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Leviathan Inc. and Corporate Environmental Engagement

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Abstract

In a special report in 2010, *The Economist* called the resurgence of state-owned mega-enterprises, especially those in emerging economies, “Leviathan Inc.,” and warned about the dangers of the state capitalism model. Traditionally, state-owned firms have been criticized for poor governance and questionable efficiency. In fact, they may be better positioned to deal with market failures and externalities. Our findings based on publicly-listed firms in 45 countries suggest that government-controlled companies engage more in environmental issues, and this engagement does not come at a cost to shareholder value. The effect is more pronounced among firms in emerging market economies and in countries with higher energy risks. The effect is attributable to ownership stakes held directly by domestic governments, rather than to foreign state ownership or investment via sovereign wealth funds. Difference-in-differences estimates show that state-owned firms reacted more significantly to the 2009 Copenhagen Accord in improving their environmental performance. Interestingly, state-owned firms also engage more in social issues, but they do not reveal better corporate governance performance.

Keywords: State ownership, environmental engagement, sustainability, ownership structure

JEL classification: G32, H11, H41, Q56

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1. Introduction

With the rise of emerging market economies in the last two decades, the role of state capitalism has attracted new attention. In China, companies in which the state is a majority shareholder account for over 60% of total stock market capitalization. Other emerging market governments such as Brazil or Russia also hold majority or significant minority stakes in local companies. These holdings can be direct through central or local governments but also indirect in the form of public pension funds or sovereign wealth funds. This pattern is contrary to that in many Western economies where large-scale privatizations in the 1980s and 1990s led to the decline in the role of the state in business. In the post-privatization era of the early 21st century, some of the world's largest publicly-listed firms are now state-owned enterprises (SOEs). In fact, Table 1 shows that 10 of the top 30 global public companies as ranked by Forbes magazine in 2010 were SOEs.¹

The Economist (2010, 2014) calls these resurging state-owned mega-enterprises “Leviathan Inc.,” especially those in emerging economies, and warns about the danger of such a state capitalism model.² There is a large literature on the economic inefficiency of state ownership, mostly based on the agency cost view (Megginson et al. (1994), Shleifer (1998), Dewenter and Malatesta (2001)). This view argues that SOE managers are chosen for political reasons, have low-powered incentives, and are poorly monitored by boards packed with politicians (Shleifer and Vishny (1998); La Porta and Lopez-de-Silanes (1999)). Political elites who control SOEs may seek rents from society at the expense of other stakeholders, which can reduce economic efficiency through corruption, poor resource allocation, less innovation and skewed wealth creation. Yet other studies re-examining SOEs in emerging markets document some positive effects of this “new state capitalism” (Musacchio and Lazzarini (2014); Musacchio, Lazzarini, and Aguilera (2015)). There is some suggestion that SOEs may help emerging markets deal with market failures and externalities.

One crucial way state ownership of businesses can be a positive factor in the public interest is in addressing climate change. While developed nations have been the largest contributors to global warming, the growth rate in new emissions is now concentrated in emerging market economies. In 2010, the countries emitting the most greenhouse gases were China (22%), the U.S. (13%), the EU-28 (10%), India (5%), and Brazil (5%), according to the EU's EDGAR data.³ In September 2016, the Hangzhou G20 Summit focused on “green finance”, and the U.S. and China ratified the Paris climate change agreement. Governments can promote green technology by imposing

¹ This marked presence of state ownership among the world's biggest companies may be understated, given that the Forbes Global 2000 covers only publicly-listed companies. For example, Saudi Aramco, the biggest energy company in the world, which has been estimated to be the world's most valuable company, has been 100% owned by the Saudi Arabian government since 1980.

² “Leviathan” is something that is very large and powerful, or a sea monster in scriptural accounts. Leviathan is generally used to refer to the political state after its use in Thomas Hobbes' “Leviathan or The Matter, Forme and Power of a Common Wealth Ecclesiastical and Civil” (1651).

³ Emission Database for Global Atmospheric Research (EDGAR) classifies CO₂, CH₄, N₂O, and F-gases as greenhouse gases (GHG). Under the United Nations Framework Convention for Climate Change (UNFCCC), countries submit their inventories of GHG. The emission time series 1990-2012 per region/country is available in <http://edgar.jrc.ec.europa.eu/overview.php?v=GHGts1990-2012&sort=des9>. The country rankings based purely on CO₂ emissions for 2014 are similar: China (31%) US (22%), EU-28 (14%), India (12%), and Russia (10%). These data are available at: <http://edgar.jrc.ec.europa.eu/overview.php?v=CO2ts1990-2014&sort=des9>.

carbon taxes and providing research subsidies (Laffont and Tirole (1993), Acemoglu, Akcigit, Hanley, and Kerr (2016)). For example, in the U.S., green industrial policies include laws such as the Clean Air Act, tools like federal tax credits and programs such as state-level renewable portfolio standards. Rodrik (2014), however, concludes that these policies are “strong in theory, ambiguous in practice” (p.470). Alternatively, the state can use its “visible hand” by intervening in the form of stakes in public corporations. Initiatives related to environmental protection usually require substantial investment and long-term resource commitment, which private firms often cannot meet. State-owned firms, though, can coordinate resources through government procurement and state funding (examples including oil or other natural resources funds and public pension funds) to support such green investment.

As companies from China and other emerging market countries transition from dirty to clean technology and reduce fossil fuel emissions to limit climate change, the role of state ownership can be important. UNEP (2016) estimates that in 2015, for the first time, the investment in renewable energies in emerging countries outweighed that in developed economies. A large element in this turnaround was China, which contributed to over a third of the world in total, based on data from Bloomberg New Energy Finance.

Standard economic theories usually suggest that the private sector (the market) pursues profit maximization and efficiency, while the public sector (the state) corrects market failures such as negative externalities that corporations generate for the environment (Benabou and Tirole (2010)). Companies in developed countries tend to exhibit more shareholder-friendly corporate governance and perform better in terms of shareholder value maximization (Aggarwal, Erel, Stulz, and Williamson (2009)). Yet these companies do not internalize environmental (and social) costs. A company might improve shareholder value by outsourcing production to developing countries with looser environmental regulations. Firms in emerging countries may not have full incentives to pursue environmentally sustainable practices and instead maximize profits by using more polluting technologies. In this respect, emerging market SOEs may be the most prone to improve their environmental standards because of their state ownership.

We conduct an international study of the impact of state ownership on a firm’s engagement in environmental, social, and governance (ESG) issues. We compile a dataset of the level of state ownership and measures of ESG performance of publicly-listed firms in 45 countries over 2004-2014. There is considerable cross-country variation in state ownership in our sample. State ownership is more prevalent in emerging markets (24.8% of publicly-listed companies) than in developed economies (4.0%). SOEs represent more than 60% of the stock market in China, close to 40% in Russia, about 20% in Brazil, and 10% in France. They are insignificant in the U.S. and in other major developed economies. The prevalence of SOEs also differs across industries; in telecommunications, utilities, oil and gas, and financial services the government has greater presence. We focus primarily on how state ownership can address corporate environmental sustainability (the “E” in ESG) as it measures how a firm addresses market failures and externalities generated via its operation. We also touch on

other sustainability issues such as corporate engagement in social issues (S) and corporate governance (G), and compare the state ownership effects on E and on the S and G dimensions to shed light on the relative strengths of state ownership.⁴

Our findings are that SOEs engage more in environmental issues, especially in emission reduction and resource reduction. We provide evidence suggesting that state ownership has a causal effect on corporate environmental engagement by showing that SOEs reacted more significantly to the Copenhagen Accord signed in December 2009 in improving their environmental performance. Arguably, the Copenhagen Conference raised awareness of the severity of climate change and other environmental problems, which shifted the demand for environmental engagement by corporations worldwide. The results from difference-in-differences regressions are consistent with the notion that state-owned firms can be more proactive in dealing with environmental externalities.

Exploration of potential channels for the effect also supports a causal interpretation of our main findings. We document a stronger role of SOEs in environmental engagement among firms in energy-related industries (particularly in oil and gas), in countries with more energy independence, and in countries with greater conflict with neighboring states that may disrupt or cut necessary energy sources. We also document that the positive effect of state ownership on environmental engagement exists mainly in the subsample of companies in emerging countries rather than developed countries. We do not find such a pattern for other types of block-owners beyond the government, and we do not find it in firms held by foreign governments or by sovereign wealth funds. These results help further define the mechanism through which state ownership is related to solving environmental externalities: It stems from the fact that the state is the controlling owner and is not simply a mechanical effect of concentrated ownership.

Interestingly, we document that SOEs also engage more in social responsibility issues, but we find that they do not have better corporate governance practices. We also show that SOEs' environmental engagement does not come at a cost to shareholder value in terms of Tobin's Q and long-term profitability. We conclude that state control does not assume superior corporate governance or greater returns to shareholders, but it does contribute to the welfare of society at large, without significantly sacrificing shareholder interests.

Our work contributes to the developing literature on government involvement in public companies. The classical view of SOEs has typically been framed around the conflicting operational, financial, and social objectives that these companies face (e.g., Megginson and Netter (2001), Chen, Jiang, Ljungqvist, Lu and Zhou, (2017)). State-owned firms usually have weaker corporate governance and poorer financial performance (e.g., Megginson, Nash, and van Randenborgh (1994); Dewenter and Malatesta (2001); Megginson and Netter (2001); Bortolotti and Faccio (2009)). The privatization waves in emerging markets in the last decades, however, might

⁴ We use the terms "environmental engagement" and "sustainability" interchangeably throughout.

have heralded the rise of a new breed of SOEs. Recent studies document that “Leviathans” can achieve good financial performance (e.g., Inoue, Lazzarini, and Musacchio (2013), Cuervo-Cazurra et al. (2014), Musacchio, Lazzarini, and Aguilera (2015)). There is also a growing literature of government investment. Karolyi and Liao (2015) document the growing amount of cross-border acquisition activities by SOEs, particularly those in emerging markets. A large part of sovereign wealth funds’ investments also come from emerging markets (Dewenter, Han, and Malatesta (2010); Kotter and Lel (2011); Bortolotti, Fotak, and Megginson (2015)). Our contribution is to show that the state capitalism model can be effective in addressing market failures and environmental externalities.

Our work also speaks to the growing finance literature on how ownership structure affects corporate environmental engagement. There has been debate on the effects of ESG on shareholder value. Some authors document a positive effect (Godfrey, Merrill, and Hansen (2009); Servaes and Tamayo (2013); Hong and Liskovich (2015); Ferrell, Liang, and Renneboog (2016); Lins, Servaes, and Tamayo (2016)). Others find a negative effect (Masulis and Reza (2015); Cheng, Hong, and Shue (2016)). In the U.S., large institutional investors have been shown to yield some power in terms of shareholder proposals and voting (Del Guercio and Tran (2012)) and private engagements (Dimson, Karakas, and Li (2015)). Internationally, finance research has focused on how shareholders affect mostly the “G” dimension (corporate governance). For example, foreign institutional investors also seem to impact corporate governance and long-term investment positively (Aggarwal, Erel, Ferreira, and Matos (2011); Bena, Ferreira, Matos, and Pires (2016)). Dyck, Lins, Roth, and Wagner (2016) examine how foreign institutional investors impact E&S. The authors find an effect only when institutional investors come from countries with high E&S social norms while, interestingly, U.S. institutions have no significant impact on firms overseas. Hopner, Oikonomou, Sautner, Starks, and Zhou (2016) examine how ESG shareholder engagement by a large institutional investor can reduce downside risk but this tends to be concentrated in the governance dimension. Our contribution is to show that state ownership appears to be positively correlated with E (and to some extent with S, but not with G). We also find that shareholder value is not negatively affected by such engagement in non-shareholder issues by SOEs.

2. Sample and Summary Statistics

We first describe how we compile the data and introduce our key variables: state ownership and corporate environmental engagement. We then delineate our sample and control variables. Finally, we show the summary statistics for the sample.

2.1. Data and Variables

2.1.1. State Ownership

The primary data on state ownership come from Orbis, a Bureau van Dijk database. This data source provides the types of ultimate owners of over 70,000 publicly-listed companies around the world.⁵ This data source has previously been used to measure state ownership in “State-Owned Enterprises” by OECD (2013). An “ultimate owner” is identified by following the path of uninterrupted control rights if there is an ownership pyramid. A company is defined as state-owned if the ultimate owner is a public authority, a state, or a government entity with the percentage of voting rights exceeding 25% in every layer of the ownership pyramid. The main variable of interest in our study is *State_own*, a dummy variable that equals one if the firm is state-owned, and zero otherwise.

The most common example of a state-owned company occurs when the government of the country in which the company is headquartered has direct ownership that exceeds 25%. The largest stakes would be held directly by central or federal governments (e.g., the government of China or Brazil) and related entities (e.g., the China State-Owned Assets Supervision & Administration Commission), as well as state-level governments (e.g., the states of Shanghai or Sao Paulo) or through a development bank (e.g., BNDES in Brazil). In other cases, the state can exert control over a company through alternative channels. First, some firms may be owned by a group of governments, such as the Scandinavian airline company SAS, which is jointly owned by the governments of Sweden, Norway, and Finland, each holding less than 25% of the company’s shares. Second, a company may be owned by a foreign government, instead of a home country government; an example is Indosat in Indonesia, (originally controlled by the government of Indonesia, and then by the government of Singapore from 2003 through 2007, and owned by the Government of Qatar since).⁶ Foreign government controlling instances usually happen when a state-owned company or a sovereign wealth fund (e.g., GIC and Temasek for Singapore or the Qatar Investment Authority) acquires a majority stake in companies overseas. Third, selling a stake to a foreign state-owned firm does not necessarily imply majority-ownership by a foreign state. For example, EDP Energias de Portugal, a company that was majority-owned by Parpublica (owned by the government of Portugal), sold its shares in 2011, with China Three Gorges becoming the largest shareholder but holding less than 25%. Thus we consider EDP Energias de Portugal as state-owned before 2012, but no longer state-owned since 2012. Finally, some firms were initially not state-owned but ultimately become nationalized. A notable example is ABN AMRO, which was nationalized in 2010 by the Dutch government.

⁵ We do not include SOEs that are not publicly-listed companies so the state presence is underestimated in our study.

⁶ Other examples of foreign state ownership include Chartered Semiconductor Manufacturing (a Singaporean company currently controlled by GlobalFoundries, which is owned by the government of UAE), J Sainsbury (a U.K. company currently controlled by Qatar Holdings LLC); Tav Havalimanlari (a Turkish company currently controlled by Aéroports de Paris, which is itself owned by the government of France); Gallaher Group (a UK company currently controlled by Japan Tobacco, which is owned by the government of Japan); and ORANGE Polska (a Polish company owned by the government of France through France Telecom [ORANGE]).

Orbis takes into account many of the special cases of state ownership, but we manually cross-check the data for possible mismeasurement of state-owned status. First, companies in some countries issue different classes of shares, such as preferred shares and ordinary shares in Brazil, and our sample may cover only one class of these shares. For example, the government of Brazil owns over 50% stakes of *Petróleo Brasileiro* (Petrobras) through holding of ordinary shares, but Orbis originally includes only the security code for its preferred shares. The result is that Petrobras was first classified as non-state-owned which we corrected. Second, in some countries such as China, many publicly-listed companies are owned by a private parent company, which is then owned by the government. Orbis does not properly identify these private parent companies as state-owned. For example, Zijin Mining in China is majority-owned (>25%) by Minxi Xinghang State-Owned Assets Investment Co. Ltd., which is a private company controlled by the Chinese government. To correct for such mismeasurements of state ownership, we consult three major databases for ownership information—Orbis, FactSet/Lionshares, and Datastream—to cross-check all companies in our sample. As long as a company is identified as state-owned according to our criteria in any of the three databases, we consider the company as potentially state-owned. We then further manually check this company’s annual reports and other public sources to see whether its ultimate owner is a state entity.

