54	33.38	54.64	5.45
MX	24	115	0.000	43.00		42.73			45.33	34.56	47.50	45.06	13.16
MY	44	207	0.490	40.12	51.97	29.13	0.00	***	44.71	37.32	40.53	49.12	46.94
NL	37	286	0.017	69.67	85.72	69.38	0.00	***	67.06	63.14	70.53	77.46	64.51
NO	18	174	0.293	66.21	85.57	58.19	0.00	***	63.98	64.62	61.74	69.81	63.62
NZ	9	65	0.154	44.31	76.07	38.54	0.00	***	43.31	45.98	41.67	41.47	62.47
PE	1	7	0.000	27.40		27.40			41.28	18.82	33.43	31.99	51.66
PH	14	63	0.164	44.86	42.04	46.01	0.68		42.42	43.30	48.75	45.31	28.78
PL	26	128	0.457	35.39	44.60	27.94	0.00	***	38.78	34.78	34.85	42.30	23.24
PT	12	103	0.140	67.44	78.67	65.14	0.04	**	69.26	56.18	67.15	76.88	56.78
RU	34	187	0.384	46.48	56.83	40.14	0.00	***	49.90	34.90	52.53	54.68	28.74
SE	50	454	0.047	67.71	82.53	66.92	0.00	***	64.58	66.35	64.50	64.94	54.29
SG	49	414	0.380	36.98	45.66	32.19	0.00	***	37.82	35.14	40.67	40.79	43.78
TH	30	136	0.415	49.30	68.88	35.19	0.00	***	48.04	47.37	50.58	59.71	45.53
TR	24	135	0.250	51.04	34.88	55.89	0.00		51.49	51.33	49.65	55.79	22.47
US	1086	8,536	0.003	44.23	19.42	44.31	0.00		42.95	45.00	44.82	47.61	74.15
ZA	121	445	0.058	53.33	59.25	52.54	0.14		55.27	40.54	60.46	71.34	60.76

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Table 2. (continued)

Panel B: Univariate Comparisons by Major Industry								
Industry	Obs.	*State_own*	*ENVSCORE*				*SOCSCORE*	*CGVSCORE*
			All	*State own*=1	*State own*=0	p-value (1 - 0)		
Basic Materials	3,015	0.056	55.58	59.84	55.40	0.07	53.39	54.89
Consumer Goods	3,370	0.019	61.55	47.15	61.90	0.00	57.76	46.95
Consumer Services	3,992	0.023	41.05	52.56	40.79	0.00	46.35	53.55
Financials	5,059	0.069	43.23	46.36	43.04	0.06	46.02	49.99
Health Care	1,633	0.010	43.79	20.76	44.06	0.00	50.63	55.82
Industrials	5,610	0.053	59.08	53.83	59.38	0.00	55.40	52.47
Oil & Gas	2,061	0.126	45.48	64.61	42.69	0.00	48.52	63.62
Technology	1,960	0.021	51.69	63.00	51.46	0.03	51.53	58.82
Telecommunications	771	0.317	55.43	63.37	51.95	0.00	62.53	52.13
Utilities	1405	0.256	63.53	64.80	63.32	0.36	62.40	55.66
Total	28,876	0.066	51.52	57.40	51.14	0.00	52.08	53.36

T4: Baseline Regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent var.:	ENVSCORE	ENVSCORE	ENER	ENER	ENPI	ENPI	ENRR	ENRR
State_own	3.991***	2.507*	4.385***	2.857**	2.606	1.306	4.703***	2.702*
	(1.524)	(1.410)	(1.472)	(1.384)	(1.670)	(1.603)	(1.511)	(1.397)
Institution_own		3.323*		2.906		3.665*		3.808*
		(1.896)		(1.953)		(2.052)		(2.007)
Ln(Assets)		6.334***		6.608***		4.074***		6.916***
		(0.310)		(0.291)		(0.305)		(0.328)
Leverage		0.0230		0.0298*		-0.00714		0.0288
		(0.0175)		(0.0180)		(0.0186)		(0.0181)
MTB		0.248**		0.276**		0.127		0.342***
		(0.113)		(0.112)		(0.127)		(0.123)
ROA		0.0915***		0.0975***		0.0560*		0.139***
		(0.0268)		(0.0277)		(0.0307)		(0.0298)
Ln(GDP)		2.536		1.191		0.0704		4.322**
		(1.735)		(1.804)		(2.034)		(1.987)
Observations	28,890	28,890	28,890	28,890	28,890	28,890	28,890	28,890
Number of firm_id	4,009	4,009	4,009	4,009	4,009	4,009	4,009	4,009
Country & Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

▸ T5: Salient Environmental Events

[A]: 12/2009 Copenhagen Accord

- The Copenhagen Accord is the successor to the Kyoto Protocol, whose round ended in 2012. Raised governmental and corporate awareness of the severity of climate change.
- Caveats: (1) non-legally-binding; (2) confounding (but reinforcing!) event: Deepwater Horizon oil spill in early 2010

