5-2024

Are corporations responding to civil society pressure?: A multilevel analysis of corporate emissions

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Forthcoming in *Sociology of Development*

Abstract: Previous research in the world-society tradition associates improvements in nation-level environmental outcomes with greater civil society integration. However, research in the world-systems tradition indicates these improvements depend on a nation's position in the global political-economic hierarchy. To test whether these patterns are present at the organizational level, I estimate a multilevel model using corporate emissions data from the Carbon Disclosure Project and include interactions between world-system position and three measures of civil society integration: number of NGOs, proportion of corporations with climate-management incentives, and number of corporate UN Global Compact signatories. I find that the relationship between civil society pressure and corporate emissions varies with a nation's position in the world-system. The NGO measure is associated with greater emissions in non-core nations, possibly due to means–ends decoupling or corporate greenwashing. The climate-incentives measure is associated with less corporate-level emissions in the core and more emissions in non-core nations, possibly due to successful regulation in the core leading to ecologically unequal exchange. I argue that reducing corporate emissions requires accounting for increasingly complicated macro-sociological contexts, as corporations are pressured by and incorporated into world society and participate in patterns of unequal exchange in the world-system.

Keywords: world society, world-systems, corporate emissions, climate change

Corporations are increasingly evaluated according to environmental, social, and governance (ESG) factors, partly due to civil society pressure, such as public interest in value-aligned investments and the rise of third-party rating systems (*Economist* 2022; Gerber et al. 2023). In response to this interest, some governments, most in the global North, want to codify ESG factors (Gerber et al. 2023). As a result, corporations are pressured by multiple groups—such as civil society, social movements, local and national governments, shareholders, and stakeholders—to integrate ESG considerations into their operations, often by reducing emissions. But how are corporations responding to these pressures? While they have significant agency, they also depend on a social license to operate. Thus, pressure from international NGOs (INGOs) like Greenpeace and international governmental organizations (IGOs) like the UN can influence their actions. However, civil society is not an even playing field: nations occupy unequal positions in the global political economy, which can constrain their capacity to mitigate environmental harm. Further, these political and economic factors can encourage ceremonial commitment, where greater integration into civil society results in greenwashing due to a lack of intention or ability. How do these structural factors influence corporate emissions?

Research has associated improvements in nation-level environmental outcomes with greater world-society integration (Jorgenson 2009; Shandra 2007a, 2007b). However, there is limited research in the world-society tradition examining sub-state (i.e., corporate or state) environmental outcomes (Shorette et al. 2017). So there could be significant variation in emissions that is otherwise missed. Patterns at the macro or national level of analysis might not hold at the meso or corporate level (Grant, Jorgenson, and Longhofer 2020; Marquis, Toffel, and Zhou 2016). Macro-level context influences organizational outcomes: while corporations are increasingly international and transnational, they are still subject to regulatory and civil society pressures in their headquarters nation.

World-society theory attributes significant variation between nations to their different positions in international civil society (Hironaka 2014; Longhofer et al. 2016; Meyer et al. 1997), suggesting that INGOs and social movements can pressure corporations to conform to global norms. World-systems theory suggests that civil society is not an even playing field, affecting not only the number and strength of ties to world society (Beckfield 2003, 2010) but also the capacity of nations to put environmental objectives into practice (Shorette 2012; Lim and Tsutsui 2012). In this article, I examine whether a nation's greater world-society integration is associated

with better corporate-level environmental outcomes and whether this depends on the nation's role in the global political economy. Are pressures from civil society associated with a change in corporate emissions? And do these changes differ with nations' position in the world-system?

I address these questions by examining the relationship between the meso level of the corporation and the macro level of the nation-state. I find that the hierarchy of the global political-economic system influences the relationship between civil society pressure and corporate emissions. Pressure from INGOs, which diffuse and support pro-environmental norms, is not associated with lower emissions. Instead, they increase emissions to a greater extent in non-core nations with less political and economic power. However, internal incentives for climate management (including monetary and non-monetary rewards for employees engaging in activities such as emissions, energy, and efficiency projects), a typical corporate response to civil society pressure and peer efforts, are associated with less emissions—but only in core nations with significant political and economic power. Finally, corporate signing of the UN Global Compact, an IGO effort, had no effect on emissions.

LITERATURE REVIEW

Research has identified macro-sociological processes, including civil society pressure and position in the global political-economic hierarchy, that influence nation-level carbon dioxide emissions (Huang 2018; Jorgenson, Dick, and Shandra 2011; Longhofer and Jorgenson 2017; Rieger 2019; Shorette 2012; Thombs 2021). However, less is known about whether these processes influence meso-level environmental outcomes like corporate emissions.

World Society and World-System

World-society theory posits that a global network of nations, IGOs, NGOs, and INGOs diffuse structure and policy (Meyer et al. 1997). These groups work together as part of a "bee swarm" (Hironaka 2014), creating a shared global culture that is the source of "top-down" processes that play a vital role in the national adoption of pro-environmental policies (Longhofer et al. 2016). Research has found that greater integration into world society is associated with decreased environmental harms, such as deforestation (Shandra 2007b), and a relative

decoupling between economic development and carbon emissions (Longhofer and Jorgenson 2017). Nations highly integrated into world society have also been quicker to implement environmental protections (Frank, Hironaka, and Schofer 2000), and greater integration is associated with better efficacy for domestic NGOs, leading to reductions in environmental harm like forest loss (Tasmim et al. 2020). The "boomerang effect" refers to the amplified environmental benefits resulting from the combined efforts of world-society actors at different levels, such as domestic and international NGOs (Tasmim et al. 2020).

World society's positive environmental influences have also been found at the individual level. A greater presence of INGOs is associated with lower carbon intensity of well-being (anthropogenic carbon emissions per unit of human well-being), meaning that greater integration is associated with greater sustainability (Givens 2017). Further, individuals in nations with more connections to world society are more likely to express serious concern about the environment (Givens and Jorgenson 2013). These studies suggest that global environmental norms influence multiple levels of society.

Complicating the influence of global environmental norms and pressures is that nations are not operating on an even playing field: their positions are unequal. World-systems theory's key argument is that nations are embedded in a hierarchical global economic order, where each nation's position is determined by its place in the global division of labor (Wallerstein 1974). *Core nations* are at the top of the hierarchy, and their economies are characterized by capital-intensive production and high wages. *Periphery nations* are at the bottom of the hierarchy, with little capital-intensive production and low wages (Chase-Dunn 1989). This hierarchy leads to inequality between nations based on their relative economic and political power, often resulting in concentration of environmental harm in developing nations (Hornborg 2009; Jorgenson 2006). Inequality in the global division of labor allows core nations, with high levels of development and often situated in the global North, to both draw resources from and deposit waste into non-core nations, depressing the "true" amount of emissions associated with the production and consumption patterns of core nations through a process known as *ecologically unequal exchange* (Givens, Huang, and Jorgenson 2019; Jorgenson 2016).

