FROM MACRO TO MESO: A Multi-Level Analysis of the Effect of National Context on Corporate Emissions, 2010-2020

Annika Rieger

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Advisor: Andrew Jorgenson, Ph.D.

ABSTRACT

According to the Carbon Disclosure Project (CDP), over 25% of the global greenhouse gas emissions in 2021 are attributed to 9,000 corporations. Clearly, corporations contribute disproportionately to the climate crisis, but the factors influencing these emissions have been understudied. In this dissertation, I examine the relationship between the "macro-level" of the nation-state and the "meso-level" of the corporation to identify national characteristics that impact corporate carbon emissions. I draw from several macro-sociological theories: first, the Varieties of Capitalism theory proposes that corporate outcomes depend on the form and extent of national government and corporate coordination. Second, I draw from World Society and World-Systems theories, which propose that national emissions are dependent on integration into global civil society and position in the global political-economic hierarchy, respectively. By testing how well these theories explain variation in corporate emissions, this dissertation extends our understanding of the macro-level factors influencing corporate environmental outcomes, especially those contributing to the climate crisis.

The first series of analyses focuses on national characteristics and institutions. The Varieties of Capitalism theory suggests that Coordinated Market Economies (CMEs),

where the government has greater control over and connections to corporations, will be more successful in mitigating emissions. To test this hypothesis, I estimate a multilevel model using a decade of longitudinal corporate emissions data from the CDP. I find that overall, corporations in CMEs have lower emissions than corporations in non-CMEs—especially those in critical industries such as fossil fuels, infrastructure, materials, and apparel. However, CMEs are not successful across the board. Large corporations in CMEs have higher emissions than similarly sized corporations in non-CMEs, suggesting that tight coupling between powerful corporations and the state contributes to increasing emissions.

Recognizing the limitations of governments' ability to control corporations, the second series of analyses focuses on non-state actors and the intersection of civil society and economic hierarchy. When taken together, World Society and World-Systems theories suggest that nations highly integrated into international civil society will be most successful in mitigating emissions, but that the economic position of those nations can temper or strengthen the association. To test this hypothesis, I estimate a multi-level model and include three measures of civil society integration. I find that the relationship between civil society pressure and corporate emissions varies by a nation's position in the world-system. Non-core nations experience increased emissions according to two measures, while core nations experience decreased emissions according to one measure. I argue that reducing corporate emissions requires accounting for increasingly complicated macro-sociological contexts, as corporations are pressured by and incorporated into the world society and constrained by the world-system's structure.

Overall, this dissertation examines which nation-level conditions mitigate corporate emissions and which exacerbate them. My results suggest that while civil society

pressure and close coordination between corporations and governments are associated with decreased emissions in some contexts, emissions increase when corporations are powerful and nations are weak. I build upon the World Society, World-Systems, and Varieties of Capitalism theories to show that these macro-level contexts matter for corporate environmental outcomes.

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1.0 INTRODUCTION

In an oft-cited quote, noted organizational sociologist Charles Perrow described corporations as "the most intensive and effective environmental destroyer" (e.g., cited in Shwom 2009; Grant, Jorgenson, and Longhofer 2020; original Perrow 1997: 6). Recent data supports this view: a 2022 CDP report found that 9,000 corporations are responsible for 25% of 2021 greenhouse gas (GHG) emissions.[1] Despite their outsize contributions in this realm, sociological research on the social contexts impacting emissions has primarily focused on nations and individuals rather than organizations such as corporations (among the notable exceptions, see Grant and Vasi 2017; Galli Robertson and Collins 2019; Grant et al. 2020; Coen et al. 2021). Solutions to the climate crisis will need to address the role of corporations, but creating these solutions will require a better understanding of corporations as actors.

As nations have played a key role in constraining corporate actions directly, via regulation, and indirectly, by shaping the institutional context from which corporations gain legitimacy (Mikler 2018), they appear best positioned to pressure corporations to reduce their environmental impacts. I first look at the variations in levels of coordination

[1] https://www.cdp.net/en/investor/ghg-emissions-dataset

between national governments and corporations. Specifically, I examine whether direct coordination, in contrast to coordination mediated by the market, is associated with decreased corporate emissions. However, it is also the case that governments are limited in what they can do and are often slow to act. In the second set of analyses, I examine how civil society pressures effect emissions outcomes, and how different political economy hierarchies moderate these results.

The ability of nations to effectively curtail corporate emissions depends on a variety of factors, not least of which the nature of the economic relationship between nations and corporations. According to the theory Varieties of Capitalism (VOC), there are two kinds of coordination: in Coordinated Market Economies (CMEs), government and corporations work together directly (Hall and Soskice 2001). In Liberal Market Economies (LMEs), the market acts as a mediator between government and corporations (Hall and Soskice 2001). Nations such as Germany and Japan are classic examples of CMEs, while nations such as the United States and the United Kingdom are examples of LMEs (Gould, Barry, and Wilkinson 2015). In Mixed Market Economies (MME), there are some areas where governments and corporations coordinate directly and others where they rely on the market (Benney 2019). This group includes emerging economies such as Nigeria and Chile and European nations such as France and Italy.

The VOC theory suggests that there are different roles that governments can play, which in turn impacts the relationship they have with the corporations under their jurisdiction. Despite the increasing attention paid to climate change by governments, this theory has been underutilized in understanding how variation in government-corporate

relations can impact environmental outcomes. Some researchers have proposed that CMEs would tackle climate change via incremental updates to technologies and regulations decided upon in coordination with corporations (Mikler and Harrison 2012). In contrast, LMEs would address the issue via technological innovations pursued by corporations independent of government support, instead in response to market pressures (Mikler and Harrison 2012). However, empirical research is still needed to determine which national coordination strategies have been most successful in reducing corporate carbon emissions.

It's also the case that corporations face pressure beyond governments. In recent years, corporations have been evaluated according to environmental, social, and governance (ESG) factors in part due to civil society pressure. This pressure has taken the form of increased public interest in value-aligned investments and the rise in third-party rating systems (Gerber, Norman, and Gamble 2023). This movement is part of a broader trend identified by World Society theory, which argues that global civil society has increasingly disseminated pro-environmental norms (Hironaka 2014). The question, then, is how corporations are responding to this pressure.

Corporations have significant agency but depend on a societal license to operate. Thus, pressure from International Non-governmental Organizations (INGOs) like Greenpeace and International Governmental Organizations (IGOs) like the United Nations can impact corporate 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. Previous research has shown that greater

world society integration has decreased national emissions, although the results have varied by world system position (Jorgenson et al. 2011; Lim and Tsuitsui 2012; Shorette 2012). However, it is not clear how these elements of structural context impact corporate emissions.

In this dissertation, I test three macro-level theories—World Society, World-systems, and Varieties of Capitalism—and whether they are associated with corporate emissions. I aim to present a clearer picture of the macro-level national factors influencing meso-level corporate environmental outcomes. In the following sections, I discuss the macro and meso factors that could drive corporations to reduce their emissions. I first turn to the literature on the relationship between corporations and nations according to the three macro-sociological theories, and touch on how national governments have tried to regulate corporate environmental impacts. Recognizing the limits of national regulation, I turn to the civil society literature, focusing on the relationships between non-governmental actors and corporations. A key point from the this literature is that the combined efforts of government and non-governmental actors have been most successful in mitigating corporate environmental impacts. With this in mind, I end with an overview of the empirical analyses, which examine how these factors have impacted corporate carbon emissions.

1.1 NATION STATES, CORPORATIONS, AND THE ENVIRONMENT

As the previous roles of the nation state, like war and protectionism, have declined in importance, the role of the nation as a regulator has become more critical (Mann 2013). Regulations are essential in determining which actions corporations think are in their interest. But these interests are not static: they change over time due to changes in institutions originating from innovations diffused by the world society (Hironaka 2014). Similarly, according to the Varieties of Capitalism theory, varying types of economic institutions create different environments in which corporations coordinate with one another and the state (Hall and Soskice 2001). These different coordination strategies lead to different regulatory environments: as a result, states might work closely with corporations, as in Coordinated Market Economies (CMEs), or take a more "hands-off" approach mediated by the market, as in Liberal Market Economies (LMEs) (Hall and Soskice 2001). The VOC typology is a classic in the political economy literature, but most scholarship drawing from the theory has focused on the state, labor, and capital. Environmental issues, such as variations in fossil fuel use, emissions, or pollution, have rarely been considered using this theory (for exceptions, see Mikler and Harrison 2012; Magnin 2018; Benney 2019). In this dissertation, I add to this growing body of literature by examining whether variation in corporate emissions can be attributed to a nation's variety of capitalism.

Previous research has suggested that firms in CMEs take an incremental approach to climate change, pursuing incremental technical innovation and mutual construction of climate regulation (Mikler and Harrison 2012). This is possibly due to embedded

autonomy, which refers to the ties between the state and corporations that allow for the mutual construction of economic goals and the means to reach them (Evans 1995). While Evans argues that these ties benefit the state in advancing its goals, other scholars see these connections as limiting progress on contentious issues like climate change. Mildenberger argues that the close ties between industry and the state in many European nations have made it challenging to introduce and implement policies requiring corporations to limit emissions (2020). The easy access of labor to the government allows both workers and industry groups to determine climate policies, usually advocating for those that do not undermine the firm's competitiveness or profitability.

In contrast, firms in LMEs can pursue radical innovation with the potential to address climate change, but at the same time tend to wait for market demand to dictate when and how these innovations take shape (Mikler and Harrison 2012). In nations like the US (especially during Obama's presidency between 2008-2016) and Australia (during a Labor-Green Party coalition from 2011-2014), where the state had weaker ties to industry, the most restrictive regulations on corporate emissions to date were proposed (Mildenberger 2020). While these regulations were largely ignored or completely repealed, they are notable because they imposed high costs on producers. However, corporate actors still tried to block the approval of such policies after the fact, once the policies have made it past drafting to debate, as well as by lobbying against such proposals at earlier stages. Given that more evidence is in favor of CMEs addressing climate change first, I test whether corporations in these nations have lower emissions than those in non-CME nations.

Previous research on corporate environmental outcomes has often focused on the impact of regulation. At the sub-national level, regulations incorporating direct measures of climate outcomes have been relatively successful. In the US, state-level direct regulations such as emissions caps and GHG targets are associated with lower carbon dioxide emissions from power plants (Grant et al. 2014). However, other approaches, such as the US Environmental Protection Agency's regulation-through-information approach, found no indication that these programs impacted corporate chemical releases (Grant and Jones 2004). Widely implemented policies, including climate action plans and GHG reporting, have also been found to have no impact on corporate emissions (Grant, Bergstrand, and Running 2014). Internationally, the European Union's Emissions Trading System (EU ETS) is one of the most extensive and longest-running examples of emissions regulation, starting in 2005 and covering 45% of member nations' total emissions (Schreuder 2012). Given the overlap in nations classified as CMEs according to the VOC and EU member nations, I include a measure to account for this regulation in Chapter 2.

1.2 CIVIL SOCIETY, CORPORATIONS, AND THE ENVIRONMENT

Beyond government regulation, corporations are increasingly under pressure from various actors—customers, competitors, industry, communities, and social movements—to mitigate their environmental harms. Much of this pressure is in response to the limitations of government regulation, leading to the rise of civil or private regulation

(Vogel 2005). Proponents of private governance—responses to climate change that originate from private actors, i.e., from advocacy groups, communities, non-governmental organizations, and even corporations themselves—don't see such governance as a "silver bullet" but instead as a complement to public governance with the ability to reduce up to 1 billion tons of emissions a year (Vandenbergh and Gilligan 2017).

World Society is a macro-sociological theory explaining the rise in pressure from global civil society to conform to environmental norms. The theory attributes significant variation between nations to their different positions in international civil society (Longhofer et al. 2016; Hironaka 2014; Meyer et al. 1997), suggesting that INGOs and social movements can pressure corporations to conform to global norms. Proponents of Corporate Social Responsibility (CSR) see great social benefits stemming from self-regulation arising from civil society pressure. However, the voluntary nature of CSR makes its impacts uneven. There is little incentive for the most polluting corporations to scale back their most harmful economic activities so long as such actions either incur financial costs or lack financial benefits (Vogel 2005). Self and civil regulation can encourage corporations to pick the "low-hanging fruit" when it comes to environmental sustainability, leading some to argue that regulation will be necessary to see continued progress on sustainability by forcing corporations to make potentially unprofitable decisions (Vogel 2005).

One reason that the impacts of civil society are uneven stems from global inequalities. Per World Society theory, the nation-state is the primary actor responding to

global problems, and is in turn, constrained by a global cultural context (Meyer et al. 1997). However, there are essential differences between nations depending on their position in the world system, with wealthy nations in the core having more power than those in the semi-periphery and periphery (Beckfield 2003, 2010; Lim and Tsuitsui 2012; Shorette 2012). The privileged position of core nations within this system is partly due to their status as "important headquarter countries of transnational corporations" (Bornschier and Chase-Dunn 1985: 131). On the other hand, nations in the semi-periphery and periphery that are "highly penetrated" by transnational corporations often experience short-term economic growth but long-term underdevelopment (Bornschier and Chase-Dunn 1985).

Given these inequalities when examining the impact of World Society integration on corporate environmental outcomes, I also consider the impact of World Systems' position by interacting the two variables, a procedure in line with previous research (Jorgenson et al. 2011; Lim and Tsuitsui 2012; Shorette 2012). While these studies have established improvements in nation-level environmental outcomes associated with greater world society integration (Jorgenson 2009; Shandra 2007a; Shandra 2007b), there is limited research in the World Society tradition examining sub-state (i.e., corporate or state) environmental outcomes (for an exception, see Shorette et al. 2017; Grant et al. 2020). This means that there is potentially significant variation in emissions that are otherwise missed: patterns at the macro or national level of analysis might not hold at the meso or corporate level (for example, see Marquis, Toffel, and Zhou 2016; Grant, Jorgenson, and Longhofer 2020). By applying World Society and World Systems

theories to a meso-level outcome, I examine how far down the pressure of civil society—and the constraints of global political economic hierarchy—can penetrate and influence environmental outcomes as they do at the national level.

Previous research has found that civil society pressure led to some environmentally beneficial outcomes, such as increased emissions reporting due to shareholder activism (Reid and Toffel 2009) and commitments to reduce emissions (Damert et al. 2017) due to institutional and stakeholder pressure. Increases in energy efficiency have resulted from emissions targets, risk and opportunity awareness, and other corporate actions (Sullivan and Gouldson 2013). Still, no such outcomes have been found thus far for emissions (Doda et al. 2016) or for corporate carbon performance (Damert et al. 2017). However, the lack of results may be due to lags between practice implementation and impact, or a lack of impact-oriented practice (Doda et al. 2016). In this dissertation, I add to the literature on the drivers of corporate environmental outcomes by moving beyond corporate-level variables—such as emissions targets—and individual-level variables—such as shareholder activism. Instead, I examine macro-level variables, including corporate-government coordination, civil society integration, and position in the global political economic hierarchy, on corporate emissions.