Finally, we use an alternative measure of state ownership which is continuous and based on government-held free-floating shares (*Government_held*), which we obtain from Datastream. This variable measures the percentage of floating shares held directly by governments if holdings are greater than 5%. The variable includes only the ownership in the first layer, does not trace up to higher levels in the case of an ownership pyramid, and does not measure non-floating shares held by governments. Despite its limitations, we obtain consistent results using this alternative measure of state ownership.

2.1.2. Corporate Environmental (and Social and Governance) Engagement

To evaluate corporate engagement in environmental issues (as well as in social and governance issues), we use data from Thomson Reuter’s ASSET4 Environmental, Social, and Corporate Governance (ESG) database.⁷ The ASSET4 sample covers more than 4,500 global publicly listed companies that are included in major equity indices.⁸ The ASSET4 ratings consist of more than 750 ESG sub-dimensions (data points). Every data point goes through a multi-step verification process, including a series of data entry checks, automated quality rules, and historical comparisons. These data points reflect more than 280 key performance indicators and are rated as both a normalized score (0 to 100, with 50 as the industry mean) and the actual computed value. The equally-weighted average is then normalized by ASSET4 so that each firm is given a score relative to the performance of all firms in the same industry around the world. All ratings are provided on a yearly basis. For all companies, at least three

⁷ In robustness checks, we consider the Environmental Pillar Score in the MSCI ESG Intangible Value Assessment (“MSCI”) database and the Environmental Pillar Score in the Sustainalytics ESG Ratings database.

⁸ These indices include the S&P 500, Russell 1000, NASDAQ 100, MSCI Europe, FTSE 250, ASX 300, STOXX 600, the MSCI World Index, the MSCI Emerging Market index, among other major equity indices. This database has been used by Ioannou and Serafeim (2012).

years of history are available, and most companies are covered from 2005 onward. Thus the effective time-series of our sample firms are about ten years on average. Firms are rated on the basis of their ESG compliance (regulatory requirements) and their ESG engagement (voluntary initiatives). Therefore, the ESG ratings reflect a comprehensive evaluation of how a firm engages in stakeholder issues and complies with regulations. We primarily focus on the “E” ratings.

One may raise the concern that the ASSET4 sample is biased toward certain countries such as the U.S., the U.K., Japan, and Germany. In fact, the sample is constructed by tracking major equity indices that cover the largest companies around the world, as in other cross-country studies. A manual check of the data confirms that almost all major multinational corporations in the Fortune 1000 are in our sample. Therefore, the results from our sample can be interpreted as environmental engagement for the world’s largest companies, whatever their country or origin. This is consistent with the idea that larger firms have greater societal and environmental impacts.

In the main analysis, we focus on a company’s overall environmental performance score (*ENVSCORE*), and three sub-aggregate level scores: Product Innovation (ENPI), Resource Reduction (ENRR), and Emission Reduction (ENER). *ENPI (Product Innovation)* measures a company’s management commitment to and its effectiveness in supporting the research and development of eco-efficient products or services. The score is compiled by checking for environmental benefits in the products or services of the reporting organization (such as introduction of environmentally friendly products). It is intended to reflect a company’s ability to reduce environmental costs and burdens for its customers, and thereby create new market opportunities through new environmental technologies and processes or eco-designed, dematerialized products with extended durability. *ENRR (Resource Reduction)* measures a company’s management commitment to and its effectiveness in achieving an efficient use of natural resources in the production process. The score is compiled by monitoring national resources reported to be used during production like water and energy. It reflects a company’s ability to reduce the use of materials, energy, or water, and to find more eco-efficient solutions by improving supply chain management. *ENER (Emission Reduction)* measures a company’s management commitment to and its effectiveness in reducing environmental emission in production and operational processes. The score reflects a company’s capacity to reduce air emissions (greenhouse gases, F-gases, ozone-depleting substances, NOx and SOx), waste and hazardous waste, water discharges, and spills, or its impacts on biodiversity, and to partner with environmental organizations to reduce the company’s environmental impact on the local or broader community.

In supplemental tests, we also investigate companies’ engagement in social issues and corporate governance issues by analyzing data on non-environmental dimensions from ASSET4, such as the social pillar score and the corporate governance pillar score. The social pillar score (*SOCSCORE*) measures a company’s ability to generate trust and loyalty in its workforce, customers, and society, through its adoption of best management practices. The score is a reflection of a company’s reputation and the health of its license to operate, which are key factors in determining its ability to generate long-term shareholder value. Dimensions examined include: product

responsibility, community, human rights, diversity and opportunity, employment quality, health and safety, and training and development. The corporate governance pillar score (*CGVSCORE*) measures a company's systems and processes, which ensure that its board members and executives act in the best interests of its long-term shareholders. The score reflects a company's ability, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives, as well as checks and balances in order to generate long-term shareholder value. Dimensions examined are: board functions, board structure, compensation policy, vision and strategy, and shareholder rights.

2.1.3. Sample and Control Variables

Table 1 shows that the top 10 state-owned enterprises feature prominently in the Forbes Global 2000 list of top companies as ranked by Forbes magazine in 2010.⁹ These companies, highlighted in bold, include four SOEs from China (ICBC, PetroChina, China Construction Bank, and Bank of China), two from France (GDF Suez and EDF Group) and one each from Russia (Gazprom), Brazil (Petrobras), the U.K. (Lloyds), and Italy (ENI). SOEs play an important role in both developed and emerging economies. While these SOEs score relatively well in terms of environmental performance (*ENVSCORE*, and its sub-scores) and social performance (*SOCSCORE*), a large majority of SOEs seem more poorly governed according to the corporate governance pillar score (*CGVSCORE*) than non-SOEs.

To conduct a large-scale study, we assemble a panel data set consisting of 4,856 firms over 13 years (2002-2014). It includes firms headquartered in a total of 45 countries in five geographic regions.¹⁰ Data availability across the years is described in the Internet Appendix. Table IA.1 shows an increasing pattern in the number of firms with available *ENVSCORE* in the ASSET4 database. There are only 955 and 966 observations available in 2002 and 2003, respectively, surging to 1,819 observations in 2004 and then more than 4,000 by 2014. We thus drop 2002 and 2003 from the main analysis to avoid biasing our baseline results by insufficient coverage. In untabulated results, we obtain consistent results if we include 2002 and 2003 in the sample. In the last column of Table IA.1 are the numbers of observations we use in our baseline regression analysis.

We control for common firm-level covariates included in most corporate finance research, such as total assets, leverage, market-to-book ratios and return on assets, obtaining the data from Datastream and Compustat Global. Definitions of the list of variables are provided in the Appendix. Following Dyck, Lins, Roth, and Wagner (2016), who find that sustainability can be driven by institutional investors (especially foreign ones), we control for a company's institutional ownership (including both domestic and foreign institutional holdings). Data on

⁹ We choose 2010 to report these figures for data comparability with the figures quoted in *The Economist* (2010). The year 2010 is also in the middle of our sample period.

¹⁰ The regions consist of Africa and Middle East (Egypt, Israel, Morocco, Turkey, and South Africa); Asia Pacific (Australia, China, Hong Kong, India, Indonesia, Japan, Philippines, Malaysia, New Zealand, South Korea, Thailand, and Singapore); Europe (Austria, Belgium, The Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, The Netherlands, Norway, Poland, Portugal, Russia, Spain, Sweden, Switzerland, and the U.K.); Latin America (Brazil, Chile, Colombia, Mexico, and Peru); and North America (Canada and the U.S.).

institutional ownership are collected from Factset/LionShares. Moreover, given the cross-country nature of our data, we control for country-level GDP per capita obtained from the World Bank. Finally, we control for country and year fixed effects.

2.2. Summary Statistics

Figure 1 provides the average percentage of state-owned firms in our sample of publicly-listed companies in each country during the 2004-2014 sample period. There is considerable cross-country variation. SOEs represent more than 60% of the market in China, close to 40% in Russia, about 20% in Brazil, and 10% in France, but are insignificant in countries such as the U.S. Figure 2 shows the evolution of the proportion of state-owned firms (both equal-weighted and value-weighted) in five geographic regions over the sample period.¹¹ In both panels, we see an increase in SOEs in emerging economies such as Asia Pacific and Latin America. At the same time, there is a decline of SOEs in Africa and Middle East in our sample. State ownership in Europe remains at relatively modest levels throughout the period, and it is virtually absent in North America.

Figure 3 shows the evolution of the average environmental pillar score by presenting the time-series of *ENVSCORE* in companies in the five geographic regions. We observe that North American firms are ranked the lowest in environmental pillar scores (*ENVSCORE*), although they have improved over time. European firms are ranked most highly in terms of environmental scores. Some fluctuations are observed for firms in the other three regions, but they do not reveal a clear pattern. In the second graph, we present value-weighted averages, and find similar patterns for European and North American companies. Comparing the two graphs suggests that larger corporations have higher levels of environmental engagement. In Figures IA.1 and IA.2, we present the time series of average social pillar score (*SOCSCORE*) and the average corporate governance pillar score (*CGVSCORE*) in companies in the five geographic regions. While we find that European firms are ranked most highly in terms of social scores, North American firms (mainly US firms) are ranked most highly in terms of corporate governance. These differences suggest that firms in different countries and regions tend to pursue different corporate objectives, and we examine these differences later.

In Panel A of Table 2 we show the distribution of firm-year observations (and unique firms) across countries for the sample in our regressions. Leading the list are firms in developed markets (the U.S., Japan, the U.K., Australia, and Canada), but the sample has a reasonable coverage of firms in emerging economies, in particular the BRICS countries (Brazil, Russia, India, China, and South Africa). Overall, we have a sample of 28,890 firm-year observations (4,009 unique firms) for which data are available for all dependent and independent variables in the baseline regressions.

¹¹ We do not include the averages of Africa and Middle East and Latin America in 2004-2007 because there are insufficient observations in these region-years. Since ASSET4 data coverage is expanding over our sample period, we checked if the patterns in Figure 2 are influenced by sample composition changes. We confirm that this is not the case, as we find the same time trend when we keep the sample of firms the same as the ones in the 2010 cohort.

Panel A of Table 2 shows that the average level of state ownership (*State_own*) of our sample is 6.6%. There is a marked difference between emerging markets (24.8%) and developed economies (4.0%). The country with the highest proportion of state-owned companies in our sample is China (65.1%). Levels are also high for other emerging countries (Colombia, Malaysia, Indonesia, Poland, Thailand, Russia, and Czech Republic) and Singapore. The presence of the state in the corporate sector is relatively low in more developed economies (Germany, the U.K., Canada, Japan, and the U.S.). Table 2 also shows the average of environmental pillar scores (*ENVSCORE*) in each country. The average environmental pillar score is 51.5, which is to be expected, as all ESG scores are industry-adjusted by Thomson Reuters to get a middle point of 50. Firms in developed countries tend to score better than those in emerging countries (French firms are highest at 76.9 while Egyptian firms rank at the bottom with an average score of 19.6). Except for China (26.0), the average environmental pillar scores of the BRICS countries are around the standardized mean: Brazil (53.5), India (55.0), Russia (46.5), and South Africa (53.3).¹²

In a first look at the relation between state ownership and environmental engagement, we conduct a t-test for the equality of *ENVSCORE* between SOEs (firms with at least 25% of control rights owned by the government) and non-SOEs. The average *ENVSCORE* for state-owned firms is 57.4 compared to 51.1 for non-SOEs. The difference is statistically significant (p-value of 0.00). When we look at each individual country, we find SOE environmental pillar scores are higher than non-SOE scores in 31 of 45 countries (the difference is statistically significant in 23 countries at the 10% level). These findings provide preliminary evidence on the link between state ownership and environmental engagement. We find similar country-level results for the sub-categories of emission reduction (*ENER*), environmental product innovation (*ENPI*), and environmental resource reduction category (*ENRR*) scores. We also report the results of a t-test for the equality of these sub-scores between SOEs and non-SOEs in Table IA.2 in the Internet Appendix. SOEs receive significantly higher scores than non-SOEs do in more countries across all three sub-categories.

There is large cross-country variation in the average of social pillar scores. Developed country firms score more highly than emerging markets countries. In Table IA.2 of the Internet Appendix, we test whether SOEs have higher *SOCSCORE* than non-SOEs and find statistically significant difference in 24 countries (at the 10% significance level). Interestingly, we find the opposite correlation between state ownership and corporate governance: The SOEs' average score (*CGVSCORE*) is 41.7, significantly lower than other firms' average score of 54.2.

In Panel B of Table 2 we show summary statistics across ten major industries. State ownership is high in Telecommunications (31.7%) and Utilities (25.6%) and low in Health Care (1.0%), Consumer Goods (1.9%), and Technology (2.1%). Comparing the environmental pillar scores, we find that SOEs have higher *ENVSCORE* in

¹² In untabulated results, the results on the relation between state ownership and environmental engagement remain consistent when we remove the five BRICS countries from the regression sample.

seven of ten industries. It is noteworthy that the three industries in which the non-SOEs' *ENVSCORE* is higher than the SOEs' (Industrials, Consumer Goods, and Health Care) are industries with fairly low state ownership (5.3%, 1.9%, and 1.0%). In other words, in industries with a stronger government presence, we find SOEs are more active in terms of environmental issues. Similarly, in industries with greater government presence, state-owned firms also have a higher social pillar scores (*SOCSCORE*), which echoes our finding in *ENVSCORE*. Finally, we find that SOEs are associated with lower corporate governance pillar scores (*CGVSCORE*) in all 10 industries. This finding is consistent with Panel A of Table 2, suggesting that on average state-owned firms are weaker in corporate governance. We report sub-category scores (*ENER*, *ENPI*, and *ENRR*) and t-test results for the equality of the sub-scores, *SOCSCORE*, and *CGVSCORE*, between SOEs and non-SOEs in Table IA.3 in the Internet Appendix.

We find that the univariate analysis patterns documented above are persistent across time. In Table IA.4 in the Internet Appendix, we document that SOEs are associated with significantly higher *ENVSCORE* and *SOCSCORE* for every sample year from 2004 through 2014. In addition, SOEs are associated with a significantly lower *CGVSCORE* in every sample year.

Results of these univariate comparisons should be interpreted with caution because we have not controlled for several firm-level factors. Panel A of Table 3 presents summary statistics of the key variables in the multivariate regressions we implement later in our study. On average, about 6% of our sample firms are classified as state-owned. As expected, the sustainability scores (the *ENVSCORE* and its sub-scores, as well as *SOCSCORE* and *CGVSCORE*) have a mean of around 50 as they are normalized scores, but there exists variation across observations. Panel B of Table 3 reports Pearson correlation coefficients for all variables in the regressions. We find that state ownership is positively and significantly correlated with all environmental engagement proxies, and multicollinearity is unlikely to be a concern.

3. Empirical Results on State Ownership and Environmental Engagement

We test the relation between state ownership and corporate engagement in environmental issues using multivariate regressions. We present results from the baseline regression and explore several potential mechanisms that might account for the association between state ownership and environmental sustainability.