Research shows that ecologically unequal exchange complicates the relationship between economic and environmental outcomes. Trade between core nations can lead to environmental benefits for those countries (Fitzgerald and Auerbach 2016), while trade between core and non-

core nations can help reduce emissions during and after economic recessions in core nations (Huang 2018). Transnational corporations also play a crucial role in ecologically unequal exchange by outsourcing and offshoring, which are processes of moving the most resource-intensive and environmentally harmful elements of production, usually from core to non-core nations (Bornschier and Chase-Dunn 1985; Muradian and Martinez-Alier 2001). Foreign direct investment and trade networks facilitate the outsourcing of production, helped by business-friendly national regulations and resulting in environmentally detrimental outcomes such as greater emissions and deforestation in non-core nations (Rieger 2019; Shandra 2007a).

Other studies show that inequality in the world-system can dampen the influence of greater world-society integration. World society is increasingly regionalized, with wealthy and powerful nations densely connected (Beckfield 2003, 2010), leading to inequality between nations. As a result, although pro-environmental norms are being diffused through world society, national capacity (or willingness) to act on these norms varies by the nation's position in the world-system. This leads to decoupling between pro-environmental objectives and actual practice, an issue more pervasive in non-core nations due to their relative lack of financial and administrative capacity (Lim and Tsuitsui 2012; Shorette 2012). Despite the difficulty, non-core nations closely integrated into world society have experienced benefits such as reduced deforestation rates and pesticide use, suggesting that environmental harms in these nations can still be mitigated through civil society pressure (Jorgenson, Dick, and Shandra 2011; Shorette 2012).

Nations and Corporations

Nations are key actors in both world-system and world-society theories. Their position within the global political hierarchy allows core nations to pursue economic growth at the expense of non-core nations while also constraining their economic and political options (Chase-Dunn 1989). Similarly, pressure from global civil society constrains the acceptable choices available to nations when responding to a particular problem, leading to greater homogeneity among nations highly integrated into world society (Meyer et al. 1997). National regulations play an essential role in determining which actions corporations think are in their interest, alongside institutional changes originating from innovations diffused by the world society, such as

organizational field dynamics, shifts in consumer preferences, and competitor recalculations (Hironaka 2014).

Where governments have enacted climate-related regulations, the effect on corporate emissions has been mixed. In the United States, direct regulation of climate outcomes, including emissions caps and greenhouse-gas targets, has been relatively successful and is associated with lower corporate emissions (Grant, Bergstrand, and Running 2014). Other approaches, such as regulation through information, climate action plans, and greenhouse-gas reporting, seem to have no effect on corporate emissions or chemical releases (Grant, Bergstrand, and Running 2014; Grant and Jones 2004). While direct forms of national regulation, such as emissions caps and targets, have great promise for reducing emissions substantively, there are barriers to success even if such regulations are implemented, such as difficulty monitoring corporate compliance. These issues have led to proposed alternatives.

Private climate governance is one potential stopgap that relies in part on the efficacy of ESG initiatives. Vandenbergh and Gilligan (2017) argue that while government intervention is ultimately necessary, private actors can play an important role in emissions reduction, buying time to push through necessary regulation. Proposed private governance measures include private certification, lender standards, carbon reporting and disclosure, corporate and household efficiency campaigns, and green finance (Vandenbergh and Gilligan 2017). Benefits of this approach include that such measures can be adopted quickly; engage different actors, such as corporations, churches, and households; appeal to a broader base of support than government regulation; and spread across borders via international trade (Vandenbergh and Gilligan 2017). However, getting corporations to adopt these measures will require pressure, which could come from various sources, including civil society.

Civil Society and Corporations

Civil society encompasses a variety of actors—including regulators, customers, competitors, industry, communities, and social movements—which, independently and in tandem, are pressuring corporations to mitigate their environmental harms (Delmas and Toffel 2004). While primary stakeholder activism—actions undertaken by corporate shareholders—often have the most significant influence, shifting internal corporate risk perceptions and

affecting financial performance (Reid and Toffel 2009; Vasi and King 2012), secondary stakeholders—the general public—can also influence corporate behavior through boycotts, publicity campaigns, and protests (Vasi and King 2012). Further, third-party evaluators, who work to increase consumer awareness and create competition, often valorize well-performing firms and shame those that perform poorly; they can even pressure companies they have not rated, when the ratings are combined with regulation (Sharkey and Bromley 2015).

While civil society provides formidable incentives alone, the efficacy of such pressure is improved when government regulation looms behind it (Reid and Toffel 2009; Vogel 2005). Thus, the benefits of corporate social responsibility are spread unevenly: they are likely most significant in core nations highly integrated into world society, because these nations couple pressure from NGOs and voluntary programs with government regulation and oversight (Meyer et al. 1997; Shorette et al. 2017). Elite control of transnational corporations in core nations increases inequality in emissions, as the elites use organizational, institutional, and network-based inequality to shift environmental costs onto those with less power, both within core nations and from core to non-core nations (Downey 2015).

A common way of accounting for the lack of concrete action on climate change, especially on the part of organizations, is that there is a decoupling between what organizations say they do and what they actually do. Termed "policy–practice" decoupling more generally, and often "greenwashing" when concerning corporations and the environment, this phenomenon suggests that while civil society pressure might be able to change how corporations portray themselves to the public, it won't change their operations. However, the focus on policy–practice decoupling obscures another kind: means–ends decoupling (Bromley and Powell 2012). In this scenario corporations might be doing what they say they are doing, but still not affecting key metrics, such as emissions (Bromley and Powell 2012). The problem arises from internal complexity, endemic reform, and the diversion of resources (Bromley and Powell 2012). To move beyond this kind of decoupling would require a better understanding of what kind of corporate actions would lead to the desired environmental outcomes. Another possibility is that the apparently widespread nature of decoupling is due to the relatively short time frame available to study ESG outcomes. Over time, beneficial outcomes can arise out of what was originally only a symbolic commitment (Cole 2012).

Research Question

Given the relationship between world-society integration and world-system position found previously at the national level, in this study I examine whether a similar relationship exists at the corporate level. Does world-society integration lead to better corporate-level environmental outcomes, and does this improvement depend on the world-system position of the nation in which the corporation is headquartered?

Per world-society theory, I argue that corporations headquartered in nations with more ties to civil society will have lower emissions, as they face greater scrutiny and pressure from NGOs, IGOs, and other actors to take action and reduce their environmental impacts. However, the environmental improvements associated with greater civil society integration can be tempered by a nation's world-system position, as non-core nations have less global political and economic power, limiting their ability and access to resources to address environmental problems adequately. In contrast, corporations in core nations also highly integrated into civil society are more likely to reduce their emissions, as they face greater pressure from civil society and other nations to reduce environmental harm and can act on this pressure.