Overall, pressure from other market actors, such as customers and competitors, is more likely to result in the adoption of international, non-governmental standards, while pressure from nonmarket actors, such as regulators and social organizations, is more likely to result in the adoption of voluntary government-initiated programs (Delmas and Toffel 2008). These differing outcomes suggest the usefulness of combining strategies.

Sharkey and Bromley found that combining regulation with third-party ratings pressured even non-rated corporations to improve their environmental performance (2015). In a study of emissions disclosure, corporations targeted by both actors—in this case, shareholders and regulators—were most likely to capitulate (Reid and Toffel 2009). The efficacy of social movement pressure was improved when government regulation loomed. While this dissertation examines government factors—drawing from VOC theory—and civil society factors—drawing from World Society theory—separately, identifying their unique effects on corporate emissions sets the stage for future research examining combinations of these pressures.

1.3 CHAPTER OVERVIEW

In this dissertation, I examine the relationship between the "macro-level" of the nation-state and the "meso level" of the corporation: under which conditions do nation-states influence corporations to reduce their emissions? In the two sets of empirical analysis, I examine which theoretically proposed nation-level mechanisms are associated with changes in corporate-level scope 1 emissions over time. I apply two broad categories of theory: the second chapter takes a comparative political economy approach by applying the Varieties of Capitalism theory, examining how coordination between corporations and governments can impact corporate emissions. The third chapter follows previous macro-sociological research on the drivers of emissions to combine World

Society and World Systems theories, examining the impact of civil society pressure and global economic hierarchy on corporate emissions.

In both sets of analyses, the dependent variable is corporate gross global Scope 1 emissions (those which the corporation is directly accountable for, such as emissions associated with offices and company vehicles), measured in CO2e. Using corporate-level data as my dependent variable allows me to examine variations that would have been hidden by data aggregated to the national level. Further, using a measure of emissions rather than a measure of corporate social responsibility (e.g., emissions reduction targets) has the benefit of being a "tangible" outcome rather than an intangible commitment. This aligns with Shwom's argument that "environmental claims require environmental data" to fully understand the material consequences of the relationship between corporations, their national contexts, and the environment (2009: 274).

The emissions data are nested in the lowest level of a multi-level model, (level 1), within corporations (level 2), which are clustered within nations (level 3). The multi-level model allows me to include both nation-level and corporate-level independent and control variables. It also provides the possibility of interactions across levels, which are used to explore whether corporate characteristics impact coordination with the government in the second chapter.

Chapter 2 examines the relationship between Variety of Capitalism and corporate emissions. My research question concerns the drivers of corporate emissions: what kinds of corporate-state relationships make it easier for corporations to pollute? As corporations are unlikely to reduce emissions of their own accord significantly, the ability and

willingness of nations to pressure corporations to do so will be a critical factor in mitigating climate change. This task will be more difficult in LMEs, where national governments have few direct ties with corporations, and the market primarily mediates coordination. But in CMEs, where national governments work more directly with corporations, this task is more straightforward, although tempered by the ability of corporations to negotiate for strategies that best suit their interests. As such, I expect corporate emissions to be lower in CMEs than in non-CMEs.

To test this hypothesis, I use a categorical measure indicating whether a nation is a CME or not as the key independent variable in a multi-level model. The sample covers 2010 to 2020 and encompasses 21 CMEs and 19 non-CMEs, in which 1,949 corporations are nested. I include interactions with corporate-level measures for industry and number of employees as a proxy for size to explore further which mechanisms might contribute to the group-level differences. Controls include population and GDP per capita at the national level and corporate revenue, another proxy for size, at the corporate level.

My results support this hypothesis, showing that corporations in CMEs have significantly lower emissions than non-CME nations. However, this relationship varies according to corporate characteristics. Corporations in industries such as fossil fuels, infrastructure, materials, and apparel all have significantly lower emissions in CME than non-CME nations, suggesting that differences in these critical industries might drive the overall lower emissions found in CMEs. However, when looking at corporate size, larger corporations in CMEs have higher emissions than similarly sized corporations in non-CME nations. I propose this is due to the strength of the connections between

corporations and government in CMEs: larger, more powerful corporations can likely negotiate with governments and avoid pressure to reduce emissions. These findings suggest that while certain kinds of corporations in CMEs have lower emissions, tight coupling between corporations and the government can lead to higher emissions in other cases.

In Chapter 3, I follow the tradition of combining World Society and World Systems theories. My research questions concern the relationship between civil integration, political economic position, and corporate emissions: are pressures from civil society associated with a change in corporate emissions? Do these changes differ based on nations' position in the modern world system? The limitations of government intervention have encouraged civil society actors to tackle climate change. Pro-environmental norms can spread throughout the world society, increasing pressure on highly integrated nations to reduce corporate emissions. Therefore, I expect that nations with more International Non-Governmental Organization chapters, higher percentages of United Nations Global Compact signatories, and higher percentages of corporate climate management incentives will have lower corporate emissions. However, nations do not have equal ability to influence corporations and address climate change, as this can depend on their position in the World System. Non-core nations face more significant constraints and limited access to resources to address environmental problems. Taken together, this suggests that core nations that are highly integrated into civil society will have lower corporate emissions as they face pressure from external actors to address climate change and can do so successfully.

To test these hypotheses, I again estimate a multi-level model with three measures of world society integration, each of which is interacted with a binary measure of world system position. There are 20 core and 16 non-core nations, in which 1,090 corporations are nested. The sample covers the years 2010 to 2018. I include national and corporate size controls previously found to be significantly associated with emissions.

I find that the constraints of the global political economic system complicate the relationship between civil society pressure and corporate emissions. Pressure from INGOs, which diffuse and support pro-environmental norms, is not associated with decreased emissions. Instead, INGOs are associated with increased emissions overall and, to a greater extent, in non-core nations with relatively less political and economic power. These nations have limited capacity to constrain corporate emissions, and the power of corporations is great enough that civil society cannot mitigate their emissions either. 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 decreased emissions—but only in core nations that have high amounts of political and economic power. These nations have the capacity to reduce corporate emissions, which, combined with civil society pressure, results in mitigated emissions.

Finally, in the conclusion, I review the results from the two empirical chapters, addressing the national contexts in which corporate emissions decrease and increase. I discuss the implications of these findings for research on the social contexts impacting emissions and touch on the limitations of this project, especially related to the constraints

of corporate data. To end, I explore the future research directions this dissertation can inform.

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2.0 VARIETIES OF CAPITALISM AND VARIATION IN CORPORATE ENVIRONMENTAL OUTCOMES

2.1 ABSTRACT

Previous research in the Varieties of Capitalism tradition has established differences between types of economies and their approaches to tackling climate change. Coordinated Market Economies (CMEs) have been more incremental in their adoption of technological innovations and regulations compared to non-CME nations, which tend to be more technologically innovative but inconsistent in regulatory implementation, as in the case of Liberal Market Economies (LMEs), or diverse in their pursued strategies, as in the case of Mixed Market Economies (MMEs). However, there is no research on whether different types of economies account for differences in emissions. I estimated a multi-level model using data on corporate carbon emissions from the Carbon Disclosure Project to examine whether CMEs have been more successful in reducing these emissions than non-CMEs. I found that while overall, corporations in CMEs have lower emissions than corporations in non-CMEs—especially those in critical industries such as fossil fuels, infrastructure, materials, and apparel—not all coordination outcomes reduce emissions. Large corporations in CMEs have higher emissions than similarly sized corporations in other nations, suggesting that tight coupling between powerful corporations and the state contributes to emissions. Reducing emissions in each economy type will require

accounting for the type and strength of the relationship between government and corporations.

2.2 INTRODUCION

In 2021, over 25% of global greenhouse gas emissions (GHG) can be attributed to the fuel consumption of 9,000 corporations (CDP 2022). Clearly, corporate environmental impacts need to be addressed. As national governments have played a key role in constraining corporate actions directly via regulation and indirectly by shaping the institutional context from which corporations gain legitimacy (Mikler 2018: 5), they appear best positioned to pressure corporations. How nations might do so depends on the relationship between nations and corporations. According to the theory Varieties of Capitalism (VOC), there are two kinds of coordination between corporations and actors such as employees, other firms, industry groups, and governments (Hall and Thelen 2008). Which kind of coordination characterizes a nation is determined by the kind of institutional support available for these relationships (Hall and Thelen 2008). In Coordinated Market Economies (CMEs), governments and corporations work together directly, while in Liberal Market Economies (LMEs), the market acts as a mediator between government and corporations (Hall and Soskice 2001). Mixed Market Economies (MME) are hybrids that exhibit a mix of CME and LME type institutions (Benney 2019). This theory suggests that there are different roles that governments can

play, which in turn impacts the relationship they have with corporations under their jurisdiction.

While the VOC typology is a classic in the political economy literature, most scholarship drawing from the theory has focused on outcomes relating to the state, labor, and capital. Environmental issues, such as variations in fossil fuel use, emissions, or pollution, have rarely been considered using this theory (for exceptions, see Mikler and Harrison 2012; Magnin 2018; Benney 2019). However, given the role corporations have played in the climate crisis, it is clear that understanding the relationship between corporate and state power can have consequences for mitigating emissions. This article extends the VOC theory to examine whether the coordination types are associated with differences in corporate carbon emissions. My research question concerns how nations mitigate or incentivize corporate emissions: what kinds of corporate-state relationships make it harder (or easier) for corporations to pollute? Is one type of nation more successful in reducing corporate carbon emissions than other types?

In the following analysis, I examine the relationship between Varieties of Capitalism and corporate emissions. As corporations are unlikely to reduce emissions of their own accord significantly, the ability and willingness of nations to pressure corporations to do so will be a critical factor in mitigating climate change. This task will be more difficult in LMEs, where national governments have few direct ties with corporations, and the market primarily mediates coordination. But in CMEs, where national governments work more directly with corporations, this task is more straightforward, although tempered by the ability of corporations to negotiate for

strategies that best suit their interests. As such, I expect corporate emissions to be lower in CMEs than in LMEs or MMEs.

My results support this hypothesis, showing that corporations in CMEs have significantly lower emissions than non-CME nations. However, this relationship varies according to corporate characteristics. Corporations in industries such as fossil fuels, infrastructure, materials, and apparel all have significantly lower emissions in CME than non-CME nations, suggesting that differences in these critical industries might drive the overall lower emissions found in CMEs. However, when looking at corporate size, larger corporations in CMEs have higher emissions than similarly sized corporations in non-CME nations. I propose that this is due to the strength of the connections between corporations and government in CMEs: larger, more powerful corporations are likely able to negotiate with governments and avoid pressures to reduce emissions. These findings suggest that while certain kinds of corporations in CMEs have lower emissions, tight coupling between corporations and the government can lead to higher emissions in other cases.

2.3 LITERATURE REVIEW

Coordination between the state, market, and civil society shapes environmental outcomes (Fisher and Jorgenson 2019). Relationships between these actors, and the level of priority they give to environmental issues, shape a nation's environment-society relationship (Fisher and Jorgenson 2019). For nation-states, these relationships can

influence the degree of embedded autonomy, referring to ties between the state and corporations, allowing them to mutually construct economic goals and the means to reach them (Evans 1995). Varieties of Capitalism (VOC) refers to variation in how nation-states solve this problem of coordinating with firms in five areas: labor relations, finance, inter-firm relations, corporate governance, and education and vocational training (Hall and Soskice 2001).

There are two broad strategies for solving coordination problems: some nations rely on the market, while others rely on non-market actors like governments and labor organizations (Hall and Soskice 2001). Other variations of political economy, such as the Treadmill of Production, also view firms as key actors, but rather than coordinating with other groups, see their interests as dominating the economy, state, and society (Carrillo and Pellow 2021). These interests operate uniformly to perpetuate the treadmill so that other variables—such as trade, production, and consumption—are key determinants in understanding emission variation. VOC differs in that it centers the relationship between firms and governments as the crucial element of analysis. A firm's actions can vary depending on the coordination strategies available to them.

According to VOC, nations can be categorized as Coordinated Market Economies (CMEs) or Liberal Market Economies (LMEs) based on the kinds of institutions present in the aforementioned five areas. LMEs are characterized by limited state corporate governance, utilizing market solutions and sector- and industry-specific contracts to regulate firms. The labor market is highly flexible, and there tends to be shuffling when workers are hired and fired with relative ease (Hall and Soskice 2001). Exemplary

nations in this category include the US, Australia, and the UK (Gould, Barry, and Wilkinson 2015). CMEs differ in that there are more state oversight and corporate regulations. The labor market is less flexible, and unions tend to have closer connections with corporations and the state (Hall and Soskice 2001). Exemplary nations in this category include Germany and Japan.

A limitation of this approach is the focus on Western nations, especially CMEs, which makes descriptions and understandings of the other categories overly general (Gould et al. 2015; Wood and Allen 2020). Relatedly, national categorizations are assumed to be stable across time, leaving ability to change over time undertheorized (Bohle and Greskovits 2009; Gould et al. 2015).Newer work drawing from the VOC approach has tried to address the critiques of CME-centrism and lack of dynamism by expanding the MME category in sample size, arguing that mixed cases falling between CMEs and LMEs should be categorized and examined in their own right. Developing nations in Africa, Asia, and Latin America are often less easily classified into one group or the other, as they display elements of both CMEs and LMEs. Thus, this group is categorized as mixed market economies (MME).

Regarding environmental issues, corporations are also under pressure from civil society actors (see chapter 3 of this dissertation). This has led to relatively high levels of corporate engagement with environmental issues, especially when compared to social and governance issues, across the VOC types (Favotto, Kollman, and Bernhagen 2016). However, other studies have found that while the VOC typology does not predict which nations will earnestly implement climate change policy, it does algin with key differences

in the ways in which the different national types have addressed climate change (Benney 2019; Magnin 2018; Mikler and Harrison 2012).

Firms in CMEs pursue incremental updates to technology and regulation to combat climate change and engage with the government to craft climate change regulation (Mikler and Harrison 2012). This incrementalism corresponds to the closer relationship between the state and corporations in CMEs, which allows for continuous negotiation in search of mutually beneficial outcomes. However, in many European nations, close ties between industry and the state have made it challenging to introduce and implement policies requiring corporations to limit emissions (Mildenberger 2020). In CMEs, where corporations have such ties to the government, prominent industry groups can better negotiate and secure regulation that works in their favor, leading to relatively weak climate regulations.