3.1. Baseline Regression

Our baseline regression is specified as follows:

$$\begin{aligned}
 ENV_{i,t} = & \beta_0 + \beta_1 State_own_{i,t-1} + \beta_2 Inst_own_{i,t-1} + \beta_3 Ln(Assets_{i,t-1}) + \beta_4 Leverage_{i,t-1} + \beta_5 MTB_{i,t-1} \\
 & + \beta_6 ROA_{i,t-1} + \beta_7 Ln(GDP_{i,t}) + \Sigma \rho * I(Country_j) + \Sigma \delta * I(Year_t) + \varepsilon_{i,t}, \quad (1)
 \end{aligned}$$

where $ENV_{i,t+1}$ denotes the environmental engagement proxies ($ENVSCORE$, $ENER$, $ENPI$, and $ENRR$) of firm i listed in country j in year t . The primary explanatory variable, $State_own_{i,t-1}$, is an indicator variable that equals one if firm i is state-owned in year $t-1$ and zero otherwise. Other control variables include the percentage of institutional ownership ($Inst_own_{i,t-1}$), firm size (total assets in logarithm, $Ln(Assets_{i,t-1})$), leverage ($Leverage_{i,t-1}$), market-to-book ratio ($MTB_{i,t-1}$), return on assets ($ROA_{i,t-1}$), and GDP per capita in logarithm ($Ln(GDP_{i,t})$). All the control variables are winsorized at the 5th and 95th percentiles. We also control for country and year fixed effects by including $I(Country_j)$ and $I(Year_t)$ which are series of dummy variables denoting each country and each year. We do not include industry fixed effects because the dependent variables are already industry-benchmarked (industry adjusted) as explained earlier. We estimate Equation (1) using ordinary least squares (OLS) regressions and all firm-year observations with non-missing values in all dependent and independent variables over 2004-2014.¹³ Given that we use a relatively short panel data set (and environmental investment is usually a long-term commitment), that environmental scores are industry-benchmarked, and that state ownership is quite stable over the sample period, we do not use industry \times year fixed effects or country \times year fixed effects in the baseline specifications because of multicollinearity concerns. Standard errors are clustered at the firm level to correct for firm-specific autocorrelation in estimation errors.

Table 4 reports the estimation results for Equation (1). We first estimate the equation using only state ownership ($State_own$) as well as country and year fixed effects (Column (1)). The point estimate of state ownership at 3.99 is statistically significant at the 1% level. Given that the dependent variable is standardized on a scale of 0-100, this suggests that state-ownership on average gives a firm an environmental score that is about 4% higher than non-state-owned firms (or about 7.7% of sample mean and 12.5% of sample standard deviation). In Column (2), when we include all other control variables in the estimation, the state ownership effect is slightly reduced, but remains statistically significant at the 10% level.

We also investigate which aspects drive the association between state ownership and environmental sustainability by replacing the dependent variable with $ENER$ (in Columns (3) and (4)), $ENPI$ (Columns (5) and (6)), and $ENRR$ (Columns (7) and (8)). One can see that the effects of the overall environmental score come from emission reduction and resource reduction, but not much from product innovation, as the coefficients on $State_own$ in Columns (5) and (6) are not statistically significant (but still positive).

Environmental sustainability scores are higher in firms with greater institutional ownership, and firms that are bigger, with higher market-to-book ratios, and are more profitable. These results are consistent with findings in the literature that the presence of institutional investors promotes socially responsible corporate behavior (see Dyck, Lins, Roth, and Wagner (2016)) and the “doing well by doing good” argument that more profitable companies care more about sustainability (see Hong, Kubik, and Sheinkman (2012)).

¹³ The dependent variables are bounded between 0 and 100. In a robustness check, we use logarithmic value of environmental engagement proxies and obtain consistent results.

Overall, the results in Table 4 support a positive relation between state ownership and environmental engagement, especially in emission reduction and resource reduction. The insignificant correlation between state ownership and environmental production innovation may indicate that SOEs are not more innovative in creating new products and processes. State-owned firms may be taking more technologically conservative approaches but not proactive ones in environmental engagement. It is also worth noting that a firm’s state-control status is generally quite stable over time, especially during our sample period, which is likely a legacy of pre-privatization ownership structures. Therefore, our results are more in line with the idea that state ownership promotes more environmental engagement, rather than that governments as owners pick “green companies” to invest in.

3.2. Identification Test Based on Passage of the 2009 Copenhagen Accord

Our baseline results suggest a positive association between state ownership and a firm’s environmental engagement. To examine whether such an association is causal, we examine a shock to worldwide awareness of environmental sustainability and investigate whether the state-controlled firms in our sample react differently. The exogenous shock we look at is the Climate Change Summit held in Copenhagen in 2009.¹⁴ The Copenhagen Summit raised awareness of the severity of climate change and other environmental problems, which shifted the demand for environmental engagement by corporations worldwide. We argue that the exogenous shock of the Copenhagen Accord strengthened the societal demands and thus increased state-owned firms’ environmental engagement, because these firms should be more responsive.¹⁵

We conduct a difference-in-differences (DiD) analysis by identifying state-owned firms after the passage of Copenhagen Accord (December 2009) as the treatment and estimating the regression:

$$\begin{aligned}
 ENV_{i,t} = & \alpha_0 + \beta_0 State_own_{i,t-1} * Post\ 2009_t + \beta_1 State_own_{i,t-1} + \beta_2 Inst_own_{i,t-1} + \beta_3 Ln(Assets_{i,t-1}) \\
 & + \beta_4 Leverage_{i,t-1} + \beta_5 MTB_{i,t-1} + \beta_6 ROA_{i,t-1} + \beta_7 Ln(GDP_{i,t}) + \Sigma \rho * I(Country_j) \\
 & + \Sigma \delta * I(Year_t) + \varepsilon_{i,t}, \tag{2}
 \end{aligned}$$

where *Post 2009*_{*t*} is an indicator variable that equals one if year *t* is from 2010 onward and zero otherwise (to capture the effect of the Copenhagen Agreement signed in December 2009). The interaction term is used to test whether state-owned firms became more environmentally engaged after 2009, because of strengthened pressure from governments. We expect the coefficient estimate on the interaction term, β_0 , to be significantly positive. To

¹⁴ The major milestone of the Summit was the passage of the Copenhagen Accord, which is a document that delegates at the 15th session of the Conference of Parties (COP 15) to the United Nations Framework Convention on Climate Change agreed to “take note of” at the final session on December 18, 2009. The Accord was drafted by the U.S. and a coalition of the BASIC countries (China, India and South Africa). It was intended to succeed to the Kyoto Protocol, which ended in 2012. Passage of the Copenhagen Accord was largely exogenous to corporate environmental engagement in the recent decade, because it was not a direct response to corporate environmental performance.

¹⁵ Some people have criticized the Copenhagen Accord for not being legally binding. We argue that this feature is actually an advantage for our empirical setting, as it enables us to test corporations’ voluntary engagement (rather than strict compliance with regulations) in environmental issues.

ensure that estimation of Equation (2) is not affected by other economic factors, we restrict the sample period to a two-year window (2008-2011) or three-year window (2007-2012). For brevity, we report only the results based on *ENVSCORE* as the dependent variable.

We report the DiD results in Table 5, which shows significantly positive estimates for the interaction term $State_own \times Post\ 2009$. For example, in Column (2) for *ENER* in 2008-2011, the coefficient estimate of the interaction term is 1.92, with statistical significance at the 5% level. This suggests that, after passage of the Copenhagen Accord, state-owned firms increased their efforts toward emission reduction about 2% more than non-state-owned firms. Overall, the results in Table 5 suggest that state-owned firms are more responsive to environmental shocks, which provides additional support for our main hypothesis for several reasons. First, if our baseline results occur simply by chance, we should not expect to see a stronger effect of state ownership after 2009. Second, if our baseline results are driven by other ownership types or by omitted variable bias, then such alternatives would need to be stronger after 2009 to explain the results in Table 5. Thus, a more convincing interpretation for our findings is that government ownership promotes environmental engagement, and the effect was strengthened after 2009 because the Copenhagen Accord pressed on all governments to act on climate change.

3.3. In What Firms Does State Ownership Matter More for Environmental Engagement?

We investigate a few potential channels behind the effects we have documented of state ownership on environmental engagement. More specifically, we focus on whether a firm is in the energy sector or is based in a country where environmental issues are stronger concerns.

First, if state ownership works in the public interest in dealing with environmental externalities, the effect should be more pronounced in industries that play a substantial role in environmental issues, such as oil and gas. In Column (1) of Table 6, we test whether the state-ownership effect is stronger in firms in energy-related industries by interacting the *State_own* dummy with the dummy variable *Oil & Gas* that equals one if the firm is in the oil and gas industry. This is an industry where green initiatives may substantially reduce pollution and improve environmental quality. As in Table 6, the coefficient of *Oil & Gas* is significantly negative, which suggests that average firms in the energy industry fall short of engagement in environmental issues. More important, the coefficient estimate of the interaction term $State_own \times Oil\ \&\ Gas$ is statistically significant at the 5% level, suggesting a particularly strong positive relation between state ownership and environmental engagement variables among energy-related firms. This finding confirms that our baseline result reflects the public interest in dealing with environmental externalities.

Second, if a country is highly energy dependent, the state may have a stronger incentive to engage in activities and technologies that improve its energy efficiency, leading to better environmental performance. We test whether the state-ownership effect is stronger in countries that are more energy dependent by interacting the *State_own*

dummy with a country-level energy security risk index. Data on country-level energy security risk are obtained from the International Index of Energy Security Risk of the U.S. Chamber of Commerce's Institute for 21st Century Energy (www.energyxxi.org). As in Column (2) of Table 6, the interaction term $State_own \times Energy\ security\ risk$ is positive and statistically significant, which indicates that a country's natural resources are a driver of a state's motivation for strong environmental engagement.

Third, if a country is in conflict with its neighboring countries, its government may have stronger incentives to improve energy efficiency to counter potential instability in energy supply; neighboring countries may disrupt or cut the necessary energy supply sources. We test this by interacting the $State_own$ dummy with a country-level neighboring country conflicts index. This is obtained from the Global Conflict Risk Index (GCRI) of the European Commission's Joint Research Center. Column (3) of Table 6 shows that the interaction term $State_own \times Neighboring\ countries\ conflict$ is positive and statistically significant, which supports our hypothesis that a country's conflicts risk is a driver of the state-ownership effect on environmental engagement.

Lastly, if a country's ruling party is more progressive in political orientation, its government may pursue a stronger role in controlling economic life (Mullainathan and Shleifer (2005)) and environmental issues. We test this by interacting the $State_own$ dummy with a political variable that takes a value of 1, 2, or 3 if the government is right, center, or left. Data on ruling parties' political orientation are obtained from the World Bank's Database of Political Institutions (DPI) and vary across countries and years. Column (4) of Table 6 shows that the coefficient of the interaction term $State_own \times Political\ orientation$ is statistically insignificant. Therefore, a government's political orientation is not likely the key driver of state-owned firms' engagement in environmental issues.

Overall, Table 6 suggests that we can attribute the influence of state ownership on firms' environmental engagement to the substantial role of energy-related firms in environmental issues and government concerns with respect to stable energy supply, and is not driven by a country's political leaning.

Another channel that may affect the association between state ownership and environmental engagement relates to economic development and geography. According to *The Economist* (2010, 2014) and Musacchio and Lazzarini (2014), the resurgence of Leviathan Inc. is particularly strong in emerging economies such as Brazil or China. These markets are more likely to suffer from a scarcity of long-term capital to fund promising projects such as environment-related expenditures, making government intervention more necessary. Therefore, we investigate cross-regional variation in the state-ownership effects. In Panel A of Table 7, we report results from estimation of Equation (1) in emerging countries in Column (1) and developed countries in Columns (2).¹⁶ We find a significantly positive coefficient of state ownership in the subsample of emerging countries and a positive

¹⁶ Following the OECD and the MSCI Global Index, we define as developed countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Singapore, the U.K., and the US. All the rest of the countries are emerging economies.

but insignificant coefficient of state ownership in the subsample of developed countries. These findings suggest that the significantly positive effect of state ownership on environmental engagement exists mainly in emerging countries.

In Panel B of Table 7, we report the results from estimation of Equation (1) in five geographic regions. We find that the state-ownership effects are mainly in the subsamples of Asia Pacific and Latin America. The coefficient estimates of state ownership are negative (although insignificant) in Africa and Middle East and in North America. Emerging countries may have to depend on state ownership to mitigate environmental externalities if these are inadequate institutional environments or necessary incentives in the private sector.

3.4. Are Government Stakes Special?

We conduct further tests to explore what is special about government ownership. We employ an alternative proxy of state ownership, compare state blockholdings to other types of blockholders, and explore further the different types of government stakes.

We first consider an alternative proxy of state ownership and replace the binary variable *State_own* (where the ultimate owner is the central government, a state, or a public authority) with the continuous variable *Government_held* using data from Datastream to identify the percentage of free-floating shares held by the government, if those holdings exceed 5%. In Column (1) in Panel A of Table 8, we rerun the analysis using this alternative measure of state ownership. Our results still hold: Firms with greater state holdings score more highly in environmental performance.

Second, we ask whether the effects we document above are unique to government ownership, or instead may just be related to the presence of any blockholder and not specific to stakes held by a government. In our baseline tests, we already control for institutional ownership or frequent blockholders in firms around the world. To further address this concern, we use data from Datastream on the percentage of total shares held by strategic blockholders. These include block holdings of 5% or more by foreign investors (*Foreign holdings*); by other (industrial) companies (*Cross holdings*); by pension funds (*Pension fund held*); by investment companies (*Investment co held*); by employees (*Employee held*); by other investors (*Other holdings*); and total holdings by all these blockholders (*Strategic holdings*). Data from Factset/Lionshares allow us to identify the percentage of all outstanding shares (traded or non-traded) owned by domestic institutional investors (*Domestic inst. held*) and by foreign institutional investors (*Foreign inst. held*) (see Aggarwal, Erel, Ferreira, and Matos (2011) and Dyck, Lins, Roth, and Wagner (2016)). Panel A of Table 8 presents the regression results for each variable.¹⁷ We find that almost all other types of blockholdings are either uncorrelated with environmental engagement (foreign holdings, cross holdings, other holdings, and domestic institutional holdings) or negatively correlated with environmental

¹⁷ Again, to save space, we present results for only ENVSCORE as the dependent variable. Results are similar using other sub-dimensional environmental scores as dependent variables.

engagement (pension fund holdings, investment company holdings, employee holdings, and strategic holdings). The only exception is a positive loading on foreign institutional ownership, which is consistent with findings in Dyck et al. (2016). Similar to those authors, we find that foreign institutional investors, especially those from developed countries with higher environmental standards, are concerned about environmental issues because of reputational concerns or moral pressure from their end investors. Nevertheless, we note that foreign institutional investors and governments are fairly independent investors with different objectives. Overall, the findings reported in Table 8 suggest that the influence of state ownership on environmental engagement is likely unique to government ownership and not driven by other types of block holdings.

Third, we explore the role of different types of government stakes. Does the effect of state occur because a domestic (not foreign) government is the owner? Does it matter whether a company is held directly by the state or held through an investment by a sovereign wealth fund (such as the Norges Bank of Norway or Temasek of Singapore)? Answering these questions can shed further light on the mechanisms through which government ownership influences corporate environmental engagement. The public interest theory would argue that the effect happens through a direct ownership stake by a domestic state entity that cares more about public goods (local environmental protection). We test this by distinguishing between domestic and foreign state ownership. The results are reported in Panel B of Table 8, where the dependent variable in all columns is *ENVSCORE*. In Column (1), the dummy variable *Domestic State_own* equals 1 if the company's ultimate owner is the domestic government as defined by Orbis, and 0 otherwise.¹⁸ Its coefficient is positive and statistically significant, and similar in size to that in the baseline regressions (about 4%). In Columns (2) and (3), we interact the *State_own* dummy with a dummy variable *Domestic_own*, which takes a value of 1 if the company has a domestic ultimate owner defined by Orbis, and 0 otherwise. The difference between the two columns is that in Column (2) we run the regression on the subsample of developed countries, whereas in Column (3) subsample is of emerging countries. The coefficient of the interaction term $State_own \times Domestic_own$ is significant in emerging countries (Column 3) but not in developed countries (Column 2), which indicates that the role of state-owned companies in promoting environmental protection is stronger in emerging economies and through holdings by domestic governments. Finally, we test the difference between direct state ownership and ownership through investment by sovereign wealth funds. In Column (4) we include *State_own* and a dummy variable indicating whether the company is invested by a sovereign wealth fund (*SWF*), and find that the effect comes mostly from *State_own* rather than *SWF*, suggesting that it is direct state ownership that matters for corporate environmental engagement. This is consistent with the notion that SWFs are mainly concerned with financial returns, while domestic government may be more concerned about solving externalities and market failures with regard to environmental issues.