DATA

Research on corporate emissions has been limited by poor data availability. The most comprehensive source is the Carbon Disclosure Project (CDP), founded in 2000 to encourage and collect corporate environmental disclosures. The data have been collected annually since 2010 via a questionnaire. While companies may choose to report emissions of their own accord, most do so because stakeholders have asked them to do so via the CDP. These stakeholders include investors, customers (large purchasing organizations), banks, and environmental initiatives. Responding corporations are given a letter grade posted publicly on the CDP's website. An A grade requires third-party verification of emissions data, among other criteria. Corporations that have been invited to respond to the survey but chose not to are also listed on the website, with a grade of F. The reported data cover 11 sections, including climate governance, risks and opportunities, business strategy, targets and performance, emissions data, verification, and carbon pricing. Recent research has found that environmental performance (in

terms of greenhouse-gas emissions) is not associated with corporate decisions to join or drop out of the CDP (Callery 2022).

One section of the survey asks corporations to report their emissions, broken down into scope 1 (from fuel combustion, company vehicles, and fugitive emissions), scope 2 (from purchased electricity, heat, and steam), and scope 3 (from outsourced production and consumption of goods and services). From 2010 to 2018, an average of 92% of the corporations that participated in the CDP survey reported their scope 1 and 2 emissions. The number reporting scope 3 emissions rose slowly over time, from 59% in 2010 to 89% by 2018. A limitation of the scope 3 emissions, however, is that there is less consistency in how they are measured, with respondents free to select which of 17 types (including upstream leased assets, downstream transportation and distribution, and use of sold products) are relevant and which are not.

Corporations indicate their "boundaries" when reporting to the CDP. Reporting boundaries are the criteria used to determine which entities' emissions are counted: equity share (accounting based on the share of ownership), financial control (accounting based on the ability to direct policy and receive profit), or operational control (accounting based on authority over material decisions). In my models, emissions are attributed to the headquarters nation of the reporting corporation, regardless of the reporting boundary. All three types focus on emissions that corporations have some form of control over. I argue that the national characteristics of the headquarters nation play a key role in determining the path pursued by the corporation in question and, ultimately, their emissions, even those that originated elsewhere. Thus, corporations are included in the sample if they reported emissions to the CDP for two or more years from 2010 to 2018, and they are grouped by nation.[1] The final sample includes 1,090 corporations in 36 nations (Table A3 in the appendix).

One of the limitations of the CDP data set is the potential for sample selection bias arising from corporations choosing not to respond to the survey when asked. Previous research using Heckman models identified factors associated with the likelihood of response to the CDP survey, including the presence and stringency of national environmental policy, national clean energy investment, whether the corporation or industry peers reported the previous year, the size

[1] Robustness checks analyzing only corporations reporting for eight or nine years found no significant differences in results.

of the corporation, and the firm's orientation to primary stakeholders, including shareholders, customers, and employees (Andrus, Callery, and Grandy 2022; Callery 2022; Mateo-Marquez et al. 2021a, 2021b). The Heckman model is used not only to examine which factors are associated with the likelihood of response and inclusion in the sample but also to estimate a coefficient called lambda, which is included in further models to estimate whether the bias of the sample is affecting the results. Research using this correction coefficient found no difference in results compared to models without the correction (Andrus, Callery, and Grandy 2022; Mateo-Marquez et al. 2022). While this suggests that, for the CDP data, sample selection bias does not significantly alter the results, I estimate a Heckman model and include the resulting lambda coefficient in my models to account for sample selection bias as a robustness check (Table A5 in the appendix).

Dependent Variable

The dependent variable is corporate-level gross global scope 1 emissions (from fuel combustion, company vehicles, and fugitive emissions), collected from the CDP. The variable is self-reported in metric tons of CO_2 equivalent (Mt CO_2e) and transformed using the natural log to account for skew. Scope 1 emissions are the focus of this analysis because they are most likely to be affected by international pressure from world society.[2] These emissions are directly associated with corporate assets that the corporation has direct control over, unlike emissions stemming from consumer use (scope 3) or energy consumption (scope 2). This does not mean that corporations cannot or should not be held accountable for those emissions, only that it may be more feasible for nations to regulate those emissions that are tied to internal corporate workings.

Figure 1 illustrates the change in *average* corporate scope 1 emissions from 2010 to 2018 for core and non-core nations. Overall, in this sample, average corporate emissions increased

[2] Scope 2 emissions (from purchased electricity, heat, and steam) are not included as they depend on available sources of electricity, which varies by geographic location, among other variables that are little affected by world-society pressure. Reporting scope 3 emissions (those associated with outsourced production and consumption of goods and services) is optional, resulting in issues with self-selection bias and limited sample size.

from 2010, peaking in 2011 at about 5 Mt CO_2e for core nations and in 2013 at about 6.5 Mt CO_2e for non-core nations.[3] As of 2018, average emissions in core nations were down to about 3.5 Mt CO_2e but were on the rise after a 2017 low of about 3 Mt. Average emissions in non-core nations had fallen since 2013 to about 4 Mt CO_2e in 2016 but in 2018 were back up to about 5.5 Mt.

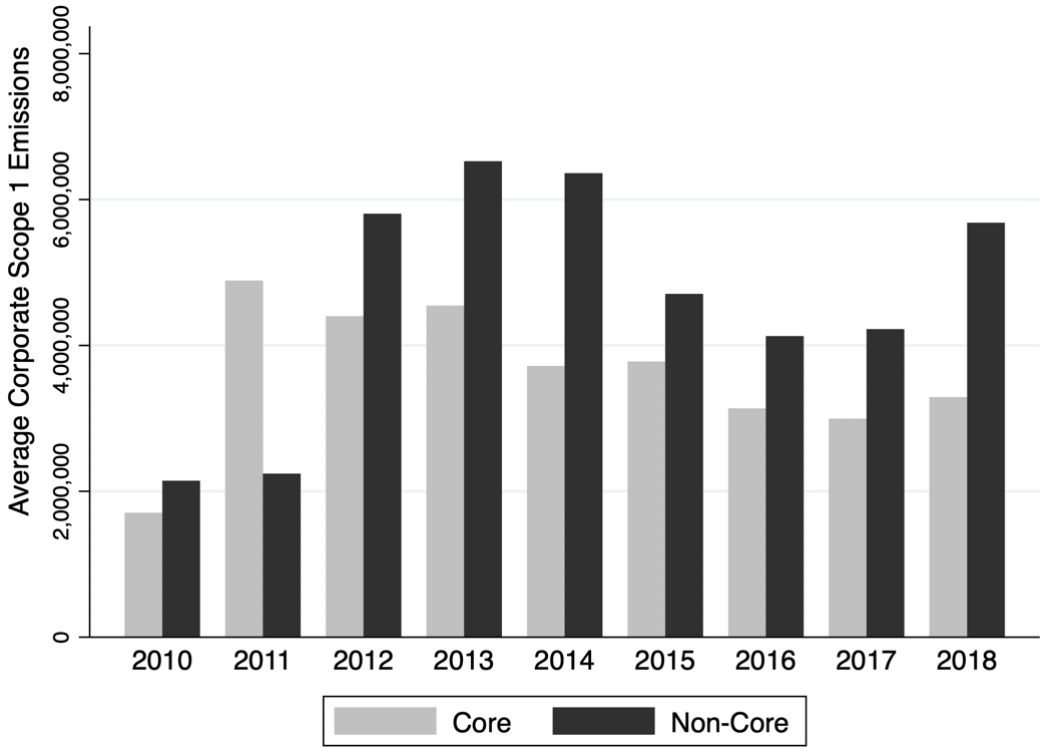

Figure 1. Average corporate emissions over time, by world-system position

Independent Variables

I include three variables representing civil society pressure. The first is a national-level count of the number of INGO chapters, bottom-coded so that the lowest possible value is 1,500 to avoid bias from outliers, and intended to capture national-level ties to world society. I follow