LMEs could theoretically be promising sources of the radical innovations that an encompassing issue like climate change requires. The relative lack of accountability of firms in LMEs to the government or industry favors short-term risk-taking, potentially resulting in new ideas and innovations pursued for their market opportunities (Mikler and Harrison 2012). However, LMEs tend not to be the source of much climate-related innovation, as firms and the government wait for market demand to dictate when and how to address climate change (Mikler and Harrison 2012). In another example, LMEs were found to be laggards in clean energy planning and development (Benney 2019). There does tend to be more variation in the climate regulations of CME nations. In US (especially during Obama's presidency between 2007-2015) and Australia (during a

Labor-Green Party coalition from 2011 to 2014), when the state had weaker ties to industry, governments proposed the most restrictive regulations on corporate emissions to date (Mildenberger 2020). While corporate lobbyists can have a great deal of power, the lack of a close relationship between corporations and government in LMEs often leads corporate actors to try to block the approval of such policies after the fact, once the policies have made it past drafting to debate. This can encourage corporations to take up voluntary initiatives in order to "head off" more restrictive regulations (Vogel 2005).

Previous research on emerging and developing economies has found that MMEs were most successful in developing a renewable energy industry and implementing a clean energy plan (Benney 2019). This approach to MMEs frames them not as somewhere in the middle on a continuum from LME to CME but as a separate group in their own right. Regarding issues such as climate change, where LME nations have difficulty implementing regulations and CME nations move slowly, from this perspective MMEs can avoid both issues and combine innovation with implementation to lower emissions. However, for now, this group remains undertheorized.

Globally, a mix of strategies to tackle climate change has been implemented, with some nations considering both cap and trade and carbon taxes in tandem.[2] In accordance with VOC theory, institutional and firm relations tend to influence the type of climate policy a nation prefers. For example, CMEs tend to prefer carbon taxes due to their reliance on state regulation and non-market coordination, while LMEs tend to prefer cap and trade systems due to their preference that coordination problems be solved by

[2] https://openknowledge.worldbank.org/handle/10986/33809

competition in the "free" market (Magnin 2018). Given the difficulties of enacting climate legislation in LMEs, and the incremental approach of CMEs, I expect corporations in the latter group to have lower emissions than those in the former, with MMEs somewhere in the middle.

H_1: Corporations in CME nations will have lower emissions than those in non-CME nations.

Within nations, there is also important corporate variation that can impact emissions. Previous research has found that larger and older organizations tend to emit more, a result attributed to "ossification," referring to the tendency for outdated and inefficient operations and processes to become entrenched as organizational age and complication increase (Grant, Jorgenson, and Longhofer 2020). Further, corporations with more employees and larger revenue streams likely coordinate with nations in ways that smaller, less complicated corporations cannot. Thus, corporate size may moderate the relationship between Variety of Capitalism and corporate emissions, leading to even higher emissions for large corporations in some types of nations compared to others.

Close ties between key economic players and the state in CMEs tend to make introducing disruptive legislation difficult (Mildenberger 2020). The case of electric vehicles illustrates how the tight coupling between government and industry in Germany kept the state from encouraging a move away from gas-powered cars (Meckling and Nahm 2018). In contrast, in the US a disparate coalition of groups, including unions,

NGOs, and government figures introduced subsidies for consumers, funding for research and development, tightened fuel economy standards, and nation-wide GHG emissions regulations that compelled automakers to invest in EVs (Meckling and Nahm 2018). Given the ability of such large and economically essential corporations to more effectively intervene in government oversight and regulation in CMEs, I expect that corporate size will moderate the relationship between Variety of Capitalism and emissions.

H_2: Larger corporations in nations with CMEs will have higher emissions than similarly-sized corporations in nations with non-CMEs.

Another important element of corporate variation impacting emissions is industry differences. In particular, fossil fuel companies are disproportionately responsible, as illustrated by the CDP's finding that 100 oil and gas majors are responsible for 71% of historical emissions.[3] Within industries such as energy generation, research has shown that national context contributes to disproportionality in emissions (Grant et al. 2020). The VOC literature on corporations and environmental outcomes has also highlighted industrial differences between nations. Benney (2019) examines renewables, noting MME leadership in that industry. Meckling and Nahm (2018) examine the auto industry, noting LME's success.

[3] https://www.cdp.net/en/articles/media/new-report-shows-just-100-companies-are-source-of-over-70-of-emissions

While specific industries have received more attention due to their environmental impacts—good and bad—it is possible that there are key differences between industries across the varieties of capitalism. If corporations in CME nations have lower emissions than those in non-CME nations (see H_1), these differences may be driven by variations in select industries.

H_3: Lower corporate emissions in CME nations, compared to non-CME nations, will vary by industry.

2.4 DATA

In the original conception in Hall and Soskice's 2001 edited volume, 20 nations were categorized according to their variety of capitalism (Ahlquist and Breunig 2008). More recently, South Korea has been broadly recognized as a CME (Mikler and Harrison 2012). Developments in categorization for emerging economies by Benney significantly increased the number of nations included beyond the OECD (2019), and Lane and Myant added classifications for post-soviet economies (2007). I draw from this literature to classify nations into two groups, shown in Table 2.1: Coordinated Market Economies (CMEs), and non-CMEs, which include Liberal Market Economies (LMEs) and Mixed Market Economies (MMEs).

Table 2.1 Varieties of Capitalism Categories

Coordinated Market Economies		**Non Coordinated Market Economies**	
		Liberal Market	**Mixed Market**
Austria	Japan	Australia	Chile[2]
Belgium	Mexico[2]	Canada	Colombia[2]
Brazil[2]	Netherlands	India[2]	France
China[2]	Norway	Ireland	Greece
Czech Republic[3]	Peru[2]	Malaysia[2]	Italy
Denmark	Poland[3]	New Zealand	Nigeria[2]
Egypt[2]	Philippines[2]	Qatar[2]	Portugal
Finland	South Korea[1]	South Africa[2]	Spain
Germany	Sweden	Thailand[2]	
Hungary[3]	Switzerland	United Kingdom	
Indonesia[2]		United States	

Source: Ahlquist & Breunig 2008, unless otherwise noted.
[1] Mikler & Harrison 2012 [2] Benney 2019 [3] Lane & Myant 2007

2.4.1 Independent Variables

In the following models, I measure Variety of Capitalism as a binary, where 1 indicates CME nations and 0 all other nations. This algins with previous research applying the VOC theory to environmental outcomes, which suggests that CMEs have been more successful than non-CMEs in introducing regulations, subsidies, and other

protections (Mildenberger 2020; Benney 2019; Mikler and Harrison 2012). Additionally, given the VOC's focus on CME nations (Gould et al. 2015; Wood and Allen 2020) and the nature of the CDP sample, the group of CME nations is larger than the other two groups combined, so the simplified measure avoids comparing groups without enough nations for proposer hypothesis testing.[4]

To better understand how coordination between governments and corporations can impact corporate environmental outcomes, I estimate cross-level interactions between Variety of Capitalism and several corporate characteristics. I include the number of employees and corporate revenue in USD as measures of corporate size to examine whether larger corporations in CMEs have different emissions compared to smaller corporations. Both variables were logged using a natural log and collected from Compustat. Logging these variables corrects for skew and allows the results to be interpreted as elasticity coefficients, where coefficient x represents the percentage change in the dependent variable attributed to a 1% change in x. I include dummy variables for industries to examine whether CMEs have advantages in reducing emissions in select economic sectors.[5] These data come from the CDP and include 13 categories: Services,

[4] Sensitivity analyses using dummy variables indicated that CMEs have 47% lower emissions compared to non-CMEs, LMEs have 60% higher emissions compared to non-LMEs, and there is no statistically significant difference between MMEs and non-MMEs.

[5] This strategy was based on the industry "fixed effects" Ioannou and Serafeim (2012) proposed to control for industry differences when examining corporate environmental outcomes.

Healthcare, Agriculture, Fossil Fuels, Hospitality, Infrastructure, Manufacturing, Materials, Mineral Extraction, Power Generation, Retail, Apparel, and Transportation.

2.4.2 Dependent Variable

The dependent variable is self-reported corporate CO_2 emissions compiled by the Carbon Disclosure Project. The dataset is the most comprehensive source of longitudinal firm-level GHG emissions currently available. It has been collected annually since 2010 via a questionnaire covering topics including climate governance, risks and opportunities, business strategy, targets and performance, emissions data, verification, carbon pricing, and engagement. Key for this study, companies are asked to report their Scope 1 (from corporate assets), 2 (from energy purchased), and 3 (from consumer use) emissions. While some companies report of their own accord, most do so because they have been requested to do so by stakeholders (such as investors, customers [defined as large purchasing organizations], banks, and environmental initiatives) via the CDP.

As the emissions data are self-reported, sample selection bias is a concern. While recent research has found that environmental performance, in terms of high GHG emissions, is not associated with corporate decisions to join or drop out of the CDP (Callery 2022), the possibility should be considered. To do so, I estimate a Heckman Correction and include the resulting variable as a control for self-selection bias in each model. Further details are discussed in the "Methods" section.

On average, over the ten years from 2010 to 2020, over 90% of corporations responding to the survey reported their scope 1 and 2 emissions. In the same period, on

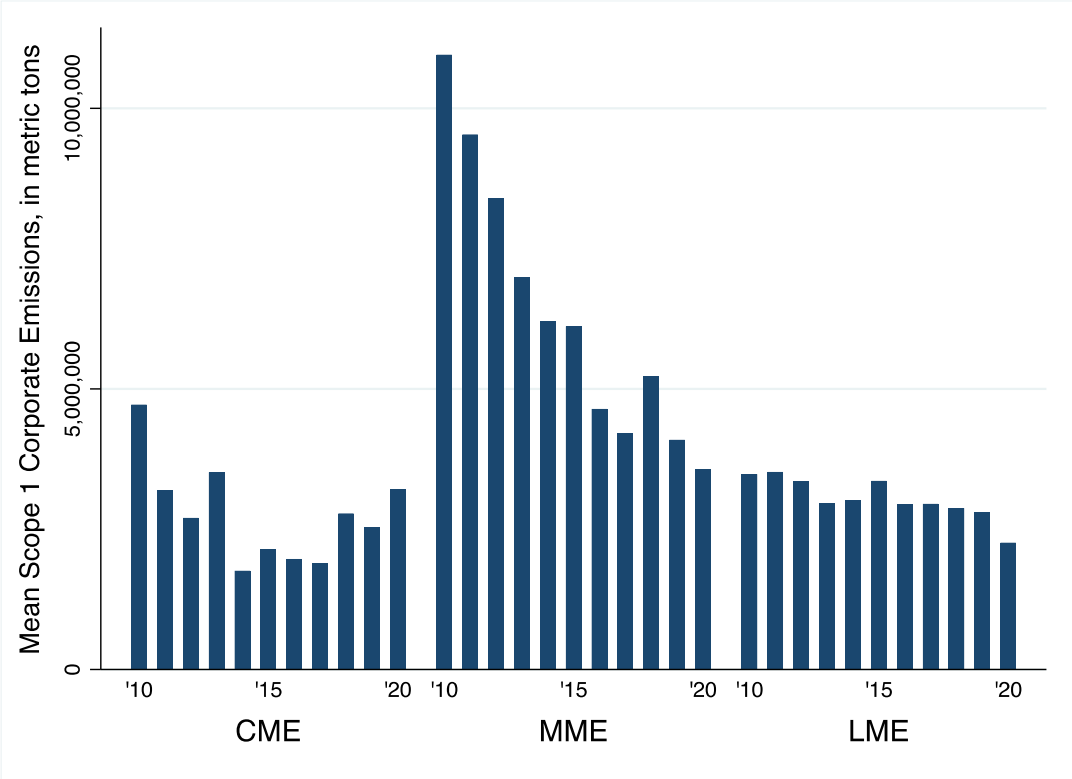
average 73% of corporations reported their scope 3 emissions. Due to the smaller sample size of corporations reporting scope 3 emissions, and the lack of consistency in the measurement of these emissions, I focus on gross global Scope 1 emissions from fuel combustion, company vehicles, and fugitive emissions, measured in metric tons of CO2e, as the outcome for the following models. This measure represents emissions most directly within the corporation's control (e.g., not dependent on a national energy mix or individual consumer habits) and has the least missing data. Scope 1 emissions were top-coded at 342,100,000 metric tons of CO2e to account for an outlier.[6] The variable was logged to account for skew and so that the results can be interpreted as elasticity coefficients when the independent variable is also logged, easing interpretation of the model. After removing corporations that responded to the CDP survey but did not report emissions data or have sufficient data to estimate results for the controls, the final dataset includes 1,949 corporations nested within 40 nations from 2010 to 2020.

The average corporate emissions across the time frame, according to each VOC category, is shown in Figure 2.1. In CME nations, average emissions decreased overall in the first five years and then slowly increased in the next five, although not at the same rate as at the beginning. The lowest average emissions for any group of nations in the period under study was CME nations in 2014. MME nations had the highest average

[6] Sensitivity analyses including the outlier gave similar results. Given that the outlier reported emissions much higher than those reported for any other corporation at any other time and was from a corporation that had reported previously to the CDP with much lower emissions, I suspect this outlier resulted from a typo.

emissions in the first five years, but the average decreased annually, except for a spike in 2018. Average emissions in LMEs remained generally consistent, slowly decreasing by 2020. The average corporate emissions by nation are shown in Figure 2.4 in the Appendix.

Figure 2.1 Mean Corporate Scope 1 Emissions by VOC Category, 2010-2020



2.4.3 Control Variables

At the national level, Population and GDP per capita are included as controls for national size and development, respectively. Both variables were logged, again to correct

for skew and for ease of interpretation, and collected from the World Bank. Dummy variables indicating either membership in the European Union or the OECD were included in sensitivity analyses to ensure that regional relationships were not impacting the findings. Both variables were not statistically significant and did not substantively alter the results.

2.5 METHODS

Most research in the VOC literature applies the categories to a small-n comparative case study. Recent quantitative studies use fsQCA to test the original categorization and examine which combinations of institutions result in an intended outcome. I take an approach that accounts for the nested nature of corporate data and use a multi-level regression model to test my hypotheses. This approach is appropriate for testing the VOC hypothesis as it explicitly models the relationship between firms and nation-states.

The model has three levels, with eleven 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.[7] Corporations are nested within nations according to the location of their headquarters, where the most direct impacts of coordination

[7] As this paper focuses on the fixed effects results, the random effects components of the model are not reported.

problems are felt. I also examine cross-level interactions to understand better how the variation in the coordination styles between corporations and nations across the categories might impact organizational strategies and emissions. Characteristics such as size and industry may change how corporations coordinate with nations, resulting in variations in emissions.[8]

2.5.1 Heckman Correction

One of the limitations of the CDP dataset is the potential for sample selection bias arising from corporations choosing not to respond to the survey when asked. Previous research has found the following factors are associated with the likelihood of response: the presence and stringency of national environmental policy, national clean energy investment, whether the corporation or industry peers reported the previous year, the size of the corporation, and the firm's orientation to primary stakeholders, including shareholders, customers, and employees (Andrus, Callery, and Grandy 2022.; Callery 2022; Mateo-Márquez, González-González, and Zamora-Ramírez 2021a; Mateo-Márquez, González-González, and Zamora-Ramírez 2021b). However, further analysis using the Heckman correction to account for the impact of these factors on environmental

[8] In sensitivity analyses, I included a random slope for size but the results indicated that this did not substantively change the results and did not improve the model fit. (continued on next page)
Other sensitivity analyses included measuring time as a continuous variable and collapsing industry categories, which also did not improve the model fit.

outcomes found no difference in results (Andrus et al. 2022.; Mateo-Marquez et al. 2022).