Panel A. 2009 Copenhagen Agreement: All Countries

	ENVSCORE	*ENER*	CO_2
	(1)	(2)	(3)
State_own × Post 2009	2.428*	3.019**	-0.059*
	(1.406)	(1.432)	(0.034)
State_own	0.814	0.753	0.031
	(1.819)	(1.780)	(0.037)
Observations	28,890	28,890	13,245
Number of Firms	4,009	4,009	2,304
Country & Year FE	Yes	Yes	Yes

▸ **T5:**

Panel B. Copenhagen Agreement: F.E.s and Subsamples			
Dep. Variable = ENVSCORE	*All Countries*	*Asia Pacific & Latin America*	North America, Europe & M.E.
	(1)	(2)	(3)
State_own × Post 2009	2.419**	7.512***	-2.429
	(1.105)	(2.311)	(1.686)
State_own	-1.352	-1.577	-2.566
	(2.275)	(3.920)	(2.895)
Observations	28,890	9,546	19,344
Number of Firms	4,009	1,448	2,561
Country & Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes

Panel C. 2009 Copenhagen Agreement: Subsamples by CO_2 per capita		
Dep. Variable = ENVSCORE	*High CO_2 per capita*	*Low CO_2 per capita*
	(1)	(3)
State_own × Post 2009	3.254**	0.714
	(1.598)	(1.826)
State_own	3.990*	1.245
	(2.138)	(2.023)
Observations	8,263	3,340
Number of Firms	2,583	1,149
Country & Year FE	Yes	Yes
Event window	2008-2011	2008-2011

▸ T5: [B]: 3/2011 Fukushima Nuclear Disaster

- Most significant nuclear incident since Chernobyl
- Germany accelerated plans to close its nuclear power reactors

Panel D. Fukushima Nuclear Disaster

	All	Utilities	Non-utilities	All
	(1)	(2)	(3)	(4)
State_own × Post 2011	2.866***	6.233***	3.118***	2.947***
	(0.912)	(2.156)	(1.030)	(1.029)
State_own	1.207	0.707	0.296	0.550
	(1.504)	(3.644)	(1.694)	(1.680)
Utilities				10.33***
				(1.878)
State_own × Utilities				-0.380
				(3.489)
Utilities × Post 2011				-6.232***
				(1.491)
State_own × Post 2011 × Utilities				4.129*
				(2.495)
Controls	Yes	Yes	Yes	Yes
Observations	28,441	1,405	27,036	28,890
Country & Year FE	Yes	Yes	Yes	Yes

▸ T6: Changes in Government Political Orientation

Dependent variable	Left – Center/Right		Center/Left – Right	
	ENVSCORE (one-year forward)			
	(1)	(2)	(3)	(4)
State_own	2.125	1.980	2.127	1.963
	(1.822)	(1.805)	(1.821)	(1.805)
Year government leaning right	-0.608			
(from left to center/right)	(0.504)			
State_own × Year government leaning right	-0.291			
(from left to center/right)	(1.942)			
Year government leaning left		-0.563		
(from center/right to left)		(0.510)		
State_own × Year government leaning left		3.567**		
(from center/right to left)		(1.577)		
Year government leaning right			-0.210	
(from center/left to right)			(0.472)	
State_own × Year government leaning right			-0.583	
(from center/left to right)			(1.738)	
Year government leaning left				-0.931*
(from right to center/left)				(0.538)
State_own × Year government leaning left				4.731***
(from right to center/left)				(1.721)
Observations	21,311	21,311	21,311	21,311
Number of firm_id	3,475	3,475	3,475	3,475
Control variables	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

T7: Cross-Country Variation

Panel A. By Level of Economic Development		
	(1) Emerging Markets	(2) Developed Countries
State_own	3.976**	1.592
	(1.806)	(1.937)
Observations	3,558	25,332
Control variables	Yes	Yes
Country & Year FE	Yes	Yes

Panel B. By Regions					
Region	(1) Africa & Middle East	(2) Asia Pacific	(3) Europe	(4) Latin America	(5) North America
State_own	-0.984	5.238**	0.283	6.851*	-3.900
	(5.236)	(2.383)	(2.152)	(3.805)	(3.719)
Observations	736	8,882	8,437	664	10,171
Control variables	Yes	Yes	Yes	Yes	Yes
Country & Year FE	Yes	Yes	Yes	Yes	Yes

▸ T8: Channels & Disentangling Theories

- **Social view:** SOEs can be effective in addressing environmental externalities
  - Especially in strategically important and environmentally sensitive industries (e.g. Oil & Gas)
  - Especially when the operation is more domestic
  - Especially in countries where environmental issues are stronger concerns
  - Is not a function of environmental regulations

- **Agency/political views:** SOEs are captured by politicians to fulfil their political agenda, or are run by self-interested managers
  - The effect is negative (agency view)
  - The effect depends on the political connectedness of the CEO