[3] That scope 1 emissions peaked relatively early during these years could reflect improvements in corporate efficiency in areas related to direct consumption of fossil fuels. As scope 2 and 3 emissions are not included in this analysis, the totals do not reflect increases in *total* corporate emissions.

the tradition of Frank, Hironaka, and Schofer (2000) and measure integration into world society as the number of INGOs a nation is linked to from 2010 to 2018, as listed in the *Yearbook of International Organizations*. This source and measurement strategy aligns with other studies using world-society and world-systems measures (e.g., Jorgenson, Dick, and Shandra 2011; Lim and Tsuitsui 2012; Shorette 2012). While some authors focus explicitly on environmental organizations (e.g., Jorgenson, Dick, and Shandra 2011), I include INGOs of all types to capture a variety of types of pressure and scrutiny influencing corporate behavior, whether the organizations are focused on the environment or not.

The second variable is the percentage of corporations in the nation that have signed the UN Global Compact, intended to measure pressure from IGOs. The compact encourages companies to incorporate ESG factors and pursue the UN's Sustainable Development Goals (United Nations Global Compact, n.d.). The measure is time-invariant, collected in May 2022 from the organization's website. The total number of corporations was collected in September 2022 from various sources, including government websites and Statista (Table A4 in the appendix).[4] The most recent year of available data was used to ensure that the measure appropriately reflected the total number of corporations that could have signed on to the compact.

The third variable is the percentage of corporations in the nation (of those reporting to the CDP) that "provide incentives [to employees] for the management of climate-related issues, including the attainment of targets" (CDP 2020). This time-varying measure covers 2010 to 2018. In the survey, corporations were asked whether they had any climate-management incentives in place. Responses of yes were coded as 1, and "not currently but we plan to introduce them in the next two years" and "no, and we do not plan to introduce them in the next two years" were coded as 0. These incentives could be aimed at executive boards, C-suite executives, managers, or all employees. Types of incentives include monetary and non-monetary rewards for activities including emissions reduction, energy reduction, and efficiency projects and targets; implementing environmental criteria for purchases; supply chain engagement; and company performance against a climate-related sustainability index. The measure was

[4] The World Bank's data on total companies include only domestic listed companies, and in some cases undercount compared to the UN signatories in each nation.

aggregated to the national level from the organizational level so that all three world-society measures were included at level 1 of the multilevel model. This reflects world society's focus on national integration into civil society as the driving force of mitigation. It also aligns with research operationalizing world society with macro-level measures (Givens 2017; Longhofer et al. 2016; Shandra 2007b; Shorette 2012; Tasmim et al. 2020).

To assess whether the relationship between corporate emissions and civil society integration varies by position in the political-economic hierarchy, I include a binary measure of world-system position interacted with the three world-society variables. A limitation of the data set is that most of the corporations responding to the CDP survey are headquartered in nations in the global North. To compare nations based on their relative economic and political power, they are divided into core or non-core (which includes periphery and semi-periphery nations) based on the "orthodox classification" described by Clark and Beckfield (2009). The periphery and semi-periphery are combined to ensure that the "non-core" group is large enough for comparison with the core.[5] As one's position in the world economy is unlikely to change in the relatively short period covered by this study (Chase-Dunn 1998), the measure is time-invariant (Shorette 2012). In the final sample, 20 nations are in the core and 16 in the non-core (Table A3).

Control Variables

Size is a key determinant of emissions; larger nations and corporations tend to emit more. Following previous studies (e.g., Jorgenson 2006; Jorgenson, Dick, and Shandra 2011; Longhofer and Jorgenson 2012; Thombs 2021), total population is included in the model to control for this. The data are from the World Bank, and logged to correct for skew. In the tables, the coefficients can be interpreted as elasticity coefficients, where a 1% change in the variable of interest is associated with an *x*% change in emissions.[6] Similarly, at the corporate level size is

[5] Robustness checks using all three categories had substantively similar results, with periphery and semi-periphery corporate emissions having similar relationships with the three measures of civil society integration.

[6] GDP is another common control for national size and power but is not used in this analysis because of its moderate correlation with the world-system measure ($r = 0.5$). Sensitivity analyses, including GDP per capita, showed that it was not significantly associated with corporate emissions.

associated with emissions, partially due to the ossification that comes from the difficulty of making changes to a large and complex organization (Grant, Bergstrand, and Running 2014; Grant, Jorgenson, and Longhofer 2020). In line with previous studies (see Mateo-Márquez et al. 2021b), total revenue (converted into 2015 USD) and number of employees are included as measures of corporate size. Both variables are from Compustat, a database of financial, statistical, and market information, and logged to correct for skew and ease interpretation. Finally, economic sector is included in the models as a control to ensure that countries with more firms in more polluting sectors are not biasing the results (Ioannou and Serafeim 2012). Sectoral classifications are from the CDP (Table A2). Most responding corporations were in the manufacturing sector (31% in core nations, and 16% in core nations), followed by services (20% in both the core and non-core). The correlation matrix of independent and control variables shows no significant correlations, suggesting multicollinearity issues are not a concern (Table A1).

Table 1. Variables Used in the Analysis

Variable	*Description*	*Mean (std. dev.)*	*Range*	*Source*
Macro level				
INGOs	Annual count of the number of INGOs in a nation, bottom-coded so the smallest value is 1,500	3291.91 (667.62)	1,500 to 4,474	*Yearbook of International Organizations*
Global Compact signatories	Time-invariant percentage, where the number of corporations signing on to the UN Global Compact is divided by the total number of corporations in a nation and multiplied by 1,000 for ease of interpretation	12.78 (16.24)	0.21 to 60	United Nations
Climate-management incentives	Annual percentage, where the number of corporations with incentives for the management of climate-related issues is divided by the total number of corporations in a nation	82.8 (11.09)	30 to 100	CDP
World-system position	Binary measure indicating whether a nation is in the core (0) or the non-core (1)			Clark and Beckfield (2009)
Population	Annual count of the number of people in a nation, logged	184,000,000 (228,000,000)	518,347 to 1,390,000,000	World Bank
Meso level				

Scope 1 emissions	Annual count, in metric tons, of the scope 1 CO_2 emissions produced by a corporation, logged	3,831,203 (14,100,000)	0.01 to 257,000,000	CDP
Industry	Categorical measure listing 13 economic sectors			CDP
Employees	Annual count of the number of people employed by a corporation, logged	50.4 (111.92)	0.01 to 2,300	Compustat
Total revenue	Annual count of the money generated from business operations by a corporation, logged	48,100,000 (420,000,000)	0.09 to 25,700,000,000	Compustat
Lambda	Measure accounting for the influence of regulative and normative factors on the likelihood a corporation responds to the CDP survey	0.92 (0.15)	0.3 to 1.7	Author's calculation, based on Mateo-Marquez et al. 2021b

METHODS

I estimate a multilevel model to account for the nested nature of the data set and research questions. Corporations are theorized to be influenced by the civil society context and world-system position of the nation where they are headquartered. The model has three levels, with nine waves of corporate CO_2 emissions as the dependent variable at level 1, nested within corporations at level 2, and including nation-level independent variables at level 3.