¹⁸ This is defined similarly to our main variable *State_own*, except that we require that the ultimate owner be the domestic government, rather than a state in general. The control group in this case consists of companies that are either owned by a foreign government or not owned by any government at all.

Overall, Table 8 provides evidence of the unique role of state ownership in environmental concerns. It also demonstrates that the influence of state ownership on corporate environmental engagement comes mainly through direct ownership stakes held by the domestic governments. Given that domestic governments are more likely in a position to deal with negative environmental externalities, the tests reported in Table 8 support a causal interpretation of our baseline findings.

3.5. Alternative Measures of Environmental Engagement

Finally, to triangulate our results based on the ASSET4 Environmental Score, we replace the dependent variable with two alternative measures of firm-level environmental engagement using another two widely-used ESG datasets with an academic focus: MSCI ESG Intangible Value Assessment (“MSCI”) and Sustainalytics ESG Ratings (“Sustainalytics”). We take the environment-related ratings from each database: the *Environmental Pillar Score* from MSCI (ranging between 0 and 10) and the *Environmental Score* from Sustainalytics (ranging between 0 and 100). Both ratings measure how well companies proactively manage the environmental issues that are the most material to their business and provide an assessment on companies’ ability to mitigate risks and capitalize on opportunities.¹⁹ Similar to ASSET4, the ratings by these two alternative databases are also industry-adjusted, that is, companies are rated on their environmental engagement (both voluntary initiatives and mandatory compliance) relative to their industry peers (a “best-of-sector” methodology to compare companies within a given sector to industry best practices) on a global scale, and they are also mostly the constituents of major global equity indices. The MSCI sample covers 1,625 companies and each company is given only one score on a scale of 0 to 10, based on its most recent year’s (i.e., 2016) environmental performance. The Sustainalytics data covers 8,060 companies over the years 2010-2017, and each company is scored on a scale of 0 to 100.

We conduct cross-sectional ordinary least squared (OLS) estimations on these two alternative samples of environmental engagement because the MSCI data are cross-sectional in nature. The control variables are the same as before and are lagged by one year. To be consistent in test with the MSCI data, we take the average environmental score and control variables for each company over the sample period for the Sustainalytics data (which is a short panel). The results shown in Table 9 are consistent with our previous findings, the coefficient on *State_own* remains positive and statistically significant. The economic magnitudes are also comparable to our baseline results using ASSET4: on average, state-owned firms score 4-7% higher than non-state-owned firms, as

¹⁹ For Sustainalytics data, the assessment of a company’s environmental engagement is structured within four dimensions: (1) Preparedness, which refers to assessments of company management systems and policies designed to manage material environmental risks; (2) Disclosure, which refers to assessments of whether company reporting meets international best practice standards and is transparent with respect to most material ESG issues; (3) Quantitative Performance, which refers to assessments of company ESG performance based on quantitative metrics such as carbon intensity; (4) Qualitative Performance, which refers to assessments of company ESG performance based on the analysis of controversial incidents that the company may be involved in. Underlying each industry group template is a customized weight matrix designed to further highlight the key environmental issues faced by each sector, and companies are also assessed for their level of involvement in major controversies and the associated business risks they face from such involvement. For MSCI data, refer to the description of Liang and Renneboog (2017).

the coefficients of *State_own* are 0.712 and 3.592 for MSCI Environmental Pillar Score (ranging between 0 and 10) and the Sustainalytics Environmental Score (ranging from 0 to 100), respectively. Given that the two alternative measures are compiled by different data providers, our consistent results suggest that the strong correlations between corporate environmental engagement and state ownership are not likely driven by the peculiarity of the ASSET4 data that may be hard-wired in the ratings.

4. State Ownership and Shareholder Value, Social Responsibility, and Corporate Governance

An important question is whether the state-ownership effects we document are unique to environmental sustainability, or whether state-owned firms are superior both in dealing with externalities and in maximizing shareholder value. Some authors find that state-owned firms care more about social issues such as employment and community engagement (Liang and Renneboog, 2017). Shleifer and Vishny (1998) argue that, due to incentive problems, state-owned firms may engage in rent-seeking activities at the cost of society at large. Others find that state-owned firms usually have weaker corporate governance and consequently poorer financial performance (e.g., Megginson, Nash, and Van Randenborgh (1994); Dewenter and Malatesta (2001); Megginson and Netter (2001); Bortolotti and Faccio (2009)). Musacchio, Lazzarini, and Aguilera (2015) argue that the new form of state ownership has mixed implications for governance and firm performance.

In Table 10 we investigate the shareholder value implications of such environmental engagement by state-owned firms. To do so, we first regress Tobin's Q (measured by *MTB*, the market-to-book ratio of assets) on the interaction between state ownership and the various environment engagement scores in Column (1). The control variables are similar to those tested before, except that we do not include the market-to-book ratio on both sides of the equation. Several interesting observations can be made. First, the coefficient on *State_own* is statistically insignificant, suggesting that SOEs do not have higher (or lower) shareholder value. Second, *ENVSCORE* is positively and significantly correlated with Tobin's Q, consistent with the "doing well by doing good" hypothesis (see Flammer (2015)) and empirical evidence that corporate environmental engagement is related to better firm performance and higher value (Dowell, Hart, and Yeung (2000)). Third, and more important, the interaction between state ownership and environmental scores is insignificant, suggesting that environmental engagement by state-owned firms is not associated with lower shareholder value.

Column (2) of Table 10 reports the results from regressing firms' forward five-year average ROA on the interaction between state ownership and engagement with environment. We again find an insignificant coefficient on *State_own*, consistent with the Tobin's Q results. This suggests that state-owned firms do not underperform financially. On the other hand, *ENVSCORE* is positively and significantly associated with future ROA, suggesting that environmental engagement per se may enhance long-term profitability. Lastly, the interaction between state ownership and environmental scores is insignificant, supporting the argument that state-owned firms'

environmental engagement does not sacrifice future profitability. Overall, Table 10 highlights that a greater engagement in environmental issues of state-owned companies does not come at a cost at shareholders, but may have welfare implications for society at large.

We then examine state ownership in terms of the bigger picture of “ESG,” namely, how state-owned firms fare in terms of social issues and corporate governance. We address this question using the *social* and *corporate governance* pillar scores of ESG ratings from the ASSET4 database. We use two aggregate scores. The first measures a company’s overall commitment to social issues (*SOCSCORE*), or how firms care about customers, suppliers, employees, community, and human rights. The second measures corporate governance quality (*CGVSCORE*) or board functions and board structure, compensation policy for executives, integrated vision and strategy, and shareholder rights. In Figures IA.1 and IA.2 of the Internet Appendix we show the time series of the average social and corporate governance pillar scores.

The evidence in Table 11 indicates that state-owned firms also engage more in social issues, as is evident by the coefficient on *State_own* in Column (1) (although significant only at the 10% level), but they do not have better corporate governance performance, as the coefficient on *State_own* is insignificant in Column (2). These results further confirm that state-owned firms may engage more in terms of non-financial issues and dealing with externalities, but they are no better (and no worse) in corporate governance. This echoes our results in Table 10 that SOEs do not produce better shareholder value, and is consistent with the large literature on the positive link between good corporate governance and higher shareholder returns (e.g., Gompers, Ishii, and Metrick (2003); Bebchuk, Cohen, and Ferrell (2009)). In our case, state-control does not result in superior corporate governance, hence greater returns to shareholders, but it has a positive effect on the welfare of society at large, without necessarily sacrificing shareholder interests.

5. Conclusion

The role of the state in organizing economic life has been a long debated topic. A major trend characterizing the beginning of the 21st century is the resurgence of state-owned enterprises (SOEs, or Leviathan Inc.), especially in emerging market economies. We have also seen increasing attention paid to global warming and sustainability issues. Governments can address market failures not just through taxation or subsidies and regulations, but also directly through providing public goods to society via state-owned firms. It is commonly thought, however, that governments can be captured, that they may lack the technical capacity to run firms, and that ultimately they cannot manage SOEs effectively.

We examined the role of state ownership of publicly-listed companies in environmental issues around the world over the last decade to answer the question. We find that SOEs tend to be highly engaged in environmental issues. We do not find such a pattern for other block-owners in the private sector. The effect comes mainly from

direct domestic ownership stakes in local firms, rather than from holdings by foreign governments or sovereign wealth funds. We document that the role of SOEs in environmental engagement is more pronounced in energy firms and firms located in: 1) emerging economies; 2) countries lacking energy resources; and 3) countries in conflict with neighboring countries. Further supporting our results on the effect of SOEs on environmental engagement is the finding that they reacted more than non-state-owned firms to passage of the Copenhagen Accord in December 2009. Interestingly, state-owned firms are also more engaged with social issues, but they do not have better corporate governance performance.

We believe these findings have policy implications. As economies worldwide embraced pro-market reforms in the last quarter of the 20th century, many prototypical SOEs were transformed. Privatization may have resulted in changes and in a reduction in their numbers, but it did not spell the end of state ownership of companies. Our findings show that modern SOEs have emerged to be more effective than their private counterparts in dealing with market failures—especially in the case of environmental externalities—without sacrificing shareholder returns.

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Appendix: List of Variables and Data Sources

Variable	Description
<i>ENVSCORE</i>	The environmental pillar (ENVSCORE) 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. The environmental pillar is an equally weighted score of the sub-dimensional scores: Emission Reduction, Product Innovation, and Resource Reduction. Source: Thomson Reuters ASSET4 database.
<i>ENRR</i>	Emission Reduction, measures a company's management commitment to and effectiveness in reducing environmental emission in production and operational processes. It reflects a company's capacity to reduce air emissions (greenhouse gases, F-gases, ozone-depleting substances, NOx, Sox, etc.), waste, hazardous waste, water discharges, and spills, or its impacts on biodiversity, and to partner with environmental organizations to reduce the environmental impact of the company in the local or broader community. Source: Thomson Reuters ASSET4 database.
<i>ENPI</i>	Product Innovation measures a company's management commitment to and effectiveness in supporting the research and development of eco-efficient products or services. It reflects a company's capacity to reduce environmental costs and burdens for its customers, and thereby create new market opportunities through new environmental technologies and processes or eco-designed, dematerialized products with extended durability. Source: Thomson Reuters ASSET4 database.
<i>ENRR</i>	Resource Reduction measures a company's management commitment to and effectiveness in 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. Source: Thomson Reuters ASSET4 database.
<i>SOCSCORE</i>	The social pillar measures a company's capacity to generate trust and loyalty its workforce, customers, and society, through (SOCSCORE) its use of best management practices. It is a reflection of the company's reputation and the health of its license to operate, which are key factors in determining its ability to generate long-term shareholder value. The social pillar is an equally weighted score of the sub-dimensional scores: Customer/ Product Responsibility, Society/ Human Rights, Workforce/ Diversity and Opportunity, Workforce/ Employment Quality, Workforce/ Health & Safety, Workforce/ Training & Development. Source: Thomson Reuters ASSET4 database.
<i>CGVSCORE</i>	The corporate governance pillar (CGVSCORE) measures a company's systems and processes, which ensure that its board members and executives act in the best interests of its long-term shareholders. It reflects a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives, as well as checks and balances in order to generate long-term shareholder value. The corporate governance pillar is an equally weighted score of the sub-dimensional scores: Board of Directors/ Board Functions, Board of Directors/ Board Structure, Board of Directors/ Compensation Policy, Integration/ Vision and Strategy, Shareholder/ Shareholder Rights. Source: Thomson Reuters ASSET4 database.
<i>MSCI Environmental Pillar Score</i>	The Environmental Pillar Score includes the following issues: carbon emissions, product carbon footprint, energy efficiency, insuring climate change risk, water stress, biodiversity and land use, raw material sourcing, financing environmental impact, toxic emissions and waste, packaging material and waste, electronic waste, opportunities in clean tech, opportunities in green building, opportunities in renewable energy, etc. The data is then converted to a relative score, by allocating the company with the best performance within its industry sector in a given category a 10, the top score, giving the company with the worst performance a 0, the lowest, and scoring the remainder pro-rata between 10 and 0. Source: MSCI Intangible Value Assessment.
<i>Sustainalytics Environmental Score</i>	The Sustainalytics Environmental Score addresses a broad range of macro-level environmental issues and trends that have a significant, and in some cases material, impact on industries and companies, creating both risks and opportunities for investors. The score is based on a company's environmental engagement based on four dimensions: (1) Preparedness, which refers to assessments of company management systems and policies designed to manage material environmental risks; (2) Disclosure, which refers to assessments of whether company reporting meets international best practice standards and is transparent with respect to most material ESG issues; (3) Quantitative Performance, which refers to assessments of company ESG performance based on quantitative metrics such as carbon intensity; (4) Qualitative Performance – assessments of company ESG performance based

	on the analysis of controversial incidents that the company may be involved in. Underlying each industry group template is a customized weight matrix designed to further highlight the key environmental issues faced by each sector, and companies are also assessed for their level of involvement in major controversies and the associated business risks they face from such involvement. The ratings are given on a scale of 0-100 using the “best-of-sector” methodology to compare companies within a given sector to industry best practices. Source: Sustainalytics ESG Ratings.
<i>State_own</i>	A dummy variable that equals one if the ultimate owner is the state, the government, or a public authority, and zero otherwise. Ultimate owner is defined as the shareholder holding the percentage of direct voting rights, identified by following the path of uninterrupted control rights (at 25%) throughout the ownership pyramid. Source: Orbis.
<i>Domestic_own</i>	A dummy variable that equals one if the ultimate owner is from the same country of the firm, and zero otherwise. Ultimate owner is defined as the shareholder of direct voting rights owned by this shareholder who is identified by following the path of uninterrupted control rights (at 25%) throughout the ownership pyramid. Source: Orbis.
<i>Domestic state_own</i>	A dummy variable that equals one if the ultimate owner is the state, the government, or a public authority of the company’s country, and zero otherwise. Ultimate owner is defined as the shareholder direct voting rights owned by this shareholder who is identified by following the path of uninterrupted control rights (at 25%) throughout the ownership pyramid. Source: Orbis.
<i>SWF</i>	A dummy variable that equals one if the company has shares owned by a sovereign wealth fund (SWF), and zero otherwise. Source: Factset.
<i>Inst_own</i>	Holdings (end-of-year) by all institutions as a fraction of market capitalization. Source: FactSet/LionShares.
<i>Market-to-book (MTB)</i>	Calculated as the ratio of the market value of total assets to the replacement value of total assets of the company (the sum of book value of equity and book value of liabilities), winsorized at the 5% level. Source: Datastream.
<i>Return on assets (ROA)</i>	Calculated as the ratio of net income to the book value of total assets of the company. Source: Datastream and Compustat.
<i>Firm size</i>	The logarithm of the company’s total assets. Source: Datastream and Compustat.
<i>Leverage</i>	The ratio of total liabilities to total assets of the company, winsorized at 5% level. Source: Datastream and Compustat.
<i>GDP per capita</i>	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Source: World Bank database.
<i>Government held</i>	The percentage of total shares in issue of holdings of 5% or more held by a government or government institution. Source: Datastream.
<i>Foreign holdings</i>	The percentage of total shares in holdings of 5% or more held by an institution domiciled in a country other than that of the issuer. Note: Before March 1 st , 2005, this datatype was calculated as a separate strategic component. Since that date NOSHFR has represented the foreign held holdings of 5% or more included in the total strategic holdings datatype NOSHST. Source: Datastream.
<i>Cross holdings</i>	The percentage of total shares in holdings of 5% or more held by one company in another. Source: Datastream.
<i>Pension fund held</i>	The percentage of total shares in holdings of 5% or more held by pension funds or endowment funds. Source: Datastream.
<i>Investment co held</i>	The percentage of total shares in holdings of 5% or more held as long term strategic holdings by investment banks or institutions seeking a long term return. Note that holdings by Hedge Funds are not included. Source: Datastream.
<i>Employee held</i>	The percentage of total shares in holdings of 5% or more held by employees, or by those with a substantial position in a company that provides significant voting power at an annual general meeting, (typically family members). Source: Datastream.