The Heckman correction is a two-step process. The first model examines which factors influence inclusion into a sample and is used to estimate a variable, called 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-Márquez et al. 2021). Results are shown in Table 2.6 of the Appendix. The resulting lambda correction factor is included in the models to assess the potential impact of nation-level factors on corporate inclusion in the CDP. The variable is non-significant in every model estimated, suggesting that selection bias is not an issue.

2.6 RESULTS

Models 1 through 3, shown in Table 2.2, compare CME nations to non-CME nations (MME and LME). In all three models, corporate-level variables include revenue, number of employees, and industry. As expected, according to the literature and given that the outcome variable is at the corporate level, all three corporate variables are significantly associated with emissions. At the national level, the controls for population and GDP per capita are not significantly associated with corporate emissions. The control for time shows that only in the most recent year of data, 2020, have emissions

significantly decreased compared to 2010. This possibly reflects the impact of the Covid-19 pandemic, which stalled corporate activities (and, therefore, emissions) worldwide. Finally, Heckman's lambda, which accounts for potential selection bias at the national level, is not statistically significant, suggesting that selection bias is not impacting the results.

In Model 1, the results show that corporations in nations with CMEs have significantly lower emissions than the rest of the sample: about 58% lower compared to non-CMEs.[9] As a reminder, since the outcome variable (emissions) is logged, all non-logged coefficients are exponentiated and multiplied by 100 for interpretation. Estimating the predicted margins to compare the two groups shows that in non-CME nations, predicted corporate emissions are 86,682 metric tons. In CMEs, predicted corporate emissions are 55,271 metric tons. The results of this first model support my hypothesis that CMEs will have lower corporate emissions than nations with other varieties of capitalism.

Consistent with previous literature on corporate environmental outcomes, larger corporations have higher emissions (Grant et al. 2020). For every 1% increase in the corporation's size, in terms of the number of employees, there is a 0.71% increase in emissions. The measure of corporate revenue is also significant, although it has a smaller association: for every 1% increase in corporate revenue, there is a 0.05% increase in emissions. The measure of industry shows that, compared to services, which has the

[9] Sensitivity analyses controlling for membership in the European Union and Organization for Economic Co-operation and Development did not find substantial differences in results.

lowest emissions, all other industries emit more, except for apparel. Industries such as mineral extraction, fossil fuels, and power generation have the highest emissions compared to services.

Table 2.2 Multilevel Models of Scope 1 Corporate Emissions and Variety of Capitalism Categories, with Cross-level Interactions

Variable	Model 1 Coefficient (SE)	Model 2 Coefficient (SE)	Model 3 Coefficient (SE)
Coordinated Market Economy	-0.46 (0.19)*	-1.02 (0.25)***	0.96 (0.77)
Population *(logged)*	0.03 (0.07)	0.02 (0.07)	0.03 (0.07)
GDP per Capita *(logged)*	-0.006 (0.12)	-0.02 (0.12)	-0.01 (0.12)
Corporate Employees *(logged)*	0.71 (0.03)***	0.64 (0.04)***	0.72 (0.03)***
Corporate Revenue *(logged)*	0.05 (0.02)*	0.04 (0.02)*	0.04 (0.02)*
Heckman's Lambda	-0.14 (0.46)	-0.12 (0.46)	-0.08 (0.45)
Constant	6.83 (2.16)**	7.41 (2.14)***	6.52 (2.11)**
Services[a]	-	-	-
Healthcare	1.64 (0.35)***	1.66 (0.35)***	1.66 (0.42)***
Agriculture	2.12 (0.37)***	2.13 (0.37)***	2.33 (0.44)***
Fossil Fuels	3.81 (0.37)***	3.82 (0.37)***	4.26 (0.43)***
Hospitality	1.74 (0.44)***	1.77 (0.44)***	2 (0.49)***
Infrastructure	1.97 (0.36)***	1.98 (0.35)***	2.48 (0.42)***
Manufacturing	1.43 (0.34)***	1.43 (0.34)***	1.8 (0.41)***
Materials	2.19 (0.36)***	2.2 (0.36)***	2.87 (0.45)***
Mineral Extraction	3.18 (0.39)***	3.19 (0.39)***	3.39 (0.46)***
Power Generation	4.27 (0.37)***	4.28 (0.37)***	4.59 (0.43)***
Retail	0.79 (0.37)*	0.81 (0.35)*	1.16 (0.4)**
Apparel	0.55 (0.34)	0.56 (0.34)	0.99 (0.4)*
Transportation	2.57 (0.38)***	2.58 (0.38)***	2.69 (0.46)***
CME x Corporate Size		0.23 (0.07)***	

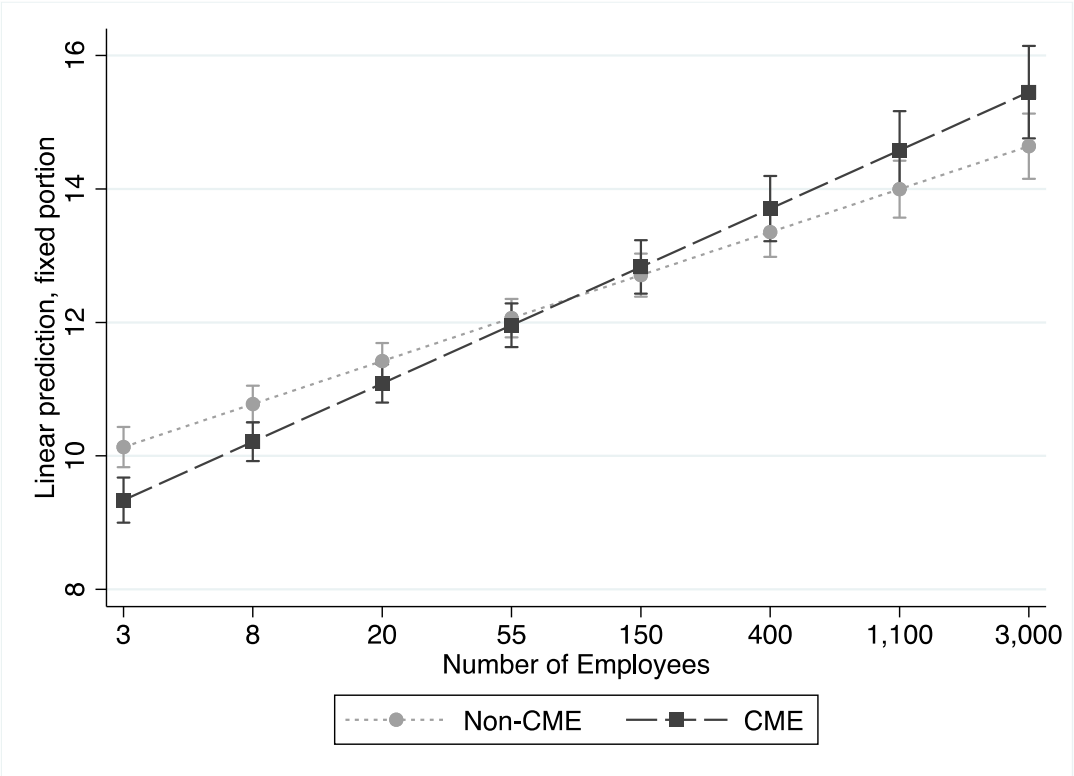
CME x Services[a]	-
CME x Healthcare	-0.59 (0.76)
CME x Agriculture	-1.07 (0.82)
CME x Fossil Fuels	-1.94 (0.85)*
CME x Hospitality	-0.79 (1.22)
CME x Infrastructure	-1.79 (0.78)*
CME x Manufacturing	-1.38 (0.75)
CME x Materials	-1.86 (0.79)*
CME x Mineral Extraction	-0.76 (0.85)
CME x Power Generation	-1.13 (0.82)
CME x Retail	-1.55 (0.82)
CME x Apparel	-1.76 (0.76)*
CME x Transportation	-0.83 (0.83)

* p<0.05 **p<0.01 ***p<0.001 [a] parameter set to zero

The results of the cross-level interactions between Variety of Capitalism and corporate size in Model 2 suggest that, in CMEs, larger corporations have higher emissions than similar corporations in non-CME nations.[10] For every 1% increase in corporate size, there is a 0.64% increase in corporate emissions in non-CME nations and a 0.87% increase in CME nations. Graphing the relationships (in Figure 2.2) suggests that smaller corporations in CMEs have lower emissions than those in non-CMEs, but that larger corporations in CMEs have much higher emissions than those in non-CMEs.

[10] A model estimating a cross-level interaction between corporate revenue and CME found no significant associations and is not reported here. These results are unsurprising considering that the association between revenue and emissions in Model 1 is smaller and less statistically significant than the association between size and emissions.

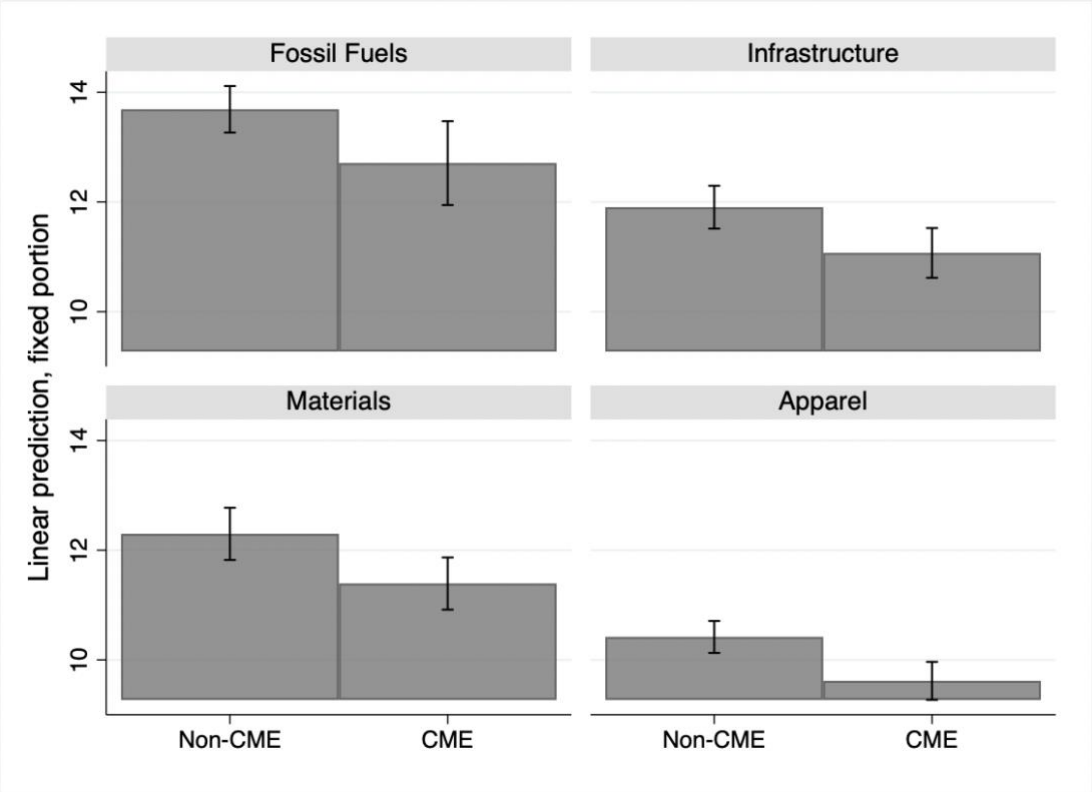
Figure 2.2 Predicted Emissions by Variety of Capitalism and Corporate Size



Estimating the margins shows that, for the smallest corporations (those with three employees or less) in CME nations, predicted emissions are lower, at 11,384 metric tons, compared to similarly sized corporations in non-CME nations, where predicted emissions are 25,084 metric tons. However, this trend is reversed for the largest corporations (those with 2,300 employees or more) in CME nations, where predicted emissions are 4,073,446 metric tons, compared to similar corporations in non-CME nations, where predicted emissions are 1,924,160 metric tons.

In Model 3, interactions between industry and variety of capitalism are examined. Only four of the thirteen industries have significantly different emissions in CMEs compared to non-CMEs, but all four have lower emissions in CMEs. These differences are shown in Figure 2.3.

Figure 2.3 Predicted Emissions by Variety of Capitalism and Corporate Industry



For corporations in the fossil fuel industry, predicted emissions in non-CMEs are 882,046 metric tons, compared to 331,042 metric tons in CMEs. For corporations in the infrastructure industry, precited emissions in non-CMEs are 147,267 metric tons, compared to 64,216 metric tons in CMEs. For corporations in the materials industry, predicted emissions in non-CMEs are 219,696 metric tons, compared to 88,433 metric tons in CMEs. Finally, for corporations in the apparel industry, predicted emissions in non-CMEs are 33,190 metric tons, compared to 15,063 in CMEs. Once the sectoral interactions are included, the main effect for CME is no longer significant, suggesting that the variety of capitalism matters more for some industries more than others. CMEs

are known for incremental changes, so these industries may represent relative success in reducing emissions via small improvements to standard practices.

2.7 DISCUSSION AND CONCLUSION

Coordination between corporations and governments appears to be a double-edged sword. In some cases, incremental changes, closer ties, and negotiation appear to have reduced corporate emissions. Smaller corporations and those in industries like fossil fuels, infrastructure, materials, and apparel have lower emissions in CMEs than in non-CMEs. But as corporations become larger and more powerful, these closer ties and negotiations might give way to greater leniency and protection from the same incremental changes. In CMEs, the close ties between corporations and the state appear to bind their interests together, allowing for easier access and perhaps greater concessions from governments. Notably, corporate size in terms of revenue is also associated with increased emissions, although this relationship is weaker and analyses introducing an interaction term with the VOC measure found no significant association. The effect of corporate size in terms of employees is possibly due to the power of labor in CMEs, where unions are another source of coordination between corporations and the state. Another possibility is that differences in the types of regulations in CMEs and non-CMEs drive the emissions outcomes (for example, see Mildenberger 2020). Future analysis could examine whether climate policies vary within the VOC types.