T8: Channels

	(1)	(2)	(3)	(4)
State_own	1.720	4.602**	1.438	3.524**
	(1.475)	(1.636)	(1.828)	(1.681)
Oil & Gas	-3.859***			
	(1.454)			
State_own × Oil & Gas	10.90**			
	(5.406)			
Foreign sales		0.054***		
		(0.010)		
State_own × Foreign sales		-0.043*		
		(0.026)		
Energy security risk			-0.0149***	
			(0.00382)	
State_own × Energy security risk			0.0118***	
			(0.00422)	
Neighboring countries conflict				-8.042***
				(2.400)
State_own × Neighboring countries conflict				13.72***
				(3.580)
Controls, Country & Year FE	Yes	Yes	Yes	Yes
Observations	28,890	24,795	24,819	21,493

T8: Channels

	(5)	(6)
State_own	3.374*	2.371*
	(1.770)	(1.367)
Environmental regulation	6.880***	
	(1.314)	
State_own × Environmental regulation	1.930	
	(1.660)	
Political connection of CEO		0.222
		(0.807)
State_own × Political connection of CEO		0.800
		(2.244)
Controls, Country & Year FE	Yes	Yes
Observations	27,798	28,890

▸ T9-A: State Ownership Special? (vs. other > 5% free-float blockholders)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Government_held	0.063**									
	(0.027)									
Foreign holdings		0.0017								
		(1.488)								
Cross holdings			-0.007							
			(0.014)							
Pension fund held				-0.314***						
				(0.076)						
Investment co. held					-0.038**					
					(0.016)					
Employee held						-0.097***				
						(0.018)				
Other holdings							0.002			
							(0.031)			
Strategic holdings								-0.042***		
								(0.010)		
Domestic inst. held									-1.537	
									(2.310)	
Foreign inst. held										7.585***
										(2.419)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	29,721	28,659	28,724	28,724	28,724	28,724	28,724	28,724	28,890	28,890
Country & Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

▸ T9-B: Different Forms of State Ownership

VARIABLES	(1) ENVSCORE	(2) ENVSCORE	(3) ENVSCORE	(4) ENVSCORE
State_own	-0.310	0.560		2.502*
	(2.790)	(2.811)		(1.411)
Domestic_own	0.736	-7.310***		
	(1.083)	(2.279)		
State_own x Domestic_own	3.845	6.812*		
	(3.807)	(3.696)		
Domestic_State_own			4.056**	
			(1.896)	
SWF				0.456
				(1.437)
Observations	25,124	3,766	28,890	28,890
Control variables	Yes	Yes	Yes	Yes
Country & Year FE	Yes	Yes	Yes	Yes
Sample	OECD Countries	Emerging Countries	Full Sample	Full Sample

▸ T10: Alternative ESG Measures

Dependent var.:	(1) *MSCI Environmental Pillar Score*	(2) *Sustainalytics Environmental Score*
State_own	0.712**	2.045*
	(0.332)	(1.101)
Inst_own	-0.375	5.813***
	(0.400)	(1.912)
Ln(Assets)	0.343***	2.074***
	(0.0580)	(0.413)
Leverage	0.139*	0.017***
	(0.0801)	(0.013)
MTB	0.426	0.374*
	(0.335)	(0.215)
ROA	0.0658***	0.099
	(0.0157)	(0.061)
Ln(GDP)	41.73	5.111*
	(115.2)	(3.036)
Observations	1,383	3,300
R-squared	0.119	0.204
Country FE	Yes	Yes
Model	Cross-section OLS	Pooled OLS

T11: Shareholder Value and Firm Performance

	(1) *Market-to-Book Assets*	(2) *5-year ROA*
State_own	-0.0088	0.310
	(0.0993)	(0.499)
ENVSCORE	0.0024***	0.0046***
	(0.0006)	(0.0016)
State_own × ENVSCORE	-0.0015	-0.0043
	(0.0014)	(0.0053)
Observations	26,163	11,969
Control variables	Yes	Yes
Country FE	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes

▸ T12: Other ESG Pillars - Social and Governance?

Dependent var.:	(1) *SOCSCORE*	(2) *CGVSCORE*
State_own	2.233*	0.917
	(1.284)	(1.099)
Observations	28,890	28,881
Number of firms	4,009	4,009
Control variables	Yes	Yes
Country FE	Yes	Yes
Year FE	Yes	Yes

- **WORK IN PROGRESS:**
  - **Econometrics:**
    - **Industry-Year FEs**
    - **Changes:**
      - **Long lead/lag changes**
      - **Climate change: Copenhagen -> Abnormal Temperature shocks (Choi, Gao, Jiang (2018))**
  - **Sample cuts:**
    - **AsiaPac & LatAm -> by MktCap/GDP**
  - **Environmental regulation**
  - **…**

▸ Conclusions:

- Using a sample of public firms in 45 countries (2004-2014), we find
  - SOEs tend to have **higher engagement in environmental issues**
  - We do not find such a pattern for other blockholding types
  - The role of SOEs on environmental engagement is more pronounced in
    - **Oil & Gas sector**
    - **Emerging economies** (Asia-Pacific and Latin America)
    - **Countries lacking energy resources**
    - **Countries with conflicts with neighboring countries**

- Policy implications: there is a role of “Leviathan Inc.” in dealing with externalities in the economy!