<i>Other holdings</i>	The percentage of total shares in holdings of 5% or more held strategically, and outside one of the above categories. Source: Datastream.
<i>Strategic holdings</i>	The percentage of total shares in holdings of 5% or more held strategically and not available to ordinary investors. Note that holdings of 5% or more held by hedge fund owners or investment advisor/hedge fund owners are regarded as very active, and not counted as strategic. Source: Datastream.
<i>Domestic inst. held</i>	Holdings (end-of-year) by institutions located in the same country where the stock is listed as a fraction of market capitalization. Source: FactSet/LionShares.
<i>Foreign inst. held</i>	Holdings (end-of-year) by institutions located in a different country from the country where the stock is listed as a fraction of market capitalization. Source: FactSet/LionShares.
<i>Energy security risk</i>	Scores for the country-level energy security risk are reported in relation to an average reference index measuring risks for OECD member countries. The OECD average risk index is calibrated to a 1980 base year figure of 1,000. It includes: (1) Global fuels, which measures the reliability and diversity of global reserves and supplies of oil, natural gas, and coal; (2) Fuel imports, which measure the exposure of national economies to unreliable and concentrated supplies of oil and natural gas, and coal; (3) Energy expenditures, which measures the magnitude of energy costs to national economies and the exposure of consumers to price shocks; (4) Price and market volatility, which measures the susceptibility of national economies to large swings in energy prices; (5) Energy use intensity, which measures energy use in relation to population and economic output; (6) Energy power sector, which measures indirectly the reliability of electricity generating capacity; (7) Transportation sector, which measures efficiency of energy use in the transport sector per unit of GDP and population; (8) Environmental, which measures the exposure of national economies to national and international greenhouse gas emission reduction mandates. Lower emissions of carbon dioxide from energy indicate a less of risk to energy security. Source: International Index of Energy Security Risk of the US Chamber of Commerce's Institute for 21 st Century Energy (www.energyxxi.org).
<i>Neighboring country conflicts</i>	The neighboring country conflicts index is an index of the statistical risk of violent conflict in the next 1-4 years and is exclusively based on quantitative indicators from open sources. With the assumption that structural conditions in a country are linked to the occurrence of violent conflict, the GCRI collects 25 variables in 5 dimensions (social, economic, security, political, geographic/environmental) and uses statistical regression models to calculate the probability and intensity of violent conflict. Source: Global Conflict Risk Index (GCRI) of the European Commission's Joint Research Center (http://conflictrisk.jrc.ec.europa.eu/)
<i>Political orientation</i>	Political orientation of the Executive Branch, which measures party orientation with respect to economic policy, coded based on the description of the party in the sources, 1=Right; 3=Left; 2=Center. Right: Parties that are defined as conservative, Christian democratic, or right-wing. Left: Parties that are defined as communist, socialist, social democratic, or left-wing. Center: Parties that are defined as centrist or when party position can best be described as centrist (e.g., party advocates strengthening private enterprise in a social-liberal context). <i>Not</i> described as centrist if competing factions "average out" to a centrist position (e.g., a party of "right-wing Muslims and Beijing-oriented Marxists"). 0: All cases that do not fit into category (i.e., party platform does not focus on economic issues, or there are competing wings), or no information. Source: Database of Political Institutions (DPI) from World Bank

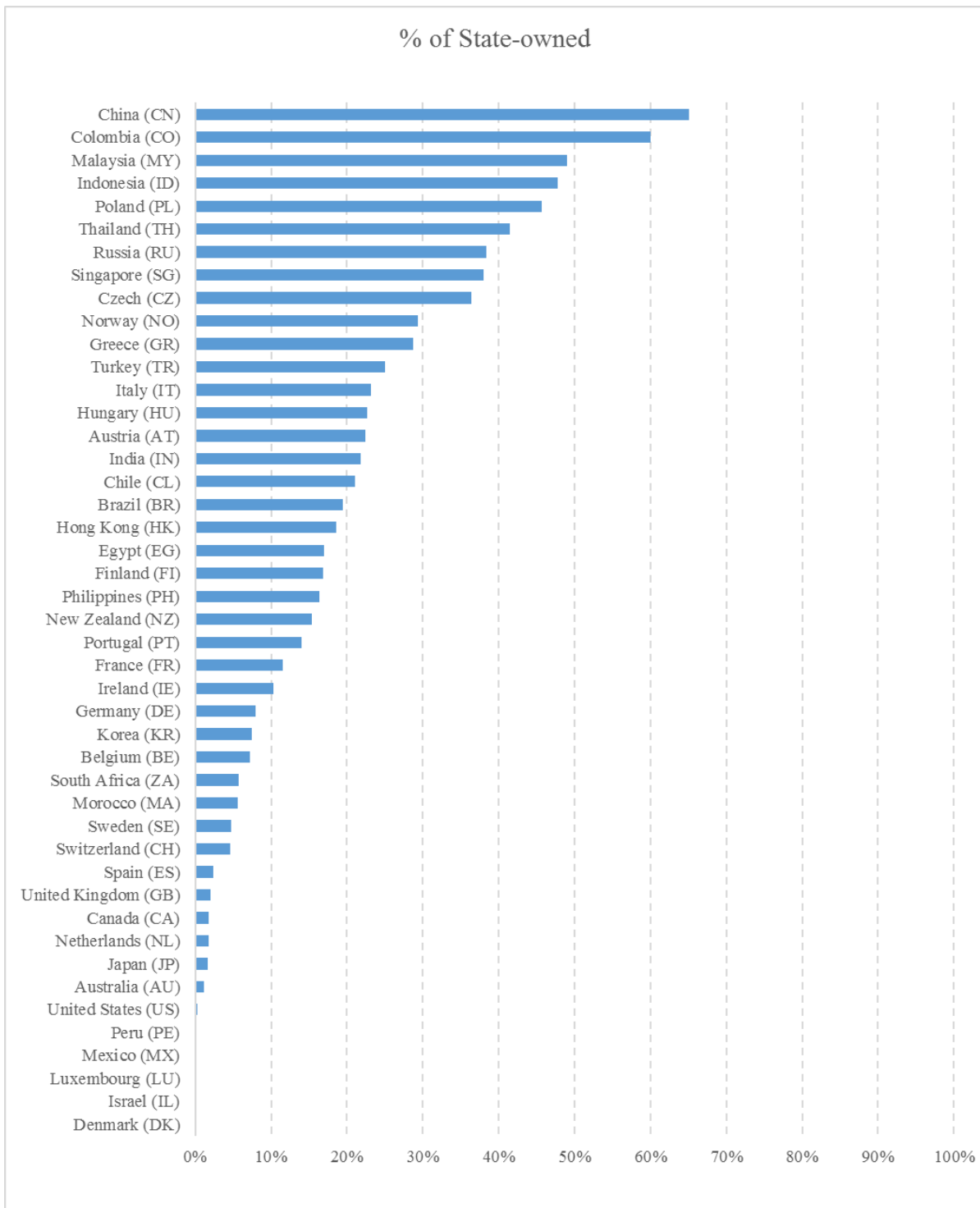


Figure 1. Average State-ownership of Publicly-Listed Firms, Per Country

This figure presents the rank of state-owned ratios of sample firms in each country. We require the firm-year to have non-missing values in the following variables (used in our regression analyses) to enter into our sample: ENVSCORE, State_own, institutional ownership, total assets, leverage, market-to-book ratio, ROA, and GDP per capita. The sample period is from 2004 to 2014.

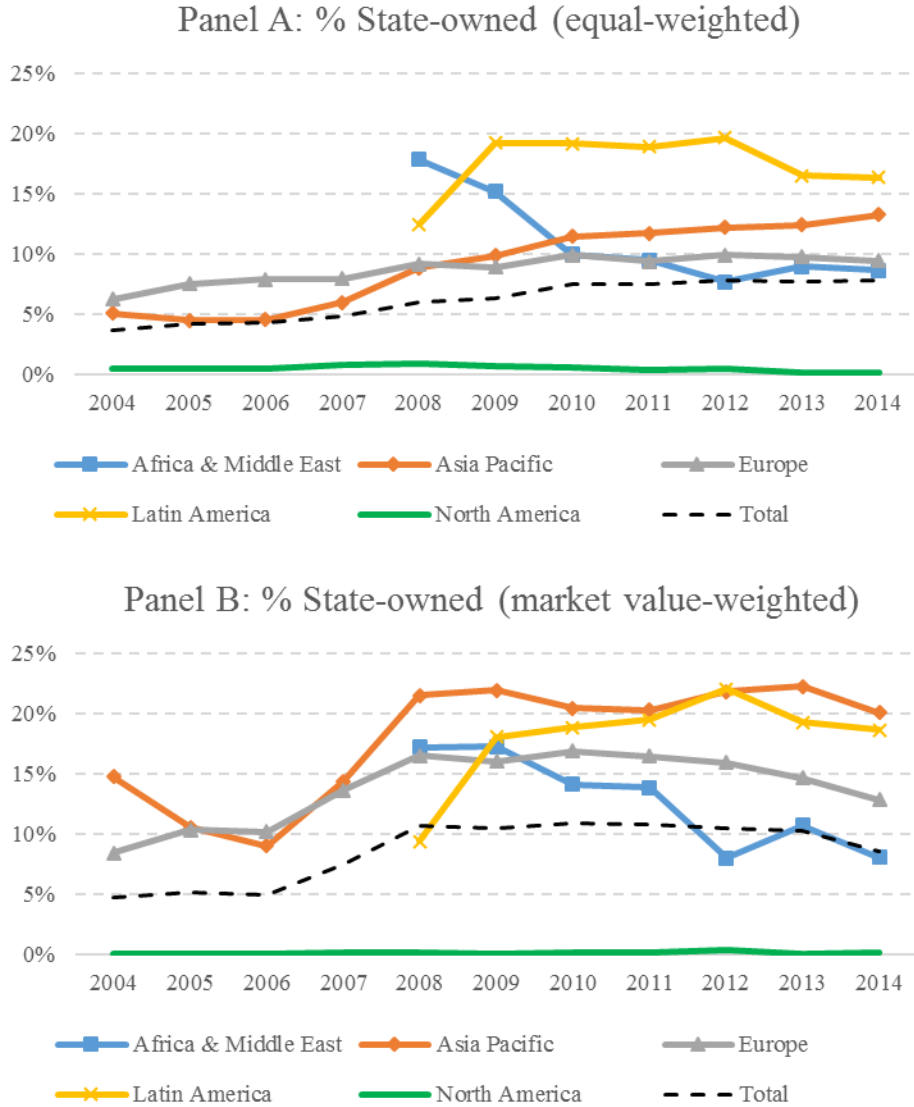


Figure 2. Average Proportion of State-owned Publicly-listed Firms, per Geographic Region and Year

This figure presents the time series patterns of the ratios of state-owned public firms in the five different regions. The sample period is from 2004 to 2014. Panel A presents 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. 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, weighted by the lagged market capitalization.

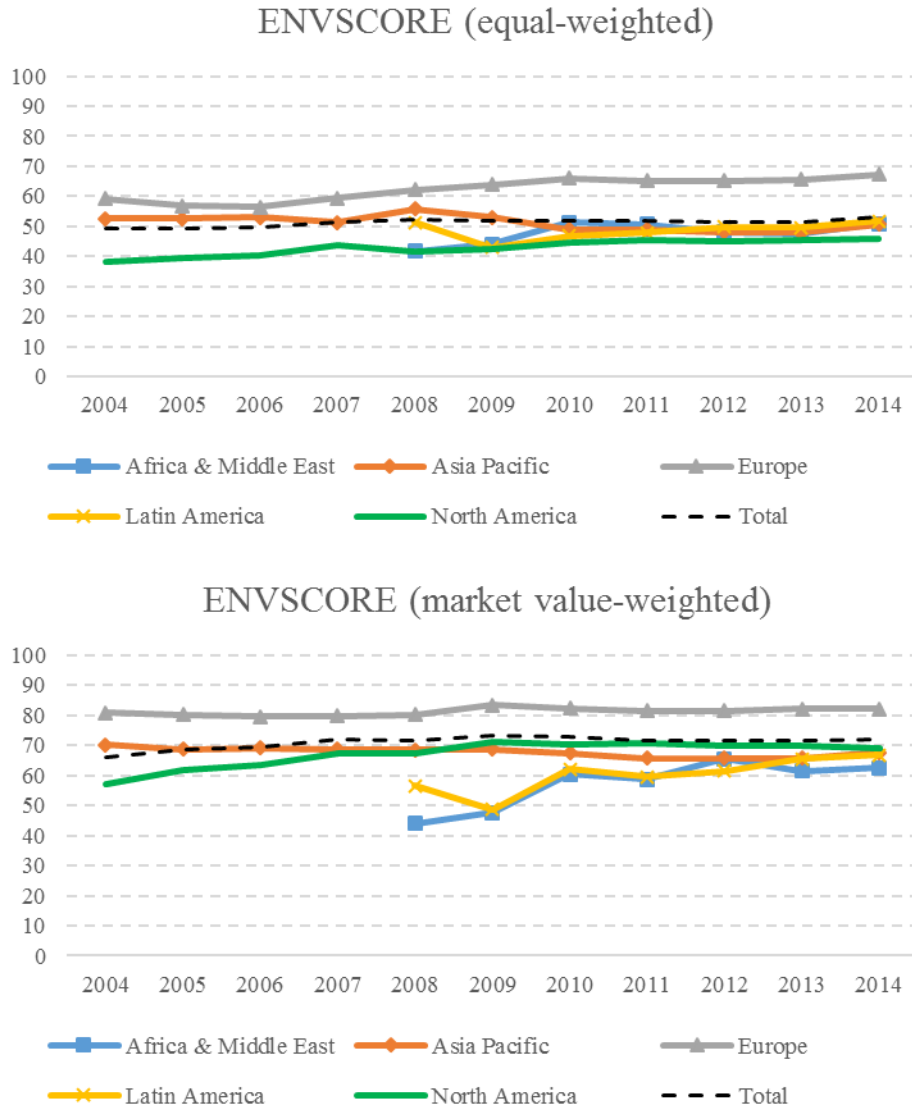


Figure 3. Average ENVSCORE of Publicly-listed Firms, per Geographic Region and Year

This figure presents the time series patterns of the average of environmental pillar scores (*ENVSCORE*) of public firms in the five geographical regions. The sample period is from 2004 to 2014. Panel A presents 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.