Heckman Correction

The Heckman correction is a two-step process. The first model examines which factors influence inclusion in a sample and is used to estimate a variable, lambda, to account for this influence. In the second step, lambda is included in a regression model to account for potential sample selection bias in the outcome of interest. I estimated a Heckman model using 2015 data on corporate response and measures of regulative and normative influence on disclosure (Mateo-Marquez et al. 2021b). Results are reported in Table A5 in the appendix. The resulting lambda correction factor is included in the models to assess the potential effect of nation-level factors on corporate inclusion in the CDP.

RESULTS

The results of the analyses are reported in Table 2. As a reminder, the outcome variable—scope 1 corporate carbon dioxide emissions—is logged, but the key independent variables are not. So each coefficient X needs to be transformed to $Y = (\exp(X) - 1) \times 100$; this Y can be interpreted as the percentage change associated with a one-unit increase in X.

Table 2. Multilevel Models of Corporate CO_2 Emissions, 2010–2018, in 36 Nations: Association with World-System Position and World-Society Measures

Variable	*Model 1* *Scope 1 coefficient (SE)*	*Model 2* *Scope 1 coefficient (SE)*
INGOs	0.0006 (0.0002)*	0.0005 (0.0002)*
Global Compact signatories	–0.01 (0.01)	–0.02 (0.01)
Climate-management incentives	–0.001 (0.002)	–0.004 (0.002)*
Core[a]	–	–
Non-core	0.11 (0.53)	–4.39 (1.34)**
INGOs × non-core	–	0.001 (0.0005)**
Signatories × non-core	–	0.03 (0.03)
Incentives × non-core	–	0.01 (0.003)**
Employees (logged)	0.37 (0.03)***	0.36 (0.03)***
Total revenue (logged)	0.26 (0.03)***	0.26 (0.03)***
Population (logged)	–0.28 (0.13)*	–0.37 (0.13)**
Lambda	1.7 (0.89)	2.19 (0.95)*
Constant	7.52 (2.26)**	9.27 (2.38)***

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

[a] Parameter set to zero.

Model 1 includes corporate and nation-level predictors. Of the three measures of civil society pressure, only INGOs have a statistically significant association with corporate emissions in this model: for every additional national INGO membership, corporate emissions increase by 0.06%. World-system position has no association with corporate emissions. The controls for corporate size are associated with corporate emissions: for every 1% increase in the number of employees, emissions increase by 0.37%, and for every 1% increase in revenue, emissions increase by 0.26%. This is consistent with earlier findings that larger and wealthier corporations

emit more over time as they become ossified (Grant, Jorgenson, and Longhofer 2020).[7] The control for national size is negatively associated with emissions: for every 1% increase in population, there is a 0.28% decrease in emissions. This finding is also consistent with previous research on meso-level outcomes, which has found that, after accounting for the effect of civil society integration and global economic and political position, a larger population is not associated with more emissions, in contrast to their well-established positive association at the macro level (Grant, Jorgenson, and Longhofer 2020). Heckman's lambda, which accounts for potential sample selection bias, is not statistically significant. Its inclusion in the model did not significantly alter the results, suggesting that selection bias does not affect the key findings (Andrus, Callery, and Grandy 2022). The coefficients for controls for the economic sector and time are reported in the Table A6 in the appendix.[8]

Model 2 introduces interactions between the three world-society variables and world-system position. The results suggest that the relationship between civil society and emissions is complicated by position in the global economic hierarchy. Further, the association between emissions and world-system position varies in strength and direction across the three measures of civil society, suggesting that not all sources of pressure have the same effect. The coefficients for the control variables remain broadly similar, except for Heckman's lambda, which just achieves statistical significance, suggesting that selection bias is present. However, comparison with the results of a model without lambda shows that the focal results do not change, suggesting that selection bias does not significantly affect the results.

The interaction between INGOs, emissions, and world-system position shows that the positive relationship between INGOs and emissions found in Model 1 is strongest in non-core nations and significantly different from the relationship in core nations. In non-core nations, each

[7] A comprehensive measure of corporate age for corporations founded before 1980 is not available from Compustat, so age could not be included in this analysis.

[8] Sensitivity analyses using scope 2 emissions as the dependent variable found largely similar results. Notable exceptions in model 1 include nonsignificant associations between INGOs and emissions, and a negative and significant association between Global Compact signing and emissions. The notable exception in model 2 is that the main effect of INGOs (i.e., the association for core nations) is nonsignificant. These variations suggest that future research on scope 2 emissions is warranted; this is discussed in more detail in the Limitations section.

additional INGO membership is associated with a 0.15% increase in emissions ((exp(0.001) – 1) × 100) + (exp(0.0005) – 1) × 100)). The relationship between emissions and INGO memberships in core nations is also positive and significant, although the effect is smaller: each additional membership is associated with a 0.05% increase in emissions. This finding suggests that INGO memberships are ceremonial, with little ability to reduce emissions.

The results in model 2 show that the nonsignificant association between emissions and climate-management incentives in model 1 was due to diverging associations between the variable and emissions according to political and economic power. In non-core nations, every 1% increase in corporations with climate-management incentives in the nation is associated with a 0.6% increase in emissions ((exp(0.01) – 1) × 100) + (exp(–0.004) – 1) × 100)). In core nations, for every 1% increase in corporations with climate-management incentives in the nation, there is a 0.4% decrease in emissions.[9] This finding provides some support for the emissions-reducing potential of world-society integration, but only in core nations. However, the reductions in emissions in core nations, concurrent with increases in emissions in non-core nations, also suggest that the former could be at the latter's expense: a case of ecologically unequal exchange.

No such divergence exists for the Global Compact signatories variable, which remains unassociated with corporate emissions. This suggests that the compact has not yet encouraged substantial emissions reduction, perhaps because a legally binding commitment is not required for participation. But the measure is not associated with increasing emissions either, so it appears that signing on to the compact is a form of greenwashing. The compact allows corporations to continue with business as usual—that is, not actively reducing their emissions—while also touting green credentials.