The lower corporate emissions in CMEs compared to non-CMEs appear to be driven by sectoral differences in emissions, especially those which higher levels of emissions compared to services, which has the lowest emissions of any sector. Fossil fuels, infrastructure, and materials are highly polluting industries, so improvements in emissions in these areas are notable. However, that these industries—that are home to some of the largest and most polluting corporations—have lower emissions in CMEs, when larger corporations overall have higher emissions in CMEs, is a puzzle. Future analysis interacting size and industry may be able to tease apart whether the higher emissions of large corporations in CMEs is driven by select industries, or perhaps differences in the dominant industries in CMEs compared to non-CMEs. The apparel industry also has lower emissions in CMEs than in non-CMEs. While this sector has the second-lowest emissions overall, it is also one of the best represented sectors in the CDP dataset. This further suggests that perhaps there are further sectoral differences between CMEs and non-CMEs, but the current sample of sectors is too small for such differences to be detected.

2.7.1 Limitations

A fundamental challenge in understanding corporate emissions is the lack of data availability. Future studies will benefit from the regulations proposed in the US and EU, among other nations, that will require corporate emissions reporting and ease concerns of sample selection bias for some nations. Another element of the data limitations is inherent to the nature of multinational entities: many corporations have offices,

operations, and other branches across national borders. In this study, I have chosen to nest emissions within the corporation's headquarter nation. As more data, and hopefully more detailed breakdowns in the data, become available, it may be easier for future studies to attribute corporate emissions more directly to the nation where they originated.

2.7.2 Conclusion

The Varieties of Capitalism theory focuses on how firms and governments coordinate with one another. The results of this analysis suggest that the kinds of ties matter, with close coordination between corporations and the state associated with lower emissions, compared to nations where mediators such as markets are responsible for coordination. However, the results also suggest that corporate power can temper this relationship, making use of close ties to continue emitting. That larger corporations emit more is not surprising; future analysis could examine the carbon intensity of these corporations to explore whether there is a qualitative difference between the emissions of larger and smaller corporations beyond those related directly to scale.

Future analysis could also examine the five institutions identified by the VOC theory—labor relations, finance, inter-firm relations, corporate governance, and education and vocational training—to understand better the mechanisms in CMEs that lead to lower emissions compared to non-CMEs. In the future, it could be LMEs that lead the way in addressing climate change. Mildenberger noted that in Australia and the US—both LMEs—regulations with the potential to position these nations as climate leaders were squandered (2020). But with the advent of energy subsidies in the Inflation

Reduction Act in the US in 2022, it is still possible that innovation (when it isn't defeated or repealed) may prove a better strategy than incrementalism.

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2.9 APPENDIX

Table 2.3 Corporations per Nation

Nation	#	**Nation**	#
Australia	64	Japan	291
Austria	13	Malaysia	6
Belgium	17	Mexico	13
Brazil	38	Netherlands	37
Canada	60	New Zealand	12
Chile	3	Nigeria	1
China	33	Norway	40
Colombia	9	Peru	1
Czech Republic	2	Philippines	7
Denmark	24	Poland	4
Egypt	1	Portugal	12
Finland	37	Qatar	1
France	90	South Africa	56
Germany	70	South Korea	10
Greece	4	Spain	39
Hungary	1	Sweden	49
India	54	Switzerland	56
Indonesia	1	Thailand	5
Ireland	19	United States	495
Italy	44	United Kingdom	230

Table 2.4 Correlation Matrix

Level 2 Variables *(N = 45)*	1.	2.	
1. GDP per capita *(logged)*	0.27	0.5	
2. Population *(logged)*	-0.12	0.37	
Level 1 Variables *(N = 2,013)*	3.	4.	5.
3. Revenue *(logged)*	1.00		
4. Employees *(logged)*	-0.004	1.00	
5. Scope 1 Emissions *(top coded, logged)*	-0.002	0.05	1.00

Figure 2.4 Average Corporate Scope 1 Emissions by Nation

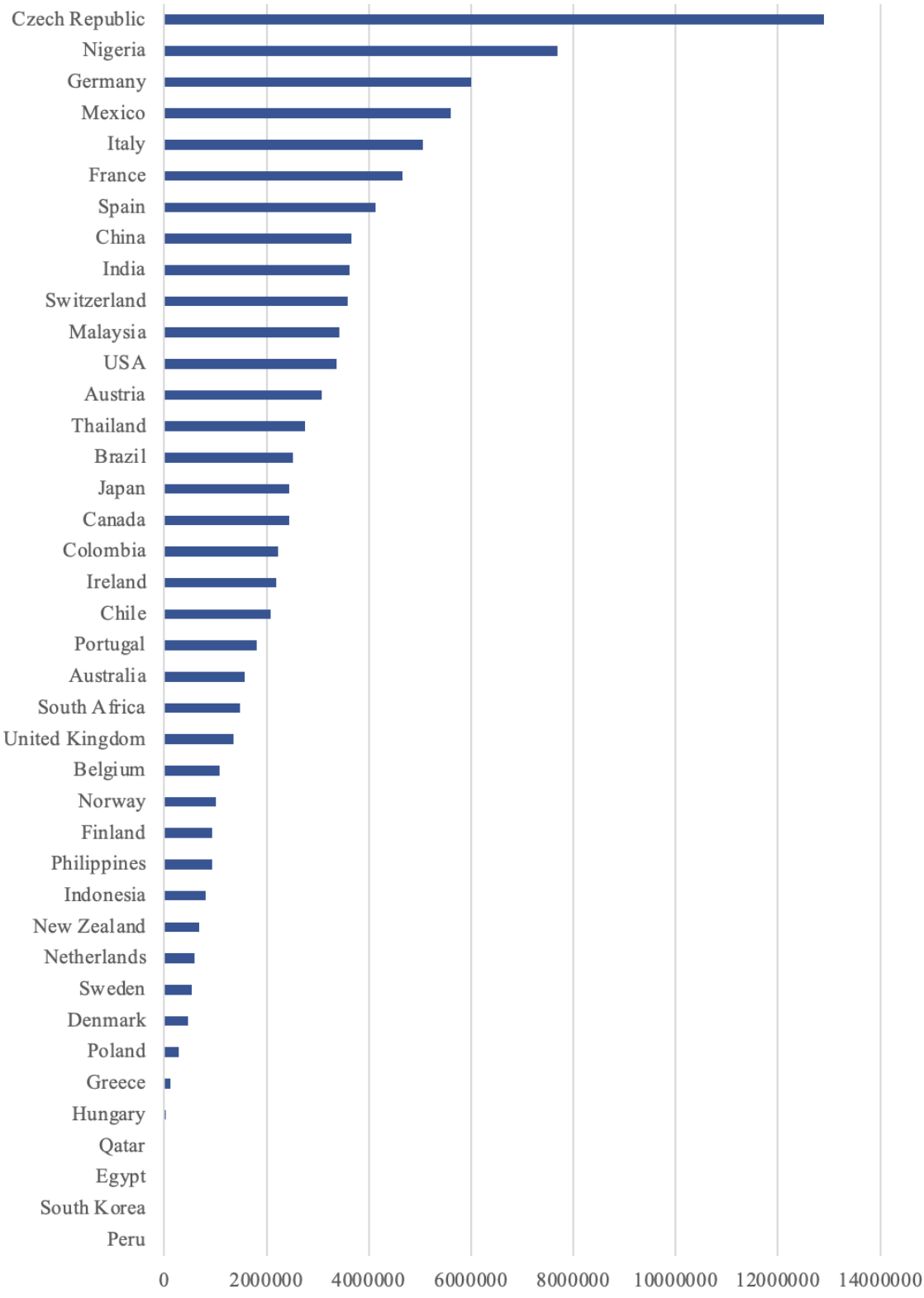

Czech Republic
Nigeria
Germany
Mexico
Italy
France
Spain
China
India
Switzerland
Malaysia
USA
Austria
Thailand
Brazil
Japan
Canada
Colombia
Ireland
Chile
Portugal
Australia
South Africa
United Kingdom
Belgium
Norway
Finland
Philippines
Indonesia
New Zealand
Netherlands
Sweden
Denmark
Poland
Greece
Hungary
Qatar
Egypt
South Korea
Peru
0
2000000
4000000
6000000
8000000
10000000
12000000
14000000

Table 2.5 Multilevel Model of Scope 1 Corporate Emissions and Varieties of Capitalism Categories Interactions (Main Effects, Interactions, Year and Industry Controls)

Variable	Model 1 Coefficient (SE)	Model 2 Coefficient (SE)	Model 3 Coefficient (SE)
Coordinated Market Economy	-0.46 (0.19)*	-1.02 (0.25)***	0.96 (0.77)
Population *(logged)*	0.03 (0.07)	0.02 (0.07)	0.03 (0.07)
GDP per Capita *(logged)*	-0.006 (0.12)	-0.02 (0.12)	-0.01 (0.12)
Corporate Size *(logged)*	0.71 (0.03)***	0.64 (0.04)***	0.72 (0.03)***
Corporate Revenue *(logged)*	0.05 (0.02)*	0.04 (0.02)*	0.04 (0.02)*
Heckman's Lambda	-0.14 (0.46)	-0.12 (0.46)	-0.08 (0.45)
Constant	6.83 (2.16)**	7.41 (2.14)***	6.52 (2.11)**
Services[a]	-	-	-
Healthcare	1.64 (0.35)***	1.66 (0.35)***	1.66 (0.42)***
Agriculture	2.12 (0.37)***	2.13 (0.37)***	2.33 (0.44)***
Fossil Fuels	3.81 (0.37)***	3.82 (0.37)***	4.26 (0.43)***
Hospitality	1.74 (0.44)***	1.77 (0.44)***	2 (0.49)***
Infrastructure	1.97 (0.36)***	1.98 (0.35)***	2.48 (0.42)***
Manufacturing	1.43 (0.34)***	1.43 (0.34)***	1.8 (0.41)***
Materials	2.19 (0.36)***	2.2 (0.36)***	2.87 (0.45)***
Mineral Extraction	3.18 (0.39)***	3.19 (0.39)***	3.39 (0.46)***
Power Generation	4.27 (0.37)***	4.28 (0.37)***	4.59 (0.43)***
Retail	0.79 (0.37)*	0.81 (0.35)*	1.16 (0.4)**
Apparel	0.55 (0.34)	0.56 (0.34)	0.99 (0.4)*
Transportation	2.57 (0.38)***	2.58 (0.38)***	2.69 (0.46)***
CME*Corporate Size	-	0.23 (0.07)***	-
CME*Services[a]	-	-	-
CME*Healthcare	-	-	-0.59 (0.76)
CME*Agriculture	-	-	-1.07 (0.82)
CME*Fossil Fuels	-	-	-1.94 (0.85)*
CME*Hospitality	-	-	-0.79 (1.22)
CME*Infrastructure	-	-	-1.79 (0.78)*
CME*Manufacturing	-	-	-1.38 (0.75)
CME*Materials	-	-	-1.86 (0.79)*
CME*Mineral Extraction	-	-	-0.76 (0.85)
CME*Power Generation	-	-	-1.13 (0.82)
CME*Retail	-	-	-1.55 (0.82)
CME*Apparel	-	-	-1.76 (0.76)*

CME*Transportation	-	-	-0.83 (0.83)
2010[a]	-	-	-
2011	0.03 (0.07)	0.03 (0.07)	0.03 (0.07)
2012	-0.005 (0.07)	-0.003 (0.07)	-0.004 (0.07)
2013	0.01 (0.07)	0.01 (0.07)	0.01 (0.07)
2014	0.04 (0.07)	0.04 (0.07)	0.04 (0.07)
2015	-0.006 (0.07)	-0.004 (0.07)	-0.004 (0.07)
2016	-0.03 (0.07)	-0.03 (0.07)	-0.03 (0.07)
2017	-0.04 (0.07)	-0.03 (0.07)	-0.03 (0.07)
2018	0.08 (0.07)	0.08 (0.07)	0.07 (0.07)
2019	0.01 (0.07)	0.02 (0.07)	0.01 (0.07)
2020	-0.27 (0.07)***	-0.26 (0.07)***	-0.26 (0.07)***

* p<0.05 **p<0.01 ***p<0.001 [a] parameter set to zero

Table 2.6 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		
Pseudo R^2	0.05		
% Correctly Predicted	60.35%		
No. of Observations	6,020		

* p<0.05 **p<0.01 ***p<0.001 [a] parameter set to zero

Following Mateo-Márquez, González-González, and Zamora-Ramírez (2021b), to control for potential sample selection bias I first estimated a Probit regression model with measures for Regulative (Environmental Policy Stringency Index) and Normative (percentage of companies responding to the CDP in 2014 per nation) variables. Given this study's focus on nation-level determinants of corporate emissions, only corporate-level variables were included. The third nation-level variable included by Mateo-Márquez et al., Cultural, was not statistically significant in the original models (2021b), and 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 together. The data include 6,020 corporations that were 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 Table 2.7. 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.

3.0 ARE CORPORATIONS RESPONDING TO CIVIL SOCIETY PRESSURE? A MULTI-LEVEL ANALYSIS OF CORPORATE EMISSIONS

3.1 ABSTRACT

Previous research in the World Society tradition finds improvements in nation-level environmental outcomes associated 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 multi-level model using data on corporate emissions from the Carbon Disclosure Project and three measures of civil society integration: number of non-governmental organizations (NGOs), corporations with climate management incentives, and United Nations Global Compact Signatories. The results suggest that the relationship between civil society pressure and corporate emissions varies by a nation's position in the world-system. The NGO measure is associated with increased emissions in non-core nations, possibly due to means-ends decoupling or corporate greenwashing. The climate incentives measure is associated with decreased corporate-level emissions in the core and increased emissions in non-core nations, possibly due to successful regulation in the core leading to corporate offshoring or further domestic decoupling. More broadly, I argue that reducing corporate emissions requires accounting for increasingly complicated macro-sociological contexts, as corporations are both

pressured by and incorporated into World Society, yet also constrained by the structure of the world-system.

3.2 INTRODUCTION

Corporations are increasingly evaluated according to environmental, social, and governance (ESG) factors, in part due to civil society pressure, such as public interest in value-aligned investments and the rise of third-party rating systems (Gerber, Norman, and Gamble 2023; The Economist 2022). In response to this interest, some governments, most located in the Global North, are looking 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, most often in the form of reducing emissions. But how are corporations responding to this pressure? While corporations have significant agency, they also depend on a societal license to operate. Thus, pressure from International Non-governmental Organizations (INGOs) like Greenpeace and International Governmental Organizations (IGOs) like the United Nations has the potential to impact corporate 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. How do these elements of structural context impact corporate emissions?

Previous research established improvements in nation-level environmental outcomes associated with greater World Society integration (Jorgenson 2009; Shandra 2007a; Shandra 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). This means that there is potentially significant variation in emissions that are otherwise missed: patterns at the macro or national level of analysis might not hold at the meso or corporate level (for example, see Marquis, Toffel, and Zhou 2016; Grant, Jorgenson, and Longhofer 2020). Macro-level context can impact organizational outcomes: while corporations may be increasingly international and transnational, they are still constrained by regulatory and civil society pressure in their headquarter nation.