Table 1. Top-Ranked Global Companies

This table describes state ownership (*State_own*), the environmental pillar scores (*ENVSCORE* and sub-categories scores: emission reduction *ENER*, product innovation *ENPI*, resource reduction *ENRR*), social pillar scores (*SOCSCORE*), and corporate governance pillar scores (*CGVSCORE*) of the top companies in the Forbes Global 2000 list for 2010. The top 10 SOEs are highlighted in boldface. Country abbreviations are described in Figure 1.

Forbes Rank 2010	Country	<i>State_own</i>	<i>ENVSCORE</i>	<i>ENVSCORE</i>			<i>SOCSCORE</i>	<i>CGVSCORE</i>
				<i>ENER</i>	<i>ENPI</i>	<i>ENRR</i>		
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

Table 2. Univariate Comparisons by Countries and Industries

This table shows the averages of state ownership dummy (*State_own*), environmental pillar score (*ENVSCORE*, and sub-scores: emission reduction *ENER*, product innovation *ENPI* and resource reduction *ENRR*), social pillar score (*SOCSCORE*), and corporate governance pillar score (*CGVSCORE*). *, **, *** denote statistical significance at the 1%, 5%, and 10% level, respectively. Country abbreviations are described in Figure 1.

Panel A: Univariate Comparisons by Country													
Country	Unique firm no.	Obs	<i>State_own</i>	<i>ENVSCORE</i>	<i>State_own</i> =1	<i>State_own</i> =0	<i>P</i> - value (1 - 0)		<i>ENER</i>	<i>ENPI</i>	<i>ENRR</i>	<i>SOCSCORE</i>	<i>CGVSCORE</i>
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

Table 2. (continued)

Panel B: Univariate Comparisons by Major Industry								
Industry	Obs.	<i>State_own</i>	<i>ENVSCORE</i>			p-value (1 - 0)	<i>SOCSCORE</i>	<i>CGVSCORE</i>
			All	<i>State own=1</i>	<i>State own=0</i>			
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

Table 3. Summary Statistics

Panel A presents summary statistics for variables in the sample period 2004-2014. The main variables of interest include state ownership dummy (*State_own*), environmental pillar score (*ENVSCORE*, and sub-scores: emission reduction *ENER*, product innovation *ENPI* and resource reduction *ENRR*) social pillar score (*SOCSCORE*) and corporate governance pillar score (*CGVSCORE*). Variables and data sources are described in the Appendix. All control variables are winsorized at the 5th and 95th percentiles. Summary statistics in Panel A include mean, standard deviation (S.D.), minimum (Min), first quartile (0.25), median (Mdn), third percentile (0.75), and maximum (Max). Panel B presents Pearson correlation coefficients for all variables. The sample period is 2004-2014.

Panel A. Descriptive Statistics								
	Obs	Mean	S.D.	Min	0.25	Mdn	0.75	Max
<i>State_own</i>	28,890	0.06	0.25	0.00	0.00	0.00	0.00	1.00
<i>ENVSCORE</i>	28,890	51.51	31.96	8.48	18.00	51.19	85.17	97.50
<i>ENER</i>	28,890	51.45	32.00	7.29	18.46	50.34	85.45	98.04
<i>ENPI</i>	28,890	49.16	31.21	8.35	19.30	35.78	82.49	99.68
<i>ENRR</i>	28,890	51.72	31.99	6.31	18.20	54.58	84.48	97.69
<i>SOCSCORE</i>	28,890	52.07	30.59	3.43	22.43	52.81	82.37	98.88
<i>CGVSCORE</i>	28,881	53.36	30.06	1.09	24.21	61.29	79.71	97.55
<i>Inst_own</i>	28,890	0.39	0.31	0.02	0.14	0.28	0.68	0.96
<i>Ln(Assets)</i>	28,890	15.57	1.53	11.81	14.54	15.49	16.63	18.31
<i>Leverage</i>	28,890	23.46	16.83	0.00	9.34	22.21	34.88	59.54
<i>MTB</i>	28,890	2.48	1.83	0.54	1.19	1.89	3.11	7.60
<i>ROA</i>	28,890	6.13	6.27	-7.55	2.05	5.39	9.55	20.39
<i>Ln(GDP)</i>	28,890	10.51	0.59	8.05	10.50	10.70	10.82	10.96

Panel B: Correlation Coefficients													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) <i>State_own</i>	1												
(2) <i>ENVSCORE</i>	0.049	1											
(3) <i>ENER</i>	0.062	0.925	1										
(4) <i>ENPI</i>	0.016	0.825	0.638	1									
(5) <i>ENRR</i>	0.048	0.922	0.838	0.626	1								
(6) <i>SOCSCORE</i>	0.085	0.781	0.756	0.568	0.772	1							
(7) <i>CGVSCORE</i>	-0.103	0.170	0.177	0.068	0.204	0.295	1						
(8) <i>Inst_own</i>	-0.198	-0.094	-0.116	-0.062	-0.077	-0.025	0.560	1					
(9) <i>Ln(Assets)</i>	0.125	0.399	0.381	0.326	0.374	0.398	0.031	0.030	1				
(10) <i>Leverage</i>	0.039	0.102	0.112	0.065	0.088	0.074	0.007	-0.030	0.190	1			
(11) <i>MTB</i>	-0.054	-0.080	-0.090	-0.079	-0.046	0.002	0.136	0.177	-0.260	-0.047	1		
(12) <i>ROA</i>	0.002	-0.030	-0.031	-0.051	-0.002	0.040	0.078	0.104	-0.225	-0.150	0.457	1	
(13) <i>Ln(GDP)</i>	-0.277	0.013	0.004	0.042	-0.005	-0.051	0.331	0.353	-0.045	-0.026	-0.009	-0.091	1

Table 4. Baseline Regressions

This table reports the regression results from regressing environmental pillar score (*ENVSCORE*, and sub-scores) on a state ownership dummy (*State_own*), other control variables, country fixed effects, and year fixed effects. Control variables include the ratio of institutional ownership (*Inst_own*), total assets in logarithm (*Ln(Assets)*), *Leverage*, market-to-book ratio (*MTB*), return on assets (*ROA*), and GDP per capita in logarithm (*Ln(GDP)*). 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 2004-2014. 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) <i>ENVSCORE</i>	(2) <i>ENVSCORE</i>	(3) <i>ENER</i>	(4) <i>ENER</i>	(5) <i>ENPI</i>	(6) <i>ENPI</i>	(7) <i>ENRR</i>	(8) <i>ENRR</i>
State_own	3.991*** (1.524)	2.507* (1.410)	4.385*** (1.472)	2.857** (1.384)	2.606 (1.670)	1.306 (1.603)	4.703*** (1.511)	2.702* (1.397)
Inst_own		3.323* (1.896)		2.906 (1.953)		3.665* (2.052)		3.808* (2.007)
Ln(Assets)		6.334*** (0.310)		6.608*** (0.291)		4.074*** (0.305)		6.916*** (0.328)
Leverage		0.0230 (0.0175)		0.0298* (0.0180)		-0.00714 (0.0186)		0.0288 (0.0181)
MTB		0.248** (0.113)		0.276** (0.112)		0.127 (0.127)		0.342*** (0.123)
ROA		0.0915*** (0.0268)		0.0975*** (0.0277)		0.0560* (0.0307)		0.139*** (0.0298)
Ln(GDP)		2.536 (1.735)		1.191 (1.804)		0.0704 (2.034)		4.322** (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 FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5. Identification Test Based on the 2009 Copenhagen Agreement

This table reports the regression results from regressing environmental pillar score (*ENVSCORE*) in year *t*, interacted with an indicator variable Post 2009 that equals one if year *t*-1 is larger than or equal to 2010 and zero otherwise (to capture the effect of the Copenhagen Agreement signed in December 2009), on state ownership dummy (*State_own*) in year *t*-1, control variables, country fixed effects, and year fixed effects. Control variables are included in the regressions, but estimated coefficients are not shown. Control variables include the ratio of institutional ownership (*Inst_own*), total assets in logarithm (*Ln(Assets)*), *Leverage*, market-to-book ratio (*MTB*), return on assets (*ROA*), and GDP per capita in logarithm (*Ln(GDP)*). All control variables are winsorized at the 5th and 95th percentiles. All control variables are in year *t*-1 (except *Ln(GDP)* that is in year *t*). The sample period is 2008-2011 in Panel A (the pre-event period is 2008-2009 and the post-event period is 2010-2011) and 2007-2012 in Panel B (the pre-event period is 2007-2009 and the post-event period is 2010-2012). 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.

	2-year window (2008-2011)	3-year window (2007-2012)
	(1)	(2)
State_own × Post 2009	2.081** (0.859)	2.136** (0.954)
State_own	2.073 (1.375)	1.798 (1.309)
Inst_own	3.964* (2.076)	2.342 (1.815)
Ln(Assets)	7.332*** (0.282)	6.468*** (0.289)
Leverage	-0.0163 (0.0182)	-0.00263 (0.0164)
MTB	0.267** (0.135)	0.166 (0.120)
ROA	0.0398 (0.0279)	0.0242 (0.0235)
Ln(GDP)	2.946 (2.457)	3.231* (1.678)
Observations	12,612	18,480
Number of firms	3,648	3,833
Country FE	Yes	Yes
Year FE	Yes	Yes

Table 6. Channels

This table reports the regression results from regressing environmental pillar score (*ENVSCORE*) on lagged state ownership dummy (*State_own*), condition variables, interaction term of *State_own* and conditional variables, other control variables, country fixed effects, and year fixed effects. Conditional variables include *Oil & Gas* (a firm-level dummy indicator), *Energy security risk* is the country-level index on energy security risk as assessed by the U.S. Chamber of Commerce, *Neighboring countries conflict* is the country-level variable nb_is in Global Conflict Risk Index (GCRI), and political orientation as the variable EXECRLC in the Database of Political Institutions. Political orientation takes a value of 1, 2, or 3 if the government is right, central, and left. Control variables are included in the regressions but estimated coefficients are not shown. 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. We omit the coefficients of the control variables for brevity. The sample period is 2004-2014. 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.

	(1)	(2)	(3)	(4)
State_own	1.720 (1.475)	1.438 (1.828)	3.524** (1.681)	3.175** (1.544)
Oil & Gas	-3.859*** (1.454)			
State_own × Oil & Gas	10.90** (5.406)			
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)	
Political orientation				1.236*** (0.239)
State_own × Political orientation				-0.0111 (0.0126)
Controls	Yes	Yes	Yes	Yes
Observations	28,890	24,819	21,493	27,970
Number of firms	4,009	3,826	3,688	3,867
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 7. Regressions by Economic Development and Regions

This table reports the regression results from regressing environmental pillar score (*ENVSCORE*) on state ownership dummy (*State_own*), other control variables, country fixed effects, and year fixed effects for the sub-sample of firms: located in emerging and developed markets (Panel A) and in each of five regions. (Panel B). Control variables are defined in the Appendix. 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 2004-2014. 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>Panel A. By Level of Economic Development</i>					
	(1)	(2)			
	Emerging Markets	Developed Countries			
State_own	3.976** (1.806)	1.592 (1.937)			
Observations	3,558	25,332			
Number of firms	730	3,279			
Control variables	Yes	Yes			
Country FE	Yes	Yes			
Year FE	Yes	Yes			
<i>Panel B. By Region</i>					
Region	(1)	(2)	(3)	(4)	(5)
	Africa & Middle East	Asia Pacific	Europe	Latin America	North America
State_own	-0.984 (5.236)	5.238** (2.383)	0.283 (2.152)	6.851* (3.805)	-3.900 (3.719)
Observations	736	8,882	8,437	664	10,171
Number of firms	173	1,313	1,037	135	1,351
Control variables	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Table 8. Alternative Measures of State Ownership and Other Types of Ownership

This table reports the regression results from regressing environmental pillar score (*ENVSCORE*) on the variables for other ownership types, other control variables, country fixed effects, and year fixed effects. In Panel A, the state ownership (*Government_held*) capturing the percentage of free-float shares held by the government if they are above 5% threshold as measured by Datastream. Proxies for other block-ownership types include the ratios of floating shares owned by foreign investors (*Foreign holdings*), by other corporations (*Cross holdings*), by pension funds (*Pension fund held*), by investment companies (*Investment co held*), by employees (*Employee held*), by other investors (*Other holdings*), by strategic investors (*Strategic holdings*), and the ratios of shares owned by domestic institutional investors (*Domestic inst. held*) and by foreign institutional investors (*Foreign inst. held*). Control variables are included in the regressions but estimated coefficients are not shown. Control variables include the ratio of institutional ownership (*Inst_own*), total assets in logarithm (*Ln(Assets)*), *Leverage*, market-to-book ratio (*MTB*), return on assets (*ROA*), and GDP per capita in logarithm (*Ln(GDP)*). All control variables are winsorized at the 5th and 95th percentiles. The variables for other ownership types and control variables (except *Ln(GDP)*) are lagged by one year. When we use domestic and foreign institutional investors as explanatory variables, we do not include *Inst_own* as a control variable in regressions. We omit the coefficients of the control variables for brevity. In Panel B, *Domestic State_own* is a dummy variable that equals one if the ultimate owner is the state of the company's country defined by Orbis and zero otherwise. *State_own* is a dummy variable that equals one if the ultimate owner is the state defined by Orbis and zero otherwise. *Domestic_own* is a dummy variable that equals one if the ultimate owner is an entity in the company's country defined by Orbis and zero otherwise. *SWF* is a dummy variable that equals one if the firm has at least one sovereign wealth fund investor defined by Factset/LionShares. The sample period is 2004-2014. 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.

Panel A. Government versus Other Types of Block-owners										
	(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								-0.0424***		
								(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
Number of firms	4,174	4,004	4,006	4,006	4,006	4,006	4,006	4,006	4,009	4,009
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

**Table 8. Alternative Measures of State Ownership and Other Types of Ownership
(continued)**

Panel B. Different Forms of State Ownership				
	(1)	(2)	(3)	(4)
Domestic State_own	4.056** (1.896)			
State_own		-0.310 (2.790)	0.560 (2.811)	2.502* (1.411)
Domestic_own		0.736 (1.083)	-7.310*** (2.279)	
State_own × Domestic_own		3.845 (3.807)	6.812* (3.696)	
SWF				0.456 (1.437)
Observations	28,890	25,124	3,766	28,890
Control variables	Yes	Yes	Yes	Yes
Country & Year FE	Yes	Yes	Yes	Yes
Sample	Full Sample	Developed Countries	Emerging Countries	Full Sample

Table 9. Alternative Measures of Environmental Engagement

This table reports the results from regressing the environmental scores using two alternative environmental engagement measures—the Environmental Pillar Score from MSCI and the Environmental Score from Sustainalytics—on a state ownership dummy (*State_own*), other control variables and country fixed effects using OLS. Control variables include the ratio of institutional ownership (*Inst_own*), total assets in logarithm (*Ln(Assets)*), *Leverage*, market-to-book ratio (*MTB*), return on assets (*ROA*), and GDP per capita in logarithm (*Ln(GDP)*). All control variables are winsorized at the 5th and 95th percentiles. Robust standard errors are clustered at the country-level and reported in parentheses. ***, **, and * denote $p < 0.01$, $p < 0.05$, and $p < 0.1$, respectively.