Graphing the relationship helps to illustrate the divergence between the core and non-core. Figure 2 is a graph of the predicted emissions for prototypical cases, according to the number of NGO memberships grouped by relative political and economic power. The concentration of the association in the non-core is clear from the graph: as NGO memberships rise, so do emissions, at a rate higher than that observed in core nations. From 2010 to 2018,

[9] In sensitivity analyses, splitting non-core nations into periphery and semi-periphery, the association between the civil society measures and emissions was stronger (larger coefficients) in periphery nations than in semi-periphery nations.

most non-core nations had between 2,000 and 2,500 NGO memberships, increasing steadily. Using margins to predict corporate emissions, in non-core nations with 2,500 NGO memberships, average emissions were 140,000 Mt CO_2e, compared to 85,000 Mt CO_2e in core nations with similar numbers of memberships. At this level, these differences are nonsignificant. However, at 3,500 NGO memberships—the average number for core nations—predicted emissions for the core are 150,000 Mt, significantly less than the almost 1,000,000 Mt in the non-core. Examples of non-core nations with high emissions and dense ties to world society include Russia, with 2,471 NGO memberships and average corporate emissions of 69,000,000 Mt CO_2e (the highest overall); and India, with 2,248 NGO memberships and average corporate emissions of 7,300,000 Mt.

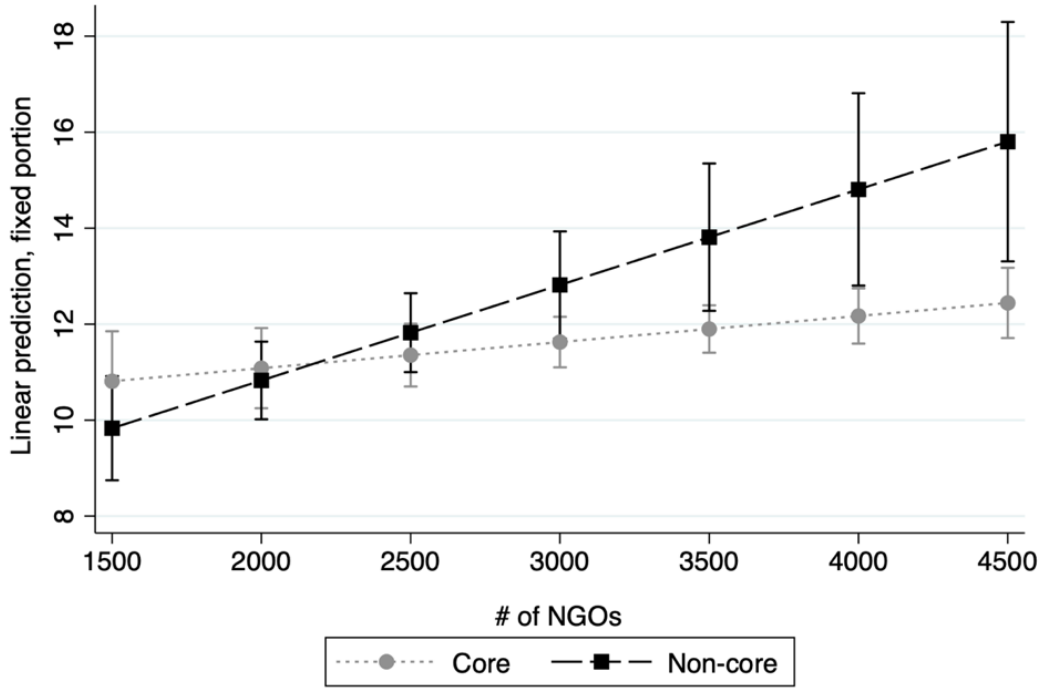

Figure 2. Predicted emissions by NGO count and world-system position

Figure 3 illustrates the difference between core and non-core nations in the association between emissions and climate-management incentives. In core nations, a greater percentage of corporations adopting such incentives is associated with less corporate emissions. In non-core nations, similar to when civil society is measured as the number of NGOs, a greater percentage of incentives is associated with *more* corporate emissions. This suggests that, as pressures

increase for corporations to adopt climate incentives in non-core nations as they integrate into world society at the same levels as core nations have, the expected emissions reductions might not materialize as long as these nations remain outside the core. The global political and economic limitations faced by non-core nations, in addition to the emissions-intensive production outsourced from core nations, lead to more emissions. In this case, the greater pressure from world society may not be strong enough to offset the effects of ecologically unequal exchange. About 89% of corporations in non-core nations had such incentives, slightly more than the 83% average in core nations. At the corresponding point on the graph, the divergence between the two groups is clear: estimating the marginal effects in cases where 85% of corporations have climate-management incentives, the estimated marginal effects predict emissions of 130,000 Mt CO_2e in core nations versus 670,000 Mt CO_2e in non-core nations.

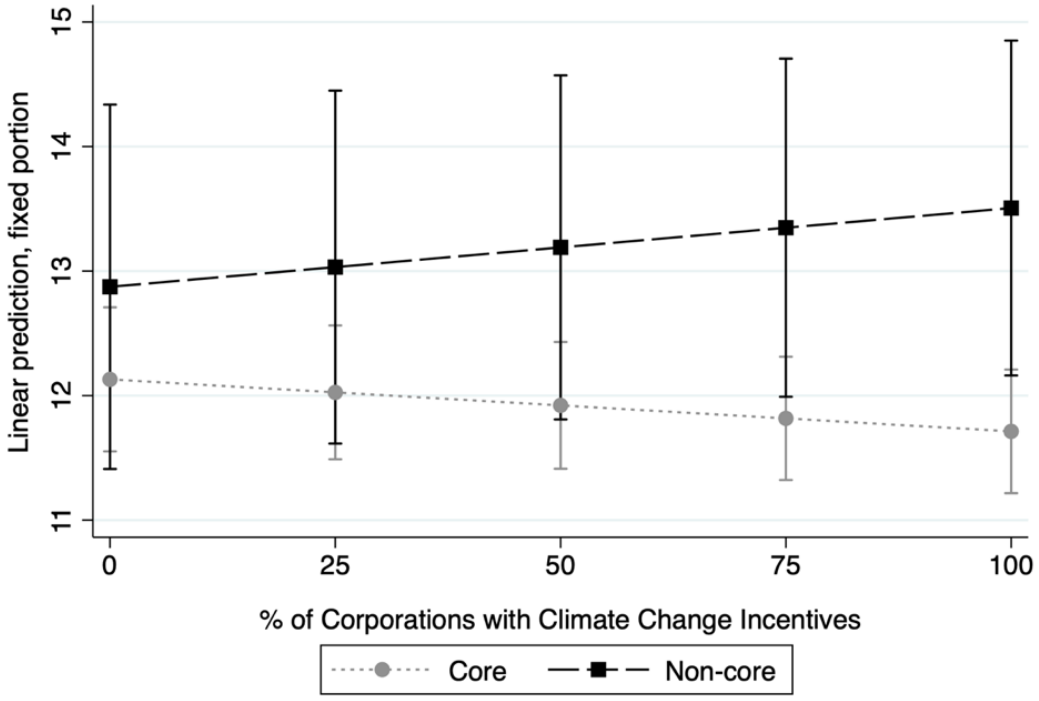

Figure 3. Predicted emissions by climate management incentives and world-system position