World Society theory attributes significant variation between nations to their different positions in international civil society (Longhofer et al. 2016; Hironaka 2014; 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 (Beckfield 2003, 2010; Lim and Tsuitsui 2012; Shorette 2012), suggesting that nations have different capacities to influence corporate emissions. In this article, I examine whether world society integration and related ESG pressures are associated with improvements in corporate-level environmental outcomes, dependent on the structural constraints of the global political economy. Are pressures from civil society associated with a change in corporate emissions? Do these changes differ based on nations' position in the modern 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 constraints of the global political economic system complicate the relationship between civil society pressure and corporate emissions. Pressure from INGOs, which diffuse and support pro-environmental norms, is not associated with decreased emissions. Instead, they increase emissions to a greater extent in non-core nations with relatively 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 decreased emissions—but only in core nations that have high amounts of political and economic power.

3.3 LITERATURE REVIEW

Previous research on the anthropogenic drivers of emissions has identified macro-sociological processes associated with national environmental outcomes, including civil society pressure and position in the global political-economic hierarchy (see Shorette 2012; Jorgenson et al. 2011). However, the literature is less clear about whether these processes are associated with meso-level environmental outcomes like corporate emissions.

3.3.1 World Society and World-System

World Society theory suggests that a global network of nations, international governmental organizations (IGOs), and both international and domestic non-governmental organizations (NGOs), diffuse structure and policy (Meyer et al. 1997), working together as part of a "Bee Swarm" (Hironaka 2014) creating a shared global culture that is the start of "top-down" processes which play a vital role in the national adoption of pro-environmental policies (Longhofer et al. 2016). 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). Additionally, nations highly integrated into world society have been quicker to implement pro-environmental protections (Frank et al. 2000).

However, the world society is not an even playing field: nations occupy unequal positions. World-systems theory's key argument is that nations are currently embedded in a hierarchical world-system, where each nation's position is determined by its place in the global division of labor (Wallerstein 1974). Dynamics of inequality between nations based on their relative economic and political power result in environmental harms concentrating in developing nations: developed core nations, concentrated in the Global North, rely on ecologically unequal exchange to externalize the environmental costs associated with their production and consumption patterns to less-developed non-core nations concentrated in the Global South (Jorgenson 2006; Hornborg 2009). Foreign direct investment and trade networks outsource production facilitated by business-

friendly national regulations, creating pathways through which these exchanges can occur, resulting in environmentally detrimental outcomes such as increased emissions and deforestation in non-core nations (Shandra 2007a; Rieger 2019). In this manner, transnational corporations play a crucial role in outsourcing and offshoring resource-intensive and environmentally harmful production from core to non-core nations (Bornschier and Chase-Dunn 1985; Muradian and Martinez-Alier 2001).

Previous research has shown how inequality in the world-system can dampen the impact 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 et al. 2011; Shorette 2012).

3.3.2 Nations and Corporations

Nations are key actors in both World-Systems and World Society theories. While pressure from global civil society constrains the choices available to a nation-state when

responding to a particular problem, leading to homogeneity (Meyer et al. 1997), nations are still the primary actors responding to global problems. 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 impact on corporate emissions has been mixed. In the United States, direct regulation of climate outcomes, including emissions caps and GHG targets, have been relatively successful and are associated with lower corporate emissions (Grant et al. 2014). Other approaches, such as regulation-through-information, climate action plans, and GHG reporting, have been found to have no impact on corporate emissions or chemical releases (Grant and Jones 2004; Grant, Bergstrand, and Running 2014). While direct forms of national regulation such as emissions caps and targets have great promise to reduce emissions substantively if adequately enforced, in the meantime, other methods of regulation—such as pressure from civil society—have been proposed and implemented.

3.3.3 Civil Society and Corporations

Civil society encompasses a variety of actors—including regulators, customers, competitors, industry, communities, and social movements—which are independently and in tandem 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 impact, shifting internal corporate risk perceptions and impacting financial performance (Vasi and King 2012; Reid and Toffel 2009), secondary stakeholders—the general public—can also influence corporate behavior through boycotts, protests, publicity campaigns, and demonstrations (Vasi and King 2012). Further, third-party evaluators, who work to increase consumer awareness and create competition, often to valorize well-performing firms and shame those who perform poorly, have been able to pressure even non-rated corporations when the ratings are combined with regulation (Sharkey and Bromley 2015).

While civil society provides formidable incentives on its own, the efficacy of such pressure is improved when government regulation looms behind it (Vogel 2005; Reid and Toffel 2009). The result is that the benefits of Corporate Social Responsibility (CSR) are spread unevenly: they are likely most significant in core nations highly integrated into world society. This is 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, especially on the part of organizations, on issues such as climate change 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: "means-ends" (Bromley and Powell 2012). In this scenario, corporations might be doing what they say they are, but the issue is that these actions are not impacting 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).

3.3.4 Hypothesis

Given the relationship between World Society integration and World-Systems position found in previous research at the national level, in this study, I ask whether a similar relationship is possible at the corporate level. Does world society integration lead to improvements in 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 more deeply integrated into civil society will have lower emissions as they face greater scrutiny and pressure from NGOs, IGOs, and other civil society 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, where non-core nations face greater constraints to 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 experience a decrease in emissions, as they face greater pressure from civil society and other nations and have the capacity to act on this pressure to reduce environmental harm.

H1: The associations between civil society measures and corporate emissions vary based on a nation's position in the world-system.

3.4 DATA

Research on corporate emissions has been limited due to data availability. One of the best sources is the Carbon Disclosure Project (CDP), founded in 2000 to encourage and collect corporate environmental disclosures. The data has been annually collected since 2010 via a standardized questionnaire. While companies may choose to report emissions of their own accord, most do so because they have been requested to by

stakeholders via the CDP. These stakeholders include investors, customers (defined as large purchasing organizations), banks, and environmental initiatives. Responding corporations are given a letter grade posted publicly on the CDP's website. Corporations invited to respond but choose not to are given an F. Third-party verification of emissions data is required, among other criteria, to receive an A. The reported data cover 11 sections, including climate governance, risks and opportunities, business strategy, targets and performance, emissions data, verification, carbon pricing, and engagement. Recent research has found that environmental performance, in terms of high GHG emissions, is not associated with corporate decisions to join or drop out of the CDP (Callery 2022).

In the survey, corporations are asked to report their scope 1 (from fuel combustion, company vehicles, and fugitive emissions), 2 (from purchased electricity, heat, and steam), and 3 (from outsourced production and consumption of goods and services) emissions. From 2010-2018, 92% of respondents, on average, shared scope 1 and 2 emissions. In contrast, only 73% of respondents shared their scope 3 emissions over the same period, and this number varied widely. In 2010, only 59% of corporations reported these emissions, a figure up to 89% by 2018. A limitation of the scope 3 emissions, however, is that there is less consistency in how they are measured, with corporations able to select which of seventeen types (such as upstream leased assets, downstream transportation and distribution, and use of sold products) are relevant and which are not.

Corporations also choose their "boundaries" when reporting: equity share (accounting based on the share of ownership), financial control (accounting based on the

ability to direct policy and receive profit), and operational control (accounting based on authority over material decisions). In the following models, these emissions are attributed to the headquarter nation of the reporting corporation. Given that the reporting boundaries include emissions that corporations have some control over, primarily financial or operational, I argue that the national characteristics of the headquarter 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 are grouped by nation.[11] The final sample includes 1,090 corporations in 36 nations (Appendix, Table 3.5).

One of the limitations of the CDP dataset is the potential for sample selection bias arising from corporations choosing not to respond to the survey when asked. Previous research has found that factors such as the presence and stringency of national environmental policy, national clean energy investment, whether the corporation or industry peers reported the previous year, the size of the corporation, and the firm's orientation to primary stakeholders, including shareholders, customers, and employees are associated with the likelihood of response (Andrus et al. 2022; Callery 2022; Mateo-Marquez et al. 2021a; Mateo-Marquez et al. 2021b). However, further analysis using the Heckman correction to account for the impact of these factors on environmental outcomes found no difference in results (Andrus et al. 2022; Mateo-Marquez et al. 2022).

[11] Robustness checks using a subsample of corporations reporting for 8 or 9 years showed no significant differences in results.

I estimate a Heckman Model and include the resulting Lambda coefficient in the following models to account for sample selection bias.

3.4.1 Dependent Variable

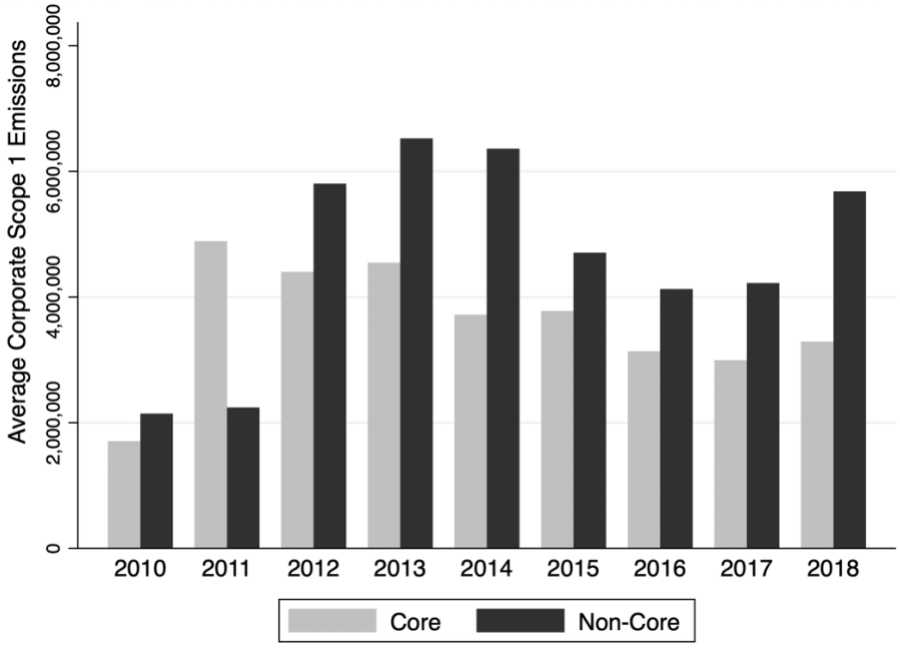
The dependent variable is corporate-level gross global scope 1 emissions (from fuel combustion, company vehicles, and fugitive emissions) collected from the CDP. The variable is self-reported in metric tons of CO2e and logged using the natural log to account for skew. Scope 1 emissions are the focus of this analysis because they are most likely to be impacted by international pressure from World Society.[12] These emissions are directly associated with corporate assets that the corporation exerts 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, but that it may be more feasible for nations to regulate those emissions tied to the corporate workings within their borders.

Figure 3.1 illustrates the change in average corporate emissions over time for core and non-core nations. Overall, average corporate emissions have increased since 2010,

[12] Scope 2 emissions, from purchased electricity, heat, and steam, are not included as they are dependent on what the source of electricity is, which can vary greatly by a nation's geographic location, among other variables that are little impacted 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.

peaking in 2011 at about 5 million metric tons of CO2e for core nations and in 2013 at about 6.5 million metric tons of CO2e for non-core nations. By the end of the period, in 2018, average emissions in core nations had decreased since their peak to about 3.5 million metric tons of CO2e but were on the rise since a 2017 low of about 3 million metric tons. Average emissions in non-core nations had decreased since 2013 to a low of about 4 million metric tons in 2016 but were also on the rise in 2018 to about 5.5 million metric tons of CO2e.

Figure 3.1 Average Corporate Emissions over Time, by World System Position



3.4.2 Independent Variables

I include three variables of civil society pressure. The first is a national-level count of the number of chapters of INGOs, bottom coded at 1500 and intended to capture national-level ties to world society. I follow the tradition of Frank and coauthors (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 et al. 2011; Lim and Tsuitsui 2012; Shorette 2012). While some authors focus explicitly on EINGOs (e.g., Jorgenson et al. 2011), INGOs of all types are included in this study to capture a variety of pressures and scrutiny impacting corporate behavior, whether the organizations are focused on the environment or not.

The second measure is the percentage of corporate signatories to the United Nations Global Compact out of the total number of corporations per nation, intended to measure pressure from IGOs. The compact is intended to encourage companies to incorporate environmental, social, and governance factors and pursue Sustainable Development Goals.[13] 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, all listed in Table

[13] https://www.unglobalcompact.org/what-is-gc/mission

3.6 of the Appendix.[14] The most recent year of data available was used to ensure the measure appropriately reflected the total number of corporations that could have signed on to the compact.

The third measure is the percentage of corporations that "provide incentives [to employees] for the management of climate-related issues, including the attainment of targets" out of the total number reporting to the CDP per nation (CDP 2020). It is intended to pressure from environmental incentives. Responses of "yes" were coded as 1, and "no, 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 and c-suite executives down the ranks to managers and 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 second and third measures were aggregated to the national level from the organizational level to reflect world society's focus on national integration into civil society as the driving force of mitigation.

To assess the second set of hypotheses, I include a binary measure of world-system position to interact with the three world society variables. A limitation of the dataset is that most corporations responding to the CDP survey are headquartered in

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

global north nations. To compare nations based on their relative economic and political power, they are grouped into core or non-core—comprising of semi-periphery and periphery nations—based on the "orthodox classification" laid out by Clark and Beckfield (2009). The semi-periphery and periphery are combined to ensure that the "non-core" group has a sufficiently large sample size for comparison with the core.[15] As changing one's position in the world economy is unlikely to occur 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 (Appendix, Table 3.5).

3.4.3 Control Variables

To control for variations in national size, total population was collected from the World Bank and logged to correct for skew and so that the results for these variables can be interpreted as elasticity coefficients, where a 1% change in the variable of interest is associated with an x% change in emissions.[16] Corporate-level control variables include total revenue (converted into 2015 USD) and the number of employees as measures of

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

[16] GDP is another common control for national size and power, but is not included in this analysis because of its moderate correlation with the World Systems measure. Sensitivity analyses showed that GDP per capita was not significantly associated with corporate emissions.

corporate size, collected from Compustat. As categorized by the CDP, the economic sector is included to ensure that countries with more firms in more polluting sectors are not biasing the results (e.g., Ioannou and Serafeim 2012).

3.5 METHODS

I estimate a multi-level model to account for the nested nature of the dataset and research questions. Corporations are theorized to be impacted by the civil society context and world-system position of the nation in which 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.

3.5.1 Heckman Correction

The Heckman correction is a two-step process. The first model examines which factors influence inclusion into a sample and is used to estimate a variable, called 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 3.7 of the Appendix. The resulting lambda correction factor is included in the models to assess the potential impact of nation-level factors on corporate inclusion in the CDP.