Dependent variable:	(1) <i>MSCI Environmental Pillar Score</i>	(2) <i>Sustainalytics Environmental Score</i>
State_own	0.712** (0.332)	3.592*** (1.324)
Inst_own	-0.375 (0.400)	4.825*** (1.255)
Ln(Assets)	0.343*** (0.0580)	2.602*** (0.305)
Leverage	0.139* (0.0801)	-8.877*** (1.958)
MTB	0.426 (0.335)	0.953 (0.602)
ROA	0.0658*** (0.0157)	0.0961 (0.106)
Ln(GDP)	41.73 (115.2)	-0.664 (4.094)
Constant	-457.4 (1,260)	24.36 (43.83)
Observations	1,383	3,690
R-squared	0.119	0.240
Country FE	Yes	Yes
Model	Cross-section OLS	Cross-section OLS

Table 10. Shareholder Value and Firm Performance

This table reports the regression results from regressing current Tobin's Q (or Market-to-Book ratio of assets, *MTB*) or future five-year average ROA, winsorized at the 5th and 95th percentiles, on state ownership dummy (*State_own*), environmental pillar score (*ENVSCORE*), the interaction effect, other control variables, country fixed effects, and year fixed effects. Control variables are defined in the Appendix. 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 2004-2014. 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)	(2)
	Market-to-Book Ratio	5-year ROA
State_own	-0.0088 (0.0993)	0.310 (0.499)
ENVSCORE	0.0024*** (0.0006)	0.0046*** (0.0016)
State_own × ENVSCORE	-0.0015 (0.0014)	-0.0043 (0.0053)
Inst_own	0.588*** (0.149)	-0.0293 (0.431)
Ln(Assets)	-0.360*** (0.0200)	-1.029*** (0.078)
Leverage	0.0035** (0.0014)	0.0161*** (0.0042)
ROA	0.0495*** -0.0029	0.0414*** (0.0078)
Ln(GDP)	0.0127 (0.123)	-1.370*** (0.408)
Observations	26,163	11,969
Number of firm_id	3,954	2,696
Country FE	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes

Table 11. Social and Corporate Governance Performance

This table reports the regression results from regressing social pillar score (*SOCSCORE*) and corporate governance pillar score (*CGVSCORE*) on state ownership dummy (*State_own*), other control variables, country fixed effects, and year fixed effects. Control variables include total assets in logarithm (*Ln(Assets)*), *Leverage*, market-to-book ratio (*MTB*), return on assets (*ROA*), and GDP per capita in logarithm (*Ln(GDP)*). 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 2004-2014. ***, **, and * denote $p < 0.01$, $p < 0.05$, and $p < 0.1$, respectively.

Dependent variable:	(1) <i>SOCSCORE</i>	(2) <i>CGVSCORE</i>
State_own	2.233* (1.284)	0.917 (1.099)
Inst_own	4.856*** (1.753)	11.59*** (1.434)
Ln(assets)	6.690*** (0.303)	3.330*** (0.191)
Leverage	-0.0176 (0.0164)	0.0116 (0.0120)
MTB	0.364*** (0.103)	0.108 (0.0872)
ROA	0.117*** (0.0252)	0.0129 (0.0213)
Ln(GDP)	5.139*** (1.691)	5.827*** (1.440)
Observations	28,890	28,881
Number of firms	4,009	4,009
Country FE	Yes	Yes
Year FE	Yes	Yes

Internet Appendix for

Leviathan Inc. and Corporate Environmental Engagement

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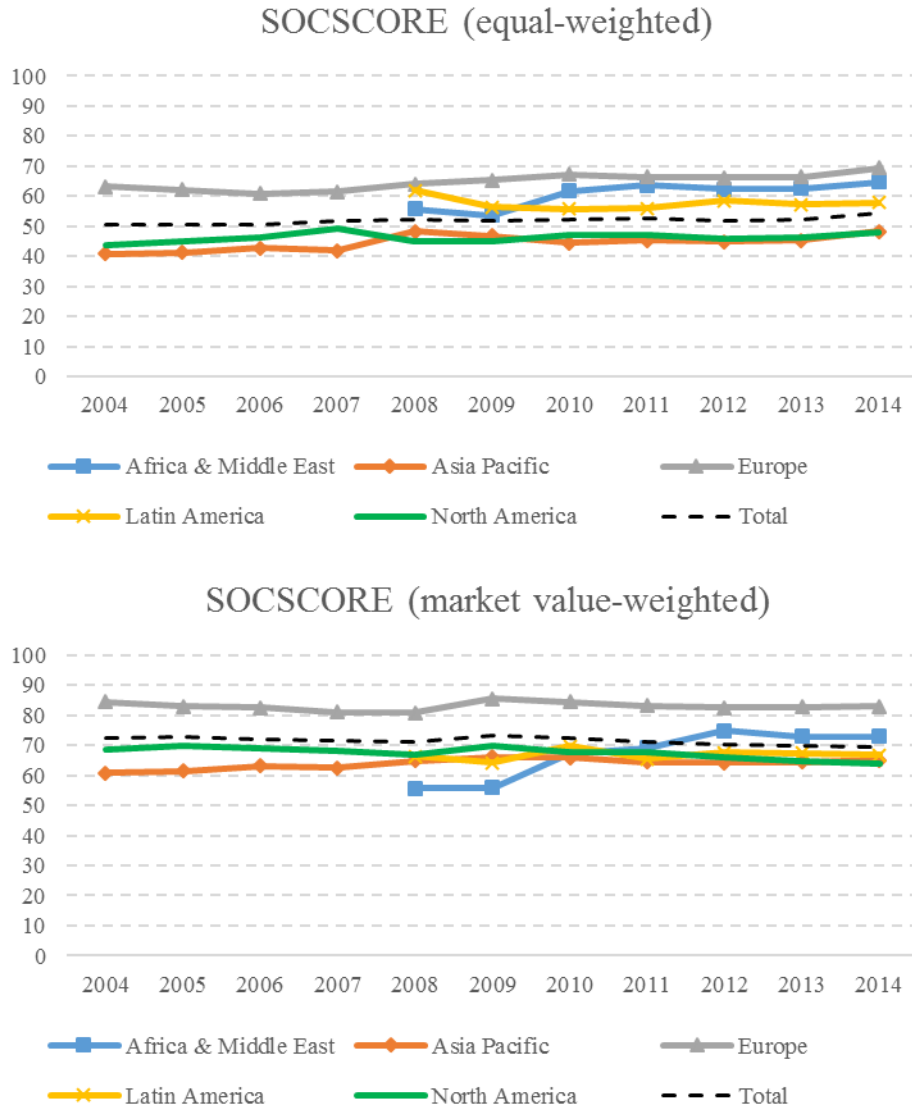


Figure IA.1 Average SOCSCORE of Publicly-listed Firms, per Geographic Regions and Years

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 2014. Panel A presents 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.

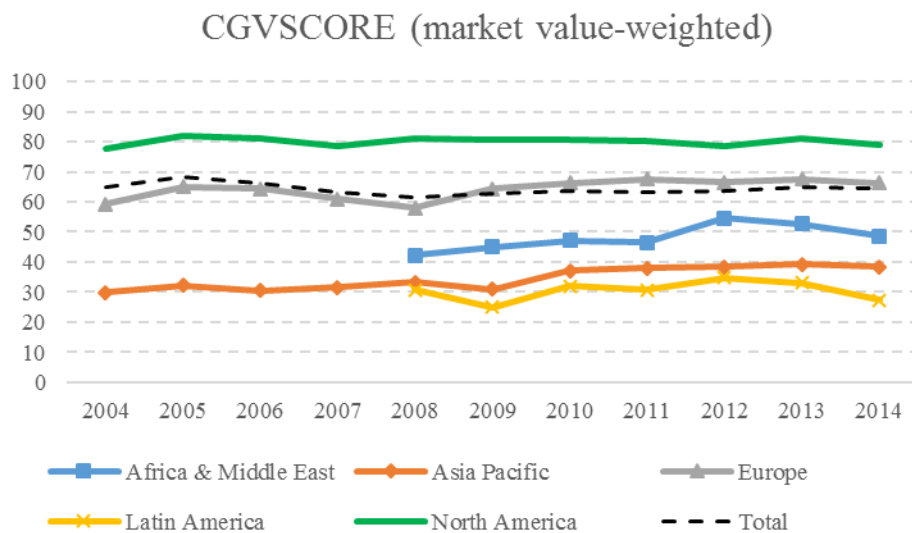
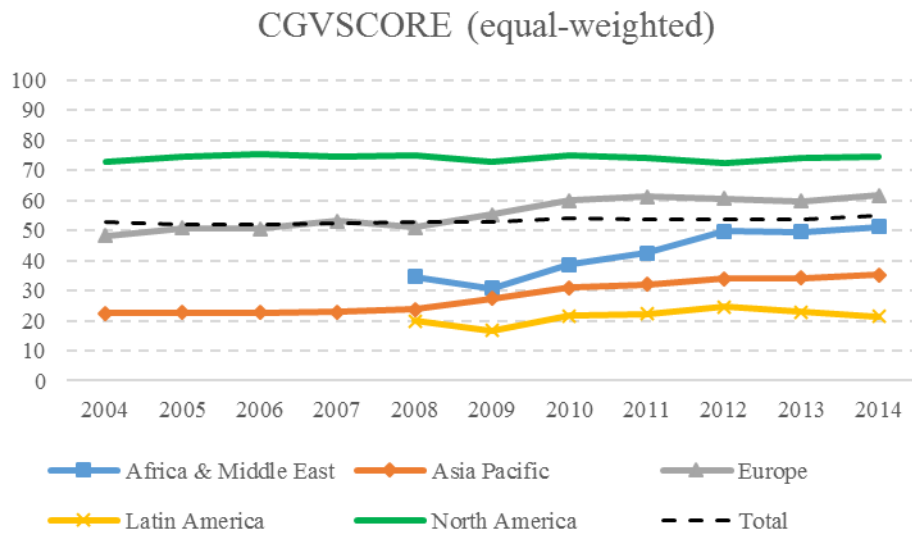


Figure IA.2 Average CGVSCORE of Publicly-listed Firms, per Geographic Regions and Years

This figure presents the time series patterns of the average of environmental pillar scores (*CGVSCORE*) of public firms in the five geographical regions. The sample period is from 2004 to 2014. Panel A presents 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.

Table IA.1. 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 (2002-2014).

Year	<i>State_own</i>	<i>ENVSCORE</i>	<i>ENER</i>	<i>ENPI</i>	<i>ENRR</i>	Observations used in regressions
2002	4,589	955	961	961	961	0
2003	4,590	966	972	972	972	0
2004	4,592	1,819	1,827	1,827	1,827	1,463
2005	4,592	2,235	2,244	2,244	2,244	1,829
2006	4,567	2,248	2,257	2,257	2,257	1,858
2007	4,557	2,425	2,436	2,436	2,436	2,005
2008	4,546	2,918	2,929	2,929	2,929	2,395
2009	4,536	3,347	3,360	3,360	3,360	2,764
2010	4,523	3,958	3,978	3,978	3,978	3,174
2011	4,496	4,048	4,070	4,070	4,070	3,270
2012	4,472	4,128	4,150	4,150	4,150	3,404
2013	4,410	4,225	4,246	4,246	4,246	3,473
2014	4,278	4,130	4,131	4,131	4,131	3,255
Total	58,748	37,402	37,561	37,561	37,561	28,890

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 difference in averages across state-owned and non-state-owned firms and report the p-value based on unequal variance. In Morocco (MA), we only have one observation in *State_won = 1* and the p-value cannot be calculated.

Country	Obs	<i>State_own</i>	<i>ENVSCORE</i>			p-value (1 - 0)	<i>ENER</i>			p-value (1 - 0)
			All	<i>State_own=1</i>	<i>State_own=0</i>		All	<i>State_own=1</i>	<i>State_own=0</i>	
Total	28,890	0.066	51.51	57.40	51.13	0.00	51.45	58.81	50.96	0.00
AT	167	0.224	56.65	78.42	49.88	0.00	54.98	80.90	47.12	0.00
AU	1,855	0.012	36.91	47.95	36.80	0.07	40.15	51.70	40.01	0.04
BE	237	0.072	56.50	64.10	56.13	0.34	56.53	61.02	56.39	0.61
BR	401	0.194	53.51	68.79	49.78	0.00	52.50	65.42	49.26	0.00
CA	1,635	0.018	39.01	33.81	38.98	0.27	42.09	44.06	41.93	0.68
CH	485	0.046	58.41	67.57	57.95	0.15	57.15	69.85	56.54	0.02
CL	115	0.211	40.19	39.81	40.54	0.91	39.43	42.18	38.93	0.61
CN	218	0.651	26.01	28.92	20.58	0.00	24.39	28.61	16.49	0.00
CO	26	0.600	48.77	59.70	33.50	0.02	54.64	64.40	43.08	0.08
CZ	22	0.364	51.00	61.92	44.76	0.00	46.32	86.10	23.59	0.00
DE	734	0.079	67.38	69.65	67.11	0.45	64.75	68.73	64.40	0.25
DK	227	0.000	57.10		56.94		54.92		54.76	
EG	55	0.170	19.55	10.55	21.15	0.00	21.37	11.33	23.11	0.00
ES	420	0.024	71.90	87.47	71.75	0.00	71.62	86.56	71.44	0.01
FI	244	0.169	76.11	88.02	73.94	0.00	69.22	88.12	65.66	0.00
FR	901	0.116	76.93	79.53	76.67	0.24	74.56	79.25	73.99	0.03
GB	2,893	0.020	60.14	63.34	60.10	0.39	62.80	69.50	62.67	0.08
GR	192	0.287	50.25	69.69	42.92	0.00	53.39	74.83	45.21	0.00
HK	920	0.185	34.69	40.49	33.78	0.00	33.12	37.89	32.49	0.02
HU	22	0.227	75.69	35.23	87.58	0.00	76.63	51.58	84.00	0.00
ID	139	0.477	46.41	46.58	46.82	0.96	51.94	53.08	51.80	0.79
IE	117	0.103	44.03	72.69	40.76	0.00	45.64	71.13	42.73	0.00
IL	82	0.000	42.73		42.34		37.24		36.66	
IN	362	0.218	54.98	52.61	55.62	0.44	54.42	55.70	54.15	0.71
IT	426	0.231	55.00	81.41	46.84	0.00	53.93	81.50	45.42	0.00
JP	3,939	0.016	62.23	70.17	62.12	0.03	61.94	72.24	61.80	0.00
KR	564	0.075	61.73	65.77	61.34	0.31	61.18	69.18	60.43	0.06
LU	18	0.000	60.19		60.19		52.85		52.85	
MA	19	0.056	27.30	54.56	23.33	-	25.57	61.80	23.06	-
MX	115	0.000	43.00		42.73		45.33		44.92	
MY	207	0.490	40.12	51.97	29.13	0.00	44.71	54.10	35.94	0.00
NL	286	0.017	69.67	85.72	69.38	0.00	67.06	68.86	67.02	0.86
NO	174	0.293	66.21	85.57	58.19	0.00	63.98	82.11	56.47	0.00
NZ	65	0.154	44.31	76.07	38.54	0.00	43.31	71.02	38.27	0.00
PE	7	0.000	27.40		27.40		41.28		41.28	
PH	63	0.164	44.86	42.04	46.01	0.68	42.42	48.10	41.42	0.57
PL	128	0.457	35.39	44.60	27.94	0.00	38.78	50.98	28.92	0.00
PT	103	0.140	67.44	78.67	65.14	0.04	69.26	84.03	66.12	0.02
RU	187	0.384	46.48	56.83	40.14	0.00	49.90	57.82	45.11	0.00
SE	454	0.047	67.71	82.53	66.92	0.00	64.58	83.88	63.57	0.00
SG	414	0.380	36.98	45.66	32.19	0.00	37.82	46.77	32.87	0.00
TH	136	0.415	49.30	68.88	35.19	0.00	48.04	73.11	30.53	0.00
TR	135	0.250	51.04	34.88	55.89	0.00	51.49	37.08	55.55	0.00
US	8,536	0.003	44.23	19.42	44.31	0.00	42.95	24.79	43.00	0.00
ZA	445	0.058	53.33	59.25	52.54	0.14	55.27	56.69	54.86	0.74

Table IA.2. (continued)