Thus, the relationship between civil society integration and corporate emissions varies with a nation's position in the world-system. A negative association between civil society integration and emissions is only found for core nations, and only when using the climate-incentives measure of integration. Core nations are the main targets of corporate emissions

reduction pressure and have the most political and economic capacity to act on such pressures. In contrast, two measures of civil society pressure are associated with greater emissions in non-core nations. These nations do not have the same political and economic ability to pressure corporations to reduce their emissions. Further, these nations may be making ceremonial commitments to reap the economic benefits of greater civil society integration, leading to more corporate emissions through corporate offshoring from core nations. Overall, the positive association between NGO presence as a measure of civil society integration and emissions at all levels of the world-system, combined with the lack of an association between corporate Global Compact signing and emissions, suggest that world-society pressure has a ways to go before it results in concrete emissions reductions across the board.

DISCUSSION

In core nations, there is some evidence that civil society influence can help reduce corporate emissions. The same cannot be said for non-core nations, likely due to their relative lack of global political and economic power. In these nations, the inequality of the world-system is suppressing the potential environmentally mitigating effect of world-society integration. The consistent positive association between emissions and civil society pressure in non-core nations suggests that their greater integration into civil society is mainly ceremonial and not reflective of intended action on the national or corporate level. In nations with less economic and political power, corporate power can override civil society pressure and continue business as usual. Any increase in world-society integration could represent an increase in greenwashing on the part of corporations—an attempt to gain legitimacy without any intention of reducing emissions.

However, it is also possible that the increases in emissions are due to ecologically unequal exchange, where greater integration into the global economy facilitates the outsourcing of environmental harms from core to non-core nations (Jorgenson 2006; Hornborg 2009). Related is the possibility of means–ends decoupling (Bromley and Powell 2012). In this case, the lack of emissions reductions resulting from pursuing NGO memberships and establishing climate-management incentives does not necessarily mean these actions are indicative of greenwashing or unrelated to environmental impacts. Nations and corporations may pursue integration with good intentions but lack the capacity, power, or resources to follow through on

their commitments (Lim and Tsuitsui 2012). These commitments are made despite possible limitations, as greater integration into world society can benefit nations and corporations economically.

The greater emissions associated with more NGO memberships in core nations further confirm the possibility of decoupling. In the case of these corporations, however, policy–practice decoupling—more commonly known in this scenario as greenwashing—is likely (Bromley and Powell 2012). Many policy discussions on reducing corporate emissions have focused on nations in the global North. These nations are not only home to many multinational corporate headquarters but are also leaders in implementing emissions-trading schemes and similar environmental regulations focusing on corporate contributions to climate change. Core nations have the capacity, power, and resources to pressure corporations, so the lack of results suggests greenwashing.

However, the lower emissions associated with world-society integration in the form of climate-management incentives in core nations suggests that some mitigation of environmental harms via civil society pressure is possible. Core nations and corporations are best able to respond to such pressures, and so would likely be the first place for such a relationship to be found. Engaging the private sector will be essential to achieve necessary emissions reductions. Civil society pressure is one such way to ensure the participation of corporations.

Limitations

Previous research on corporate contributions to climate change has been limited by poor data availability. While the CDP data set is the most comprehensive source of corporate emissions currently available, it is still limited by sample size regarding the corporations and countries represented. The Heckman correction can help account for factors that influence whether a corporation responded to the CDP survey, but it cannot diversify the sample. Given the relatively small number of nations included in the analysis and the overrepresentation of certain nations, including the US, UK, and Japan, the findings should be interpreted cautiously. A further data limitation is the lack of reporting on scope 3 emissions. The currently available scope 3 emissions would further shrink the sample in terms of the number of corporations and the nations represented.

As national requirements for corporate emissions reporting become more stringent and the financial and social benefits of reporting increase, future analyses can take advantage of more detailed emissions data for a larger sample of nations. Another opportunity for future research is examining how civil society might influence different corporate emissions. While scope 1 emissions are most squarely under corporate control, relationships with the state as an energy provider (scope 2) and individuals as consumers (scope 3) could be fruitful for further analysis. In addition to updated corporate data, future research could incorporate more nuanced national data. The binary measure of world-system position used here is useful for exploratory analysis but does not capture the true complexity of the relationships between nations. As the global economic hierarchy evolves, additional analysis could explore how these changes shape corporate emissions.

CONCLUSION

Corporations are facing increasing pressure to address climate change. This pressure has often come from civil society through NGOs, IGOs, and peer pressure to implement climate-management incentives. Some corporations are better positioned than others to reduce their emissions due to the political and economic power of the nation they are headquartered in, lending increased pressure and capacity. However, while there is evidence that corporate emissions are decreasing in some contexts, in other contexts they are increasing. This suggests that decoupling, in terms of inability or lack of will to implement desired outcomes, continues to hamper efforts to reduce corporate emissions.

The relationship between corporations and civil society is complicated by how corporations themselves are being integrated into world society. With corporations increasingly part of the "bee swarm," peer pressure to conform to ESG initiatives might play an increasingly important role. As the lack of significant findings when using the UN's Global Compact in the analysis illustrates, one of the pillars of civil society—IGOs—might have less influence on corporate environmental outcomes than hoped. In the meantime, civil society pressures, especially in nations in the global North, compel corporations to make their stance known on various social and environmental issues. As more corporations integrate environmental concerns into their operations, the external and internal peer pressure for others to do the same grows.

Even the financial world has become interested in ESG initiatives, adding another layer of incentives. Corporations will continue to grapple with these pressures and increasingly attempt to align ESG and corporate social responsibility principles with their business models to maintain their social license to operate.

Research on corporate sustainability has focused on pressure from stakeholders, shareholders, and regulations (Damert, Paul, and Baumgartner 2017; Sump and Yi 2021) but without considering the nation-level factors that influence the presence, scope, or type of these pressures. However, strategies like that advocated by Grant, Jorgenson, and Longhofer (2020) in tackling power plant emissions suggest how national interventions might work by identifying and targeting corporations with disproportionately high emissions in the nations most receptive to tighter emissions regulation (see also Schor and Jorgenson 2019). Without understanding national contexts—including world-society integration and world-system position—our understanding of corporations' success or failure in reducing their emissions will be incomplete. This understanding is not purely academic but has important implications for effectively crafting climate policies to reduce emissions. As this article has shown, some sources of pressure to reduce corporate emissions have been effective. In contrast, others have been ineffective or even counter-effective, depending on the country's level of civil society integration and position in the global political and economic hierarchy.

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ACKNOWLEDGEMENTS

Many thanks to the to the editors and anonymous reviewers, as well as the participants of the Environmental Sociology Working Group, Dissertation Seminar, and Clough Center for the Study of Constitutional Democracy at Boston College for their comments. I am especially grateful to Andrew Jorgenson, Juliet Schor, and Wesley Longhofer for their feedback and guidance over the course of this project.