3.6 RESULTS

Model 1 in Table 3.1 reports the main effects. As a reminder, the outcome variable—corporate scope 1 carbon dioxide emissions—is logged, but the key independent variables are not. To interpret the results for these variables, the chosen coefficient X needs to be transformed using the formula (exp(X) -1)*100 = Y. The resulting Y can then be interpreted as a percentage change associated with a one-unit increase in variable X.

Of the three measures of civil society pressure, only INGOs have a statistically significant association with corporate emissions: for every additional national INGO membership, corporate emissions increase by 0.06%. World-systems position has no main effect on corporate emissions. The controls for corporate size are associated with increased 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%. While a comprehensive measure of corporate age is not available in the Compustat database, this aligns with previous literature, which has found that larger and wealthier corporations emit more as they become ossified over time (Grant et al. 2020).

The control for national size is associated with decreased 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 and indicates that after considering civil society integration global economic and political position, larger populations are not associated with increased production and consumption (Grant et al. 2020). Heckman's lambda, which accounts for potential sample selection bias, is not statistically significant, suggesting that selection bias is not an issue. The coefficients for controls for the economic sector and time are reported in the Appendix (Table 3.8).

Table 3.1 Elasticity Coefficients for the Regression of Corporate CO2 Emissions: Main Effects of World Systems 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 x Non-core	-	0.001 (0.0005)**
Signatories x Non-core	-	0.03 (0.03)

Incentives x Non-core	-	0.01 (0.003)**
Number of 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)***

Note: * p<0.05 **p<0.01 ***p<0.001 [a] parameter set to zero

Answering my research questions requires interacting the three world society variables with world-system position, shown in Model 2. Including interaction terms suggests that the relationship between civil society and emissions is complicated by position in the global economic hierarchy. The positive relationship between INGOs and emissions found in Model 1 is strongest in non-core nations, significantly different from the relationship in core nations. In non-core nations, each 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.

The results of the interactions included in Model 2 also suggest that the lack of a main effect for the measure of climate management incentives in Model 1 may be 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.[17]

No such divergence exists for the Global Compact signatories variable, which remains unassociated with corporate emissions. 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 impact the results.

Graphing the relationship helps to illustrate the divergence between the core and non-core. Figure 3.2 shows a graph of the predicted emissions values 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, most non-core nations had between 2,000 and 2,500 NGO memberships, with the number of memberships increasing steadily. Using margins to predict corporate emissions, in non-core nations with 2,500 NGO memberships, average emissions were 135,944 metric tons of CO2e, compared to 84,965 metric tons of

[17] Sensitivity analyses splitting non-core nations into the periphery and semi-periphery highlight that the relationship between the variables in periphery nations drives the positive association between emissions and civil society measures.

CO2e in core nations with similar numbers of memberships. At this level, these differences are non-significant. However, at 3,500 NGO memberships—the average number for core nations—predicted emissions for the core are 145,801 metric tons, compared to 994,505 metric tons in the non-core, a significant difference.

This suggests that, as NGO memberships increase and non-core nations are integrated into World Society at the same levels as core nations currently are, the expected emissions decreases might not materialize, as long as these nations remain outside the core. Examples of non-core nations with high levels of emissions and denser ties to World Society include Russia, with 2,471 NGO memberships and average corporate emissions of 69,380,616 metric tons of CO2e (the highest overall), and India, with 2,248 NGO memberships and average corporate emissions of 7,306,740 metric tons. In these cases, increased pressure from World Society may not be strong enough to offset ecologically unequal exchange.

Figure 3.2 Predicted Emissions by NGO Count and World Systems Position

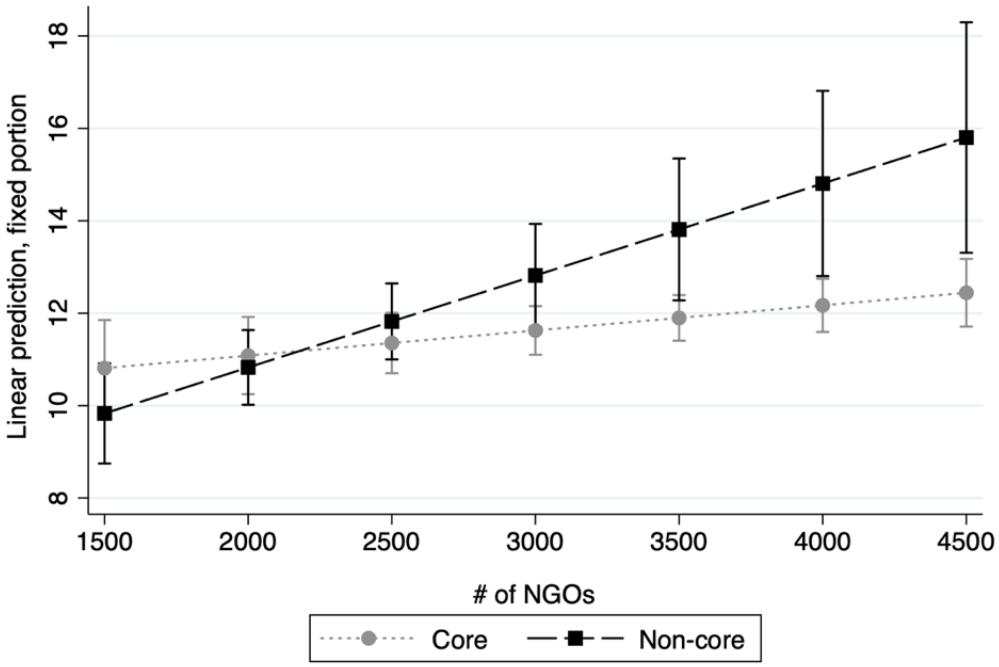
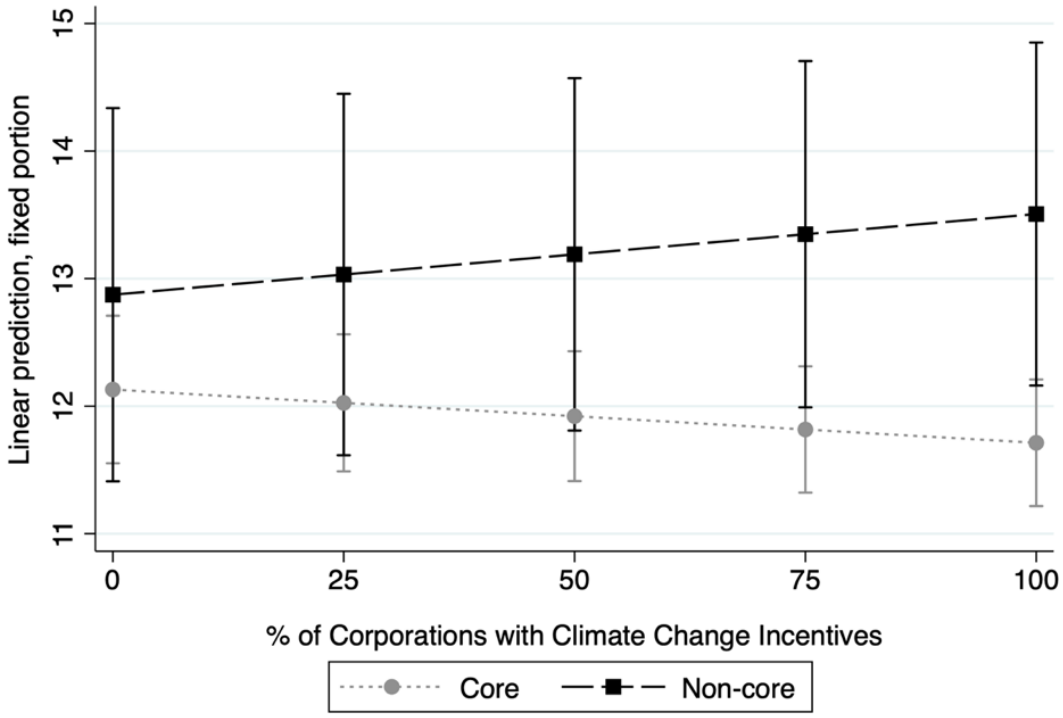


Figure 3.3 illustrates the difference in the association between emissions and climate management incentives between core and non-core nations. In core nations, corporate emissions decrease when a higher percentage of corporations have adopted climate change incentives. In non-core nations, similar to the results when civil society is measured as the number of NGOs, an increasing percentage of incentives is associated with increased corporate emissions.

In non-core nations, about 89% of corporations had such incentives, an average slightly higher 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 shows that in core nations, predicted emissions are 130,614 metric tons of CO2e, while in non-core nations predicted emissions are 666,636 metric tons of CO2e.

Figure 3.3 Predicted Emissions by Climate Management Incentives and World Systems Position



The results support hypothesis H_1 that the relationship between civil society integration and corporate emissions varies by nations' position in the world-system. There is evidence of a decrease in emissions associated with greater civil society pressure. However, this relationship is only present for core nations, which have been both the main target of corporate emissions reduction pressure and have the political and economic capacity to act on such pressures. In non-core nations, in contrast, both measures of civil society pressure are associated with increased emissions. 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 in order to reap the economic benefits of greater civil society integration, leading to increased corporate emissions through corporate offshoring from core nations.

3.7 DISCUSSION

The ability of World Society to reduce corporate emissions is present in core nations, but less so in the rest of the world. In non-core nations, the balance of power and rampant 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 suggests that in non-core nations, greater integration into civil society is mainly ceremonial and not reflective of intended action on the national or corporate level. However, it is also possible that the increases in emissions are due to ecologically unequal exchange, where greater integration to the global economy facilitates the outsourcing of environmental harms from core to non-core nations (Jorgenson 2006; Hornborg 2009). In this case, the lack of emissions reductions resulting from pursuing NGO memberships and establishing climate management incentives does not mean these actions are indicative of greenwashing or unrelated to environmental impacts. Instead, means-ends decoupling may occur (Bromley and Powell 2012). Nations and corporations may pursue integration with good intentions but lack the capacity, power, and resources necessary to follow through on their commitments (Lim and

Tsuitsui 2012). These commitments are made despite possible limitations, as greater integration into world society can bring economic benefits for nations and corporations.

The increases in emissions associated with larger numbers of NGO memberships in core nations further confirm the possibility of decoupling. In the case of these corporations, however, policy-practice—more commonly known in this scenario as "greenwashing"—is likely (Bromley and Powell 2012). Many policy discussions on reducing corporate emissions have focused on global north nations. These nations are not only home to a large number of 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, and so the lack of results suggests that corporate responses are to pay lip service to environmental concerns while continuing with business as usual. However, the decrease in emissions associated with world society integration in the form of climate management incentives in core nations suggests that mitigation of environmental harms is possible via civil society pressure. 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. However, the success of core nations in reducing corporate emissions might come at the cost of offshoring those emissions elsewhere in the world-system, leading to the increase in emissions observed in those nations.

3.7.1 Limitations

Previous research on corporate contributions to climate change has been limited by data availability, and while the CDP dataset is the most comprehensive source of corporate emissions currently available, it is similarly limited by sample size. Further data limitations include selection bias and lack of reporting on scope 3 emissions. 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.

3.8 CONCLUSION

Corporations are facing increasing pressure to address climate change. This pressure has often come from civil society through non-governmental organizations, international governmental organizations, 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, there are more contexts where corporate emissions are increasing. This suggests that decoupling, in

terms of inability and lack of will to implement desired outcomes, continues to plague efforts to reduce corporate emissions.

The relationship between corporations and civil society is complicated by the ways in which corporations themselves are being integrated into world society. Civil society pressures, especially in Global North nations, compel corporations to make their stance known on a range of social and environmental issues. As more corporations integrate environmental concerns into their operations, there is also increasing external and internal peer pressure for others to do the same. Even the financial world has taken an interest in ESG initiatives, adding another layer of incentives. Corporations will continue to grapple with these pressures and increasingly attempt to align ESG and CSR principles with their business models to maintain their social license to operate.

Previous research on corporate sustainability has focused on pressure from stakeholders, shareholders, and regulations (see Sump and Yi 2021; Damert et al. 2017) 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 in tackling power plant emissions (2020; see also Schor and Jorgenson 2019) suggest how national interventions might work by identifying and targeting corporations with disproportionately higher emissions in nations most receptive to increased emissions regulation. Without understanding national contexts—including world society integration—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.

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3.10 APPENDIX

Table 3.2 Summary Statistics

Variable	**N**	**Mean (Std. Dev.)**	**Range**	**Source**
Scope 1 Emissions *(in metric tons)*	6248	3,831,203 (14,100,000)	0.01 to 257,000,000	CDP
INGOs *(nation-level count)*	6248	3291.91 (667.62)	1,500 to 4,474	Yearbook of International Organizations
Climate Incentives *(nation-level %)*	6248	82.8 (11.09)	30 to 100	CDP
Global Compact Signatories *(nation-level % x1000)*	6248	12.78 (16.24)	0.21 to 60	United Nations
Revenue *(total)*	6248	48,100,000 (420,000,000)	0.09 to 25,700,000,000	Compustat
Employees *(count)*	6248	50.4 (111.92)	0.01 to 2,300	Compustat
Population *(count)*	6248	184,000,000 (228,000,000)	518,347 to 1,390,000,000	World Bank

Table 3.3 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 3.4 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, Inc.	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 Corporation	49	5.66
12. Apparel	Nike Inc.	11	1.27
13. Transportation Services	Southwest Airlines	33	3.82

Table 3.5 Nations Categorized by World Systems Position

Core					
Nation	**N**	**%**	**Nation**	**N**	**%**
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					
Nation	**N**	**%**	**Nation**	**N**	**%**
Brazil	19	1.7	Peru	1	0.1
Chile	3	0.3	Philippines	1	0.1
China	5	0.5	Russia	3	0.3
Colombia	2	0.2	Thailand	4	0.4
Hungary	1	0.1	Turkey	19	1.7
India	31	2.8	United Arab Emirates	1	0.1
Ireland	11	1			
Israel	2	0.2			

Table 3.6 Data Sources for Total Corporations per Nation

Nation or Group	Source, Data 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 3.7 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	No. of Observations	6,020

* p<0.05 **p<0.01 ***p<0.001

Following Mateo-Márquez, González-González, and Zamora-Ramírez (2021b), to control for potential sample selection bias I first estimated a Probit regression model with measures for Regulative (Environmental Policy Stringency Index) and Normative (percentage of companies responding to the CDP in 2014 per nation) variables. Given this study's focus on nation-level determinants of corporate emissions, only corporate-level variables were included. The third nation-level variable included by Mateo-Márquez et al., Cultural, was not statistically significant in the original models (2021b),

and 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 together. The data include 6,020 corporations that were 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 above. 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 3.8 Coefficients for the Regression of Corporate CO2 Emissions, 2010-2018 Main Effects of World Systems 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)**
Number of 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

4.0 CONCLUSION

The general aim of this dissertation was to answer the call to "place organizational actions within their proper social, political, and economic relations" and to advance our sociological understanding of the relationship between corporations and the environment (Shwom 2009: 286). In addition to contributing to the literature on this topic, a better understanding of the national drivers of corporate emissions can help target policies to maximize the curtailing of greenhouse gas emissions. The two empirical chapters focused on the ways in which macro-level characteristics shape meso-level outcomes, namely, how do nation-level characteristics and actions influence what is happening at the organizational level? Thus, the major innovation of this dissertation is in testing long-standing theories about nation-states and corporations by combining well-established independent variables with a novel dependent variable. The findings suggest that national context matters. Corporate emissions are shaped by World Society integration, World Systems position, and the Variety of Capitalism.