Country	ENPI	ENPI	ENPI	p-value	ENRR	ENRR	ENRR	p-value
	All	State_own=1	State_own=0	(1 - 0)	All	State_own=1	State_own=0	(1 - 0)
Total	49.16	51.16	49.07	0.00	51.72	57.41	51.34	0.00
AT	55.25	67.03	51.33	0.00	53.66	74.65	47.16	0.00
AU	34.69	33.59	34.74	0.85	39.16	60.32	38.92	0.00
BE	50.74	61.85	50.04	0.09	56.67	64.84	56.25	0.32
BR	46.89	56.61	44.57	0.00	56.34	71.56	52.67	0.00
CA	36.23	27.63	36.35	0.02	40.45	34.56	40.39	0.24
CH	54.97	65.89	54.39	0.08	58.25	62.62	58.05	0.54
CL	39.81	42.56	39.30	0.61	43.05	37.62	44.63	0.27
CN	38.47	37.28	40.69	0.37	23.13	27.40	15.14	0.00
CO	38.17	46.24	28.07	0.05	50.86	60.28	34.02	0.02
CZ	51.33	33.56	61.49	0.00	51.43	53.90	50.02	0.54
DE	65.09	57.89	65.69	0.04	66.30	71.60	65.71	0.10
DK	54.79		54.62		58.09		57.94	
EG	25.05	18.63	26.66	0.00	20.67	10.07	22.22	0.00
ES	60.63	85.49	60.20	0.00	72.95	78.94	73.07	0.09
FI	78.39	84.05	77.30	0.05	71.03	77.77	69.92	0.02
FR	70.22	71.47	70.19	0.68	76.66	77.95	76.52	0.55
GB	48.16	45.96	48.26	0.57	62.88	67.62	62.78	0.20
GR	37.45	45.89	34.21	0.01	55.32	76.57	47.39	0.00
HK	36.85	42.61	35.57	0.00	37.07	42.58	36.35	0.01
HU	70.86	28.00	83.46	0.00	71.43	34.58	82.27	0.00
ID	37.26	37.58	36.66	0.84	48.70	46.25	51.62	0.26
IE	41.01	70.06	37.69	0.00	45.12	63.80	42.99	0.00
IL	40.99		40.92		49.35		48.95	
IN	48.83	42.24	50.62	0.02	59.16	55.29	60.21	0.20
IT	52.84	73.52	46.38	0.00	56.28	77.78	49.66	0.00
JP	63.09	66.64	63.04	0.32	57.26	65.52	57.14	0.05
KR	63.98	61.64	64.20	0.56	56.14	58.05	55.90	0.62
LU	57.76		57.76		60.94		60.94	
MA	27.54	19.15	24.40	-	33.38	75.92	29.03	-
MX	34.56		34.69		47.50		47.13	
MY	37.32	48.88	26.60	0.00	40.53	50.09	31.63	0.00
NL	63.14	85.12	62.75	0.00	70.53	85.43	70.27	0.01
NO	64.62	82.94	57.03	0.00	61.74	78.55	54.78	0.00
NZ	45.98	84.61	38.96	0.00	41.67	60.42	38.26	0.00
PE	18.82		18.82		33.43		33.43	
PH	43.30	30.37	46.54	0.03	48.75	46.97	49.78	0.68
PL	34.78	34.52	34.90	0.91	34.85	46.91	25.09	0.00
PT	56.18	59.68	56.06	0.57	67.15	79.06	64.54	0.02
RU	34.90	42.22	30.37	0.00	52.53	63.43	45.83	0.00
SE	66.35	68.01	66.15	0.74	64.50	79.00	63.73	0.00
SG	35.14	37.99	33.60	0.11	40.67	51.22	34.88	0.00
TH	47.37	61.70	36.62	0.00	50.58	61.63	42.60	0.00
TR	51.33	41.18	54.22	0.03	49.65	29.56	56.31	0.00
US	45.00	21.92	45.09	0.00	44.82	21.37	44.88	0.00
ZA	40.54	41.20	40.04	0.81	60.46	72.73	59.42	0.00

Table IA.2. (continued)

Country	<i>SOCSCORE</i>	<i>SOCSCORE</i>	<i>SOCSCORE</i>	p-value (1 - 0)	<i>CGVSCORE</i>	<i>CGVSCORE</i>	<i>CGVSCORE</i>	p-value (1 - 0)
	All	<i>State_own=1</i>	<i>State_own=0</i>		All	<i>State_own=1</i>	<i>State_own=0</i>	
Total	52.07	61.88	51.41	0.00	53.36	41.67	54.24	0.00
AT	56.08	87.38	46.75	0.00	33.32	48.26	28.71	0.00
AU	39.30	52.69	39.24	0.04	63.42	71.81	63.44	0.10
BE	52.96	67.52	52.04	0.09	50.56	52.84	50.49	0.59
BR	64.11	86.21	58.72	0.00	27.24	28.04	27.11	0.67
CA	39.72	26.66	39.90	0.00	73.74	73.80	73.75	0.99
CH	56.61	56.39	56.61	0.97	47.10	39.11	47.62	0.11
CL	44.91	44.76	45.29	0.95	9.26	9.33	9.31	0.99
CN	25.40	30.71	15.48	0.00	24.59	26.33	21.33	0.05
CO	71.34	77.48	62.04	0.24	28.21	32.82	22.20	0.23
CZ	70.32	75.72	67.23	0.02	18.27	24.79	14.55	0.00
DE	68.48	67.05	68.53	0.67	34.59	30.44	34.97	0.07
DK	54.07		53.88		38.02		37.85	
EG	27.24	12.45	29.99	0.00	8.64	2.30	9.77	0.00
ES	78.12	94.15	77.98	0.00	50.24	55.75	50.15	0.24
FI	70.35	85.47	67.44	0.00	60.87	63.32	60.51	0.32
FR	78.17	81.77	77.74	0.06	55.07	51.64	55.55	0.12
GB	63.31	67.70	63.25	0.22	73.89	65.51	74.08	0.00
GR	50.69	67.35	44.55	0.00	17.72	23.84	15.49	0.00
HK	35.98	38.76	35.82	0.23	36.48	41.96	35.11	0.00
HU	78.51	34.34	91.50	0.00	41.16	34.47	43.12	0.11
ID	62.82	71.48	56.43	0.00	26.03	35.39	18.78	0.00
IE	36.74	50.74	35.14	0.01	64.48	65.43	64.37	0.83
IL	45.73		45.08		37.17		36.88	
IN	58.84	61.23	58.25	0.38	29.11	14.91	32.89	0.00
IT	64.23	86.13	57.51	0.00	43.97	53.81	41.01	0.00
JP	47.32	57.70	47.16	0.02	11.96	13.77	11.94	0.30
KR	57.05	72.12	55.70	0.00	13.79	10.21	14.09	0.00
LU	50.93		50.93		58.92		58.92	
MA	54.64	87.75	50.62	-	5.45	14.80	4.82	-
MX	45.06		44.64		13.16		13.16	
MY	49.12	64.32	34.62	0.00	46.94	58.28	35.29	0.00
NL	77.46	90.48	77.23	0.00	64.51	74.15	64.34	0.00
NO	69.81	89.97	61.45	0.00	63.62	71.78	60.24	0.00
NZ	41.47	46.59	40.54	0.54	62.47	66.47	61.74	0.31
PE	31.99		31.99		51.66		51.66	
PH	45.31	57.02	43.73	0.15	28.78	27.42	29.15	0.76
PL	42.30	55.41	31.83	0.00	23.24	27.09	20.18	0.02
PT	76.88	88.50	74.62	0.00	56.78	46.00	58.71	0.13
RU	54.68	62.50	49.59	0.00	28.74	28.03	29.40	0.64
SE	64.94	85.60	63.74	0.00	54.29	64.16	53.80	0.01
SG	40.79	52.71	34.38	0.00	43.78	53.16	38.97	0.00
TH	59.71	73.89	49.45	0.00	45.53	48.97	42.73	0.11
TR	55.79	38.17	61.65	0.00	22.47	19.94	23.09	0.29
US	47.61	23.52	47.68	0.00	74.15	71.84	74.17	0.30
ZA	71.34	72.29	71.15	0.83	60.76	63.94	60.15	0.31

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: Basic Materials, Consumer Goods, Consumer Services, Financials, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, and Utilities. We also conduct t-tests for the difference in averages across state-owned and non-state-owned firms and report the p-value based on unequal variance.

Industry	Obs	<i>State_own</i>	<i>ENVSCORE</i>			p-value	<i>ENER</i>			p-value
			All	<i>State_own</i> =1	<i>State_own</i> =0		(1 - 0)	All	<i>State_own</i> =1	
Basic Materials	3015	0.056	55.58	59.84	55.40	0.07	58.38	62.94	58.16	0.05
Consumer Goods	3,370	0.019	61.55	47.15	61.90	0.00	59.96	48.85	60.26	0.00
Consumer Services	3,992	0.023	41.05	52.56	40.79	0.00	41.00	58.37	40.59	0.00
Financials	5,059	0.069	43.23	46.36	43.04	0.06	41.47	40.42	41.60	0.50
Health Care	1,633	0.010	43.79	20.76	44.06	0.00	44.24	27.83	44.43	0.04
Industrials	5,610	0.053	59.08	53.83	59.38	0.00	57.31	56.64	57.35	0.70
Oil & Gas	2,061	0.126	45.48	64.61	42.69	0.00	51.42	68.79	48.86	0.00
Technology	1,960	0.021	51.69	63.00	51.46	0.03	48.05	61.04	47.79	0.01
Telecommunications	771	0.317	55.43	63.37	51.95	0.00	54.71	62.69	51.13	0.00
Utilities	1405	0.256	63.53	64.80	63.32	0.36	69.93	69.70	70.23	0.73
Total	28,876	0.066	51.52	57.40	51.14	0.00	51.46	58.81	50.97	0.00

Industry	<i>ENPI</i>	<i>ENRR</i>			p-value	<i>ENRR</i>			p-value
		All	<i>State_own</i> =1	<i>State_own</i> =0		(1 - 0)	All	<i>State_own</i> =1	
Basic Materials	49.57	51.01	49.59	0.58	55.14	59.51	54.92	0.06	
Consumer Goods	59.38	41.96	59.78	0.00	60.85	48.94	61.14	0.00	
Consumer Services	36.90	36.17	36.96	0.77	46.01	57.66	45.74	0.00	
Financials	42.89	50.33	42.37	0.00	45.26	47.01	45.16	0.32	
Health Care	39.91	23.61	40.13	0.02	47.33	21.12	47.59	0.00	
Industrials	59.43	47.52	60.11	0.00	56.19	54.50	56.29	0.33	
Oil & Gas	40.69	53.47	38.81	0.00	44.08	63.28	41.27	0.00	
Technology	55.58	63.88	55.42	0.10	50.57	64.41	50.28	0.01	
Telecommunications	51.54	56.74	49.26	0.00	56.74	64.96	53.09	0.00	
Utilities	53.16	54.94	52.68	0.19	59.50	61.85	58.91	0.07	
Total	49.16	51.16	49.07	0.01	51.73	57.41	51.36	0.00	

Industry	<i>SOCSCORE</i>	<i>SOCSCORE</i>			p-value	<i>CGVSCORE</i>			p-value
		All	<i>State_own</i> =1	<i>State_own</i> =0		(1 - 0)	All	<i>State_own</i> =1	
Basic Materials	53.39	63.75	52.79	0.00	54.89	53.80	55.03	0.62	
Consumer Goods	57.76	44.97	58.06	0.00	46.95	38.20	47.21	0.02	
Consumer Services	46.35	54.08	46.17	0.01	53.55	43.93	53.82	0.00	
Financials	46.02	54.30	45.49	0.00	49.99	37.60	50.98	0.00	
Health Care	50.63	26.25	50.91	0.00	55.82	29.47	56.15	0.00	
Industrials	55.40	55.26	55.41	0.93	52.47	41.08	53.13	0.00	
Oil & Gas	48.52	67.23	45.80	0.00	63.62	41.12	66.86	0.00	
Technology	51.53	60.40	51.32	0.06	58.82	48.78	59.13	0.03	
Telecommunications	62.53	69.97	59.15	0.00	52.13	48.34	54.09	0.01	
Utilities	62.40	71.35	59.56	0.00	55.66	36.14	62.43	0.00	
Total	52.08	61.88	51.42	0.00	53.36	41.67	54.24	0.00	

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 2014. We also conduct t-tests for the difference in averages across state-owned and 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	1,463	0.037	49.26	59.41	48.87	0.02	48.87	58.13	48.52	0.03
2005	1,829	0.042	49.38	59.31	48.95	0.00	49.10	59.43	48.65	0.00
2006	1,858	0.043	49.71	56.96	49.43	0.04	49.43	56.24	49.19	0.05
2007	2,005	0.048	51.46	59.37	51.06	0.01	51.25	60.31	50.77	0.00
2008	2,395	0.060	52.05	58.77	51.64	0.01	51.75	60.93	51.18	0.00
2009	2,764	0.063	51.77	55.25	51.54	0.14	51.68	57.92	51.28	0.01
2010	3,174	0.075	51.96	55.91	51.59	0.05	51.88	57.45	51.39	0.01
2011	3,270	0.075	51.99	56.54	51.65	0.02	52.00	58.32	51.52	0.00
2012	3,404	0.078	51.60	56.69	51.12	0.01	51.70	58.43	51.08	0.00
2013	3,473	0.077	51.54	58.34	51.14	0.00	51.76	59.60	51.25	0.00
2014	3,255	0.079	53.10	58.51	52.85	0.01	53.19	59.76	52.81	0.00
Total	28,890	0.066	51.51	57.40	51.13	0.00	51.45	58.81	50.96	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			46.66	53.60	46.39	0.06	48.72	59.32	48.31	0.01
2005			46.73	45.97	46.77	0.81	48.93	63.15	48.31	0.00
2006			47.22	45.61	47.36	0.60	49.57	60.40	49.07	0.00
2007			49.35	53.46	49.15	0.19	51.50	58.81	51.13	0.02
2008			50.23	54.04	50.02	0.15	52.24	57.03	51.94	0.07
2009			49.84	49.66	49.85	0.94	51.81	55.12	51.60	0.16
2010			49.56	50.92	49.41	0.47	52.22	54.86	51.96	0.18
2011			49.55	50.71	49.47	0.56	52.41	56.62	52.09	0.03
2012			49.26	50.55	49.14	0.49	52.26	57.08	51.80	0.01
2013			49.17	52.63	49.05	0.08	52.04	58.16	51.67	0.00
2014			50.40	52.18	50.46	0.41	53.48	58.31	53.22	0.01
Total			49.16	51.16	49.07	0.01	51.72	57.41	51.34	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			50.50	60.96	50.10	0.01	52.64	41.29	53.08	0.01
2005			50.32	62.22	49.80	0.00	51.86	44.41	52.19	0.03
2006			50.67	62.17	50.13	0.00	51.95	42.40	52.43	0.00
2007			51.74	60.83	51.26	0.00	52.21	44.70	52.60	0.01
2008			52.36	61.31	51.79	0.00	52.78	38.62	53.70	0.00
2009			51.83	60.41	51.27	0.00	52.88	36.72	54.01	0.00
2010			52.25	60.69	51.54	0.00	53.93	38.51	55.13	0.00
2011			52.45	62.17	51.70	0.00	53.80	40.37	54.95	0.00
2012			51.95	61.55	51.10	0.00	53.78	44.93	54.61	0.00
2013			52.12	62.88	51.37	0.00	53.86	42.35	55.04	0.00
2014			54.27	63.75	53.66	0.00	54.91	44.85	55.94	0.00
Total			52.07	61.88	51.41	0.00	53.36	41.67	54.24	0.00