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APPENDIX

Table A1. Correlations

Variable	*Scope 1 emissions*	*1.*	*2.*	*3.*	*4.*	*5.*
1. INGOs	0.07	1				
2. Climate incentives	0.01	0.02	1			
3. Global Compact signatories	0.04	0.026	–0.15	1		
4. Revenue	0.003	–0.14	0.09	–0.05	1	
5. Employees	0.06	0.05	0.004	–0.07	0.06	1
6. Population	0.03	–0.24	0.13	–0.39	–0.02	0.08

Table A2. Corporations Categorized by Industry

Industry	*Example*	*Count*	*Percentage*
1. Services	Walt Disney Company	176	20.3
2. Biotech, healthcare, & pharmaceuticals	AstraZeneca	63	7.28
3. Food, beverage, & agriculture	Nestle	58	6.7
4. Fossil fuels	ConocoPhillips	31	3.58
5. Hospitality	Hilton Worldwide	19	2.2
6. Infrastructure	National Grid	74	8.55
7. Manufacturing	Mattel	261	30.17
8. Materials	Tata Steel	50	5.78
9. Mineral extraction	Mitsubishi Materials	10	1.16
10. Power generation	Dominion Energy	30	3.47
11. Retail	Target	49	5.66
12. Apparel	Nike	11	1.27
13. Transportation services	Southwest Airlines	33	3.82

Table A3. Nations Categorized by World-System Position and Number of Corporations per Nation

	N	*%*	*Nation*	*N*	*%*
Core					
Australia	19	1.7	Luxembourg	1	0.1
Austria	4	0.4	Netherlands	14	1.3
Belgium	9	0.8	Norway	22	2
Canada	31	2.8	Portugal	5	0.5
Denmark	10	0.9	South Africa	38	3.5
France	46	4.2	Spain	25	2.3
Germany	31	2.8	Sweden	26	2.4
Greece	2	0.2	Switzerland	30	2.8
Italy	25	2.3	United Kingdom	117	10.7
Japan	180	16.5	United States	341	31.3
Non-core					
Brazil	19	1.7	Mexico	5	0.5
Chile	3	0.3	New Zealand	6	0.6
China	5	0.5	Peru	1	0.1
Colombia	2	0.2	Philippines	1	0.1
Hungary	1	0.1	Russia	3	0.3
India	31	2.8	Thailand	4	0.4
Ireland	11	1	Turkey	19	1.7
Israel	2	0.2	United Arab Emirates	1	0.1

Table A4. Data Sources for Total Corporations per Nation

Nation or group	*Source (date accessed) link*
Australia	Australian Bureau of Statistics (09/29/22) link
Canada	Statistics Canada (09/29/22) link
China	Statista (09/29/22) link
Europe	HIT Horizons (09/29/22) link
Israel	Statista (09/29/22) link
Peru	Statista (09/29/22) link
Philippines	Department of Trade and Industry (09/29/22) link
United Arab Emirates	Statista (09/29/22) link
Rest of sample	Trading Economies (09/29/22) link

Table A5. Heckman Correction

Variable	*Coefficient*	*SE*	*Marginal effects*
Regulative	0.004***	0.001	0.002
Normative	0.021***	0.001	0.008
Constant	–1.17***	0.061	
x^2	367.07***		
Log-likelihood	–3854.67	Correctly predicted	60.35%
Pseudo-R^2	0.05	Observations	6,020

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Notes: Following Mateo-Márquez et al. (2021b), to control for potential sample selection bias I first estimate a probit regression model with variables *Regulative* (environmental policy stringency index) and *Normative* (percentage of companies responding to the CDP in 2014 per nation). Given this study's focus on nation-level determinants of corporate emissions, only nation-level variables were included. The third nation-level variable used by Mateo-Márquez et al. (2021b), *Cultural*, was not statistically significant in the original models. Tests of the model's classification rate suggested that a model using the *Regulative* and *Normative* variables yielded the highest "correct" classification rate (60%, which was higher than the rate for all three variables). The data include 6,020 corporations invited to report to the CDP in 2015. The dependent variable, *Response*, was 1 if the company responded and 0 if not. The results of the probit model are shown in the table. The predicted values based on this model were used to calculate the inverse Mills ratio, also known as Heckman's lambda. The resulting variable was averaged for each nation and included as a time-invariant national-level control for sample selection bias in each model.

Table A6. Coefficients for the Regression of Corporate CO_2 Emissions, 2010–2018: Main Effects of World-System Position and World-Society Measures

Variable	*Scope 1 coefficient (SE)*	*Scope 1 coefficient (SE)*
INGOs	0.0006 (0.0002)*	0.0005 (0.0002)*
Global Compact signatories	–0.01 (0.01)	–0.02 (0.01)
Climate-management incentives	–0.001 (0.002)	–0.004 (0.002)*
Core[a]	–	–
Non-core	0.11 (0.53)	–4.39 (1.34)**
INGOs (non-core)	–	0.001 (0.0005)**
Signatories (non-core)	–	0.03 (0.03)
Incentives (non-core)	–	0.01 (0.003)**
Employees (logged)	0.37 (0.03)***	0.36 (0.03)***
Total revenue (logged)	0.26 (0.03)***	0.26 (0.03)***
Population (logged)	–0.28 (0.13)*	–0.37 (0.13)**
Lambda	1.7 (0.89)	2.19 (0.95)*
Constant	7.52 (2.26)**	9.27 (2.38)***
Services[a]	–	
Healthcare	1.04 (0.25)***	1.04 (0.25)***
Agriculture	2.73 (0.26)***	2.73 (0.26)***
Fossil fuels	5.79 (0.34)***	5.8 (0.34)***
Hospitality	1.9 (0.41)***	1.9 (0.41)***
Infrastructure	3.55 (0.24)***	3.55 (0.24)***
Manufacturing	1.88 (0.17)***	1.89 (0.17)***
Materials	4.47 (0.27)***	4.45 (0.27)***
Mineral extraction	4.35 (0.47)***	4.34 (0.48)***
Power generation	6.72 (0.34)***	6.71 (0.34)***
Retail	0.62 (0.28)*	0.64 (0.28)*
Apparel	0.23 (0.54)	0.22 (0.54)
Transportation	4.6 (0.32)***	4.6 (0.32)***
2010[a]	–	
2011	–0.03 (0.06)	–0.02 (0.06)
2012	–0.07 (0.06)	–0.04 (0.06)
2013	–0.07 (0.07)	–0.03 (0.07)
2014	0.006 (0.07)	–0.04 (0.07)
2015	–0.07 (0.08)	–0.02 (0.08)
2016	–0.07 (0.07)	–0.03 (0.08)
2017	–0.09 (0.08)	–0.04 (0.08)
2018	–0.08 (0.08)	–0.03 (0.09)

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

[a] Parameter set to zero.