Each set of empirical analyses showed a different dimension of how national contexts contribute to decreased emissions. In chapter 2, the results suggest that corporations in CMEs have lower emissions than those in non-CMEs. In chapter 3, I show that core nations where higher percentages of corporations have climate management incentives, a measure of civil society pressure, have decreased emissions. This suggests that civil society pressure on powerful and wealthy nations and tight coupling between corporations and government can contribute to reducing corporate

environmental impacts. However, other national contexts contributed to increased emissions. In chapter 2, I find that size mitigates the environmental benefits of CMEs nations, as larger corporations in such nations have higher emissions than similarly sized corporations in non-CME nations. In chapter 3, the results show that in non-core nations, greater civil society integration—measured by the number of INGO memberships, the most common variable in previous research—is associated with increased emissions. This suggests that corporate power, state capture, and political and economic constraints on nations can contribute to increasing corporate emissions.

4.1 SUMMARY OF EMPIRICAL CHAPTERS

Given the scale of the climate crisis, nations are often the focus of analysis, particularly regarding their political and economic capacities. The first empirical paper, chapter 2 of the dissertation, draws from the Varieties of Capitalism (VOC) theory (Hall and Soskice 2001) to examine how the relationship between corporations and nations impacts corporate emissions. Unlike other political economy theories, the VOC theory places corporations front and center by categorizing nations according to their coordination strategies with corporations. Nations with direct ties with corporations are Coordinated Market Economies (CMEs), while those whose relationships are mediated by the market are Liberal Market Economies (LMEs).

I hypothesized that CME nations would have lower emissions than non-CME nations, but this relationship would vary based on the corporation's size and industry.

The results supported my first hypothesis. CMEs have lower emissions than non-CMEs, perhaps due to the success of incremental innovation (Mikler and Harrison 2012; Magnin 2018; Mildenberger 2020). Larger corporations, in terms of more employees and revenue, have higher emissions, a finding aligning with previous research (Grant, Jorgenson, and Longhofer 2020). The lower corporate emissions in CMEs compared to non-CMEs appear to be driven by sectoral differences in emissions, especially those with higher emissions levels compared to services, which have the lowest emissions of any sector. Fossil fuels, infrastructure, and materials are highly polluting industries, so improvements in emissions in these areas are notable. However, the benefits of coordination between government and corporations are not without problems. Larger corporations in CMEs had significantly higher emissions than those in non-CMEs. The close ties between the two groups of actors might bind their interests together, allowing corporations easier access to and perhaps more significant regulatory concessions from governments (Mildenberger 2020).

The decrease in corporate emissions associated with CMEs, especially in the fossil fuels, infrastructure, and materials sectors, suggest that there are institutional contexts in which corporate environmental impacts can be reduced. The incremental innovations typical of CMEs appear to have been the more successful strategy. However, the relatively higher emissions of larger corporations in CMEs compared to non-CMEs highlights that the power of corporations is significant and will continue to pose a problem for emissions reduction.

Historically, governments have had little success in reducing emissions. This has led other actors to tackle the issue, notably civil society actors. The presence of International Non-governmental Organizations (INGOs) is a commonly used measure of integration and participation in civil society (Frank et al. 2000). Other signals of close ties are the widespread occurrence of climate-related agreements and incentives (Lim and Tsuitsui 2012). However, civil society is not an even playing field: some nations have more ability to pressure corporations based on their political and economic power (Beckfield 2003; 2010). This has led to a tradition of interacting measures of World Society and World Systems to better understand how civil society norms and pressures can impact environmental outcomes (Jorgenson et al. 2011; Lim and Tsuitsui 2012; Shorette 2012).

The third chapter focuses on World Society and World Systems theories to examine the relationship between civil society integration and political-economic inequality on corporate emissions. I hypothesized that nations more closely integrated into World Society would have lower emissions but that this relationship would be tempered by World System position. I find that World Society integration is associated with decreased emissions, but only for one of the three measures and only in core nations. For non-core nations, two of the three integration measures are associated with increased emissions.

There are two related possibilities: first, increases in emissions could be 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). In this case, the lack of emissions reductions resulting from pursuing NGO memberships and establishing climate management incentives means that these actions are not indicative of greenwashing by non-core nations, or unrelated to environmental impacts. Rather than a failure of non-core nations to reduce corporate emissions, this first possibility suggests that the hierarchical nature of world society has led to emissions decreases in core nations at the expense of emissions increases in non-core nations.

The second possibility is that means-ends decoupling is occurring (Bromley and Powell 2012). Nations and corporations may pursue integration with good intentions but need more capacity, power, and 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. This second possibility suggests that non-core nations are not intentionally engaging in greenwashing, but make commitments in good faith that they are unable to follow through on due to the limitations of the hierarchical world system.

The decrease in emissions associated with world society integration in the form of climate management incentives in core nations suggests that mitigation of environmental harms is possible via civil society pressure. 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. However, the success of core nations in reducing corporate emissions might come at the cost of offshoring those emissions elsewhere in the world system, leading to the increase in emissions observed in those nations.

4.2 THEORETICAL AND SUBSTANTIVE CONTRIBUTIONS

Understanding which national-level factors influence corporate emissions is vital from an academic and practical perspective. Research that examines corporate attempts to reduce emissions divorced from their national context risks missing important factors that restrict or enable corporations to make such changes. On the other hand, research on the social contexts impacting emissions that focuses on the micro level of the individual or the macro level of the nation risks missing the essential role of organizations in contributing to emissions. In this dissertation, I seek to extend our understanding of the corporate drivers of emissions beyond corporate-level factors, such as size and age, to national contexts. Corporations are constrained by the form of coordination possible with governments, the amount of civil society presence and pressure, and the political and economic power of the nation in which they are headquartered.

This dissertation also contributes to the growing body of literature that focuses on corporate environmental impacts. As highlighted in the introduction, 9,000 corporations are responsible for 25% of global emissions (CDP 2022), but their contributions to the climate crisis have been understudied. Frumhoff, Heede, and Oreskes outline five reasons that corporate contributions to climate change should be highlighted: (1) a small group of corporations is responsible for producing fossil fuels, (2) major corporations have the scientific expertise to understand the implications of climate science, (3) they could have adjusted their business models in light of these implications, (4) instead many tried to discredit scientific evidence, and (5) despite this, relatively little attention has been paid to corporations by academics and policymakers (2015).

Previous research on corporate sustainability has focused on pressure from stakeholders, shareholders, and regulations (see Sump and Yi 2021; Damert et al. 2017) but without considering the nation-level factors that influence the presence, scope, or type of these pressures. My aim is not only to test the macro-sociological theories I draw from but to extend them. In the case of Varieties of Capitalism, my contribution is to apply the theory to environmental outcomes, adding to a small but growing body of literature in this area (Benney 2019; Magnin 2018; Mikler and Harrison 2012). Environmental concerns are rising to the top of national agendas, making coordination on this issue an increasing concern. If the VOC theory is to address the critique that it is unable to account for new political economic trends (Gould et al. 2015), the ability to explain variation in corporate environmental outcomes would be a place to start.

In the case of the World Systems and World Society theories, my contribution is to apply them to a different level of environmental outcomes. Previous research has established how the normative power of civil society can impact national environmental outcomes (Hironaka 2014; Longhofer et al. 2016; Shandra 2007; Longhofer and Jorgenson 2017; Frank et al. 2000) and that these effects vary according to world system position (Jorgenson et al. 2011; Lim and Tsuitsui 2012; Shorette 2012). More recently, these theories have been used to help understand variations in organizational-level environmental outcomes in the case of power plant emissions (Grant et al. 2020). These findings suggest that macro-level theories can help us understand what is happening at the organizational level, where a large proporation of emissions are produced.

Understanding the impact of national context on corporate environmental outcomes is not purely academic but has important implications for effectively crafting climate policies to reduce emissions. One example would be identifying and targeting corporations with disproportionately higher emissions, starting with those in nations committed to climate regulation. This is similar to the strategy suggested by Grant, Jorgenson, and Longhofer in tackling power plant emissions (2020; see also Schor and Jorgenson 2019). Another example would be implementing different types of policy proposals depending on the variety of capitalism by continuing incremental regulations in CMEs and encouraging innovation in LMEs. This is already being done to some extent: in the US, the 2022 Inflation Reduction Act contains efforts to boost the domestic clean energy sector. However, globally it is still essential to work on reducing inequality between nations; otherwise, the corporate emissions reductions in core nations could come at the expense of emissions increases in non-core nations.

4.3 LIMITATIONS AND FUTURE DIRECTIONS

The sociological study of corporate environmental outcomes is small but growing, both hampered by data limitations and aided by increased data availability. While access to corporate emissions data is limited, upcoming national regulation has the potential to require reporting, alleviating sample selection concerns. Outside of government, pressures to report emissions can be seen in the overall increase in corporations reporting to the CDP and the increase in scope 3 emissions reporting.

The fundamental challenge in understanding corporate emissions is the lack of data availability. Corporations have been reluctant to release quantitative information. Therefore, many studies have focused on interviews or other qualitative forms of data collection, which limits the number of corporations that can be compared to one another. While the Carbon Disclosure Project (CDP) dataset used in this paper expands the possible sample size, it is limited due to potential selection bias, as the sample is not random. As a result, there is an overrepresentation of corporations in the sample headquartered in the United States, the United Kingdom, Japan, and the corporations in the apparel industry. Future studies will benefit from the regulations proposed in the US and EU, among other nations, that will require corporate emissions reporting and ease concerns of sample selection bias for some nations. However, some nations and industries will remain underrepresented without international pressure and requirements to report emissions.

Another difficulty in studying the emissions of corporations is related to their multinationalism: many corporations have offices, operations, and other branches across national borders. As more data and detailed breakdowns in the data become available, it may be easier for future studies to attribute corporate emissions more directly to the nation where they originated. This characteristic also makes capturing a full range of a corporation's emissions more difficult. Scope 1 and 2 emissions (those which the corporation is directly accountable for, such as energy consumption of offices and company vehicles) are easier for corporations to measure and report. However, the largest portion of a corporation's contribution is usually its Scope 3 emissions (those associated

with outsourced production and consumption of goods and services) (Vogel 2005). Scope 3 emissions are significant: for example, for oil companies, consumption of their products accounts for the vast majority of their climate change contributions. For technology companies, outsourced resource extraction and production account for a large portion of contributions.

Even for those corporations that release their Scope 3 emissions, there is no standardized way of measuring them: some break down emissions by subsidiary, some by product, and others by nation. Increased pressure to report emissions from government and civil society will hopefully contribute to increased standardization and access to this emissions component. While scope 3 emissions data is still limited compared to scope 1 and 2, more corporations are reporting this information to the CDP. In 2020, 86% of the sample reported scope 3 emissions. Future analysis could explore whether nation-level factors impact scope 3 emissions to paint a fuller picture of corporate contributions to climate change.

Like other longitudinal studies of emissions, the preceding papers cover relatively short time frames of a decade or less. While the passage of time, given the continued (and hopefully increased) measurement of corporate emissions, can help ameliorate this limitation, the time remaining to mitigate the worst impacts of climate change is running out. Short time frame studies are still useful to indicate emerging trends.

A limitation of the current study, and an invitation for future research, is that there is still much left to be explained regarding the drivers of corporate emissions. The corporate-level variance explained by the nation-level variables is, on the whole, a small

portion. While this makes the statistical significance of the nation-level variables notable, other national factors could also matter. One future direction would be to continue using multi-level modeling to probe further the relationship between national context and corporate environmental outcomes. Other theories, such as Fossil Capitalism, which focuses on nation-level fossil fuel dependence, could be examined. Examining national regulations, especially those relating to climate issues, could give a more direct indication of the success of previous mitigation attempts.

The corporate-level variables, though few in number, also leave a large portion of the variance unexplained. This opens the possibility for future analysis. I could not include age in this study due to data limitations for the international sample. Including the variable would allow for better testing of the ossification hypothesis—that larger and old organizations become more inert and less able to adapt. Financial variables, such as return on assets (ROA) and risk (beta), also associated with corporate outcomes, were similarly challenging to access for corporations outside the United States but likely influence corporate emissions.

When possible, I have included multiple measures of theoretical concepts, such as the three different measures of World Society integration in Chapter 2. To address some of the limitations of the Varieties of Capitalism approach—such as a focus on Western nations and especially CMEs (Gould et al. 2015; Wood and Allen 2020) and a general lack of dynamism (Bohle and Greskovits 2009; Gould et al. 2015)—future research might measure the five institutions identified by VOC theory, rather than categorical groupings. These institutions include labor relations, finance, inter-firm relations,

corporate governance, and education and vocational training. This would further the analysis by examining mechanisms within each category that could explain the finding that CMEs have lower emissions than other nations. Finally, other environmental impacts beyond emissions could be examined. Corporations are already required by law in the US to release information on toxic chemical pollution (Grant and Jones 2004). The CDP also collects corporate data on water and forestation.

This study gives rise to many directions for future research. Beyond applying other macro-sociological theories, there is also potential in isolating and examining distinct mechanisms. Future research might also examine variation within industries within and across nations. Incorporating additional measures of key variables—such as the VOC institutions—and introducing new variables, such as measures of climate regulation, could also help understand the differences between groups of nations found here.

Addressing climate change will take the combined efforts of individuals, organizations, and nations. However, of these three groups, organizations are the "most intensive and effective environmental destroyer" and have contributed disproportionately to the climate crisis (Perrow 1997:6). This dissertation contributes to our understanding of which nation-level conditions might mitigate these destructive tendencies and which exacerbate them. The results suggest that while civil society pressure and close coordination between corporations and governments are associated with decreased emissions in some contexts, emissions increase when corporations are powerful, and nations are weak. I build upon the World Society, World Systems, and Varieties of

Capitalism theories to show that these macro-level contexts matter for corporate environmental outcomes. When seeking to understand wicked problems such as climate change, future research should consider how the characteristics of nations impact organizational outcomes.

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