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Corporate Pressure Makes Regime Diamonds: An Analysis of the Impact of Multinational Corporations on International Environmental Regime Effectiveness

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CORPORATE PRESSURE MAKES REGIME DIAMONDS: AN ANALYSIS OF THE
IMPACT OF MULTINATIONAL CORPORATIONS ON INTERNATIONAL
ENVIRONMENTAL REGIME EFFECTIVENESS

by
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Abstract

Despite the tendency for multinational corporations to overexploit natural resources and pollute the Earth, the immense power of capital in a globalizing world has presented a unique opportunity for corporations to become drivers for positive global environmental change. To make sense of this puzzle, this study asks how does an international environmental regime's relationship to the economic marketplace impact its institutional and ecological effectiveness? Through a small-n case study, this project analyzes the historical context, market interactions, and regime outcomes of four distinct instances of global environmental governance: the stratospheric ozone regime, the climate change regime, the global oceanic regime, and the biodiversity regime. By using indicators from both traditional and contemporary regime theory literature, each regime is coded as market-enabling or regulatory and its effectiveness is evaluated. These narratives indicate that both market-enabling regimes and regulatory regimes alike may face pushback from state and corporate actors that compromises the regime's institutional and ecological effectiveness. However, this oppositional stance may change when the cost of defecting from regime provisions exceeds the cost of compliance. Market-enabling features, coupled with technological advancements, enforcement mechanisms, and a concentrated regime structure, establishes conditions under which corporations may choose to abide by environmental regime provisions.

Résumé

Malgré les tendances des multinationales à exploiter les ressources naturelles et polluer la Terre, la force immense du capital dans un monde globalisé a présenté une opportunité unique pour les entreprises de devenir des motrices du changement positif de l'environnement. Pour comprendre ce mystère, cette étude pose la question « comment est-ce-que le lien entre un régime international environnemental et le marché économique avoir un impact sur l'efficacité institutionnelle et écologique du régime ? » Avec une étude de case, ce projet analyse le contexte historique, les interactions au sein du marché, et les résultats du quatre exemples de gouvernance globale environnementale : le régime de l'ozone stratosphérique, le régime du changement climatique, le régime des océans, et le régime de la biodiversité. En utilisant des indicateurs de la littérature de la théorie des régimes, chaque régime est codé comme étant celui qui permet les activités du marché or celui qui les régule. Enfin, l'efficacité de chaque est évalué. Ces exemples indiquent que les régimes habilitants ainsi que les régimes réglementaires peuvent faire face à résistance des acteurs du gouvernement et de l'entreprise qui compromettent l'efficacité institutionnelle et écologique du régime. Cependant, cette position oppositionnelle peut changer quand le coût de défection des provisions du régime dépasse le coût de compliance. Les caractéristiques d'un régime habilitant, couplé aux avancements technologiques, les mécanismes de surveillance, et un design du régime concentré, établissent les conditions dans lesquelles les entreprises peuvent choisir de respecter des provisions du régime environnemental international.

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Chapter 1: Introduction

DuPont, the hegemonic chemical company headquartered in Wilmington, Delaware, may not be the first thought that comes to mind when considering environmental sustainability. Rather, as one of the globe's largest chemical companies, it may take quite the opposite place. As one of the world's largest producers of chlorofluorocarbons (CFCs) in the 1980s, DuPont was one of the greatest single contributors to ozone depletion (Maxwell and Briscoe 1997). With vested interests in protecting the CFC industry to remain a leader, it would seem economically unwise for the firm to readily participate in the search for solutions to the ozone depletion problem.

Nonetheless, during the negotiation process for global ozone governance, DuPont publicly lobbied in favor of imposing regulations on ozone depleting substances (ODSs). With the support from DuPont and other major chemical companies, the international community signed the 1987 Montreal Protocol on Ozone Depleting Substances. This agreement, in its over two decades of enforcement, has successfully moved global corporations moved away from CFC production and consumption.

The case of DuPont and the Montreal Protocol demonstrates that although international firms have historically been some of the largest contributors to environmental degradation, some have chosen to bear the brunt of regulation for the benefit of environmental change. Despite the historic tendency for corporations to overexploit natural resources and pollute, the immense power of capital in a globalizing world presents a unique opportunity for corporations to become drivers for positive global environmental change.

In order to understand the role that large international businesses, like DuPont, can have in the crafting, implementation, and outcomes of global environmental governance, scholars are actively studying the overlap of policy, economics, and ecology. With a base in political science, this paper continues this exploration by asking the following question: *how does an international environmental regime's relationship to the economic marketplace impact its institutional and ecological effectiveness?*

Chapter II is a deep dive into the body of academic literature surrounding the development of contemporary regime theory. The discussion of the existing neo-liberal and neo-Gramscian theoretical bases for current scholarship outlines how environmental regime effectiveness has historically been measured. The historic gaps in the literature have indicated an importance of distinguishing between regime outcome and impact, or institutional and ecological effectiveness. Then, with a particular concentration on multinational corporations, the chapter shifts its focus to the nuances of non-state actors as participants in the regime negotiation, creation, and implementation processes. Overall, this analysis of the literature uses relevant theories to situate the research question and craft a theoretical argument.

Chapter III is an outline of the most-similar comparative case study method deployed in the remainder of the study. The first section explains the selection process for the four cases international environmental regimes, with two being market-enabling and two being regulatory. These selections will allow for the assessment of the impact (or lack of impact) of the two types of regime-market relationships on regime effectiveness. By creating coding techniques and explaining their relationship to the literature, the

chapter concludes with the full operationalization of the dependent and independent variables.

Chapter IV is the full analysis of the four case studies: the stratospheric ozone regime, the climate change regime, the global oceanic regime, and the biodiversity regime. Each study begins with an overview of the context and background of the case. Then follows a discussion of the regime-market relationship and a justification on the coding of the regime as market-enabling or regulatory. An evaluation of the institutional and ecological effectiveness of each international environmental regime leads into a discussion of each case's final conclusions.

Finally, Chapter V brings together the four case studies into a single discussion of multinational corporations and the effectiveness of international environmental regimes. The study, which aimed to define the relationship between these phenomena, does not seem to point to direct correlation between the market-enabling nature of a regime and its effectiveness, either in an institutional or ecological sense. Rather, the study's findings suggest that a firm's cost analysis of market opportunities, rather than the presence of the market opportunities themselves, may be driving corporate support for international environmental regimes and impacting their levels of success. Other factors, such as the available technologies, enforcement mechanisms, and nature of the regime fragmentation, are also considered as relevant to regime effectiveness. Finally, the chapter considers the methodological strengths and limitations of the study and suggests future routes for research.

Chapter 2: Literature Review

This chapter provides an exploration of existing scholarship as it relates to international environmental regimes and multinational corporations. Beginning with a discussion of the origins of regime theory, the first section describes how the growing prominence of global environmental governance has prompted the creation of an environmental subsection of international regime theory. Then, the second section describes methods employed by these environmental regime theory scholars to measure the success, or effectiveness, of these institutionalized frameworks. The third section explores non-state actors, particularly multinational corporations, as drivers in the creation of international regimes. Finally, this review of the literature is synthesized into the study's theoretical argument and hypotheses.

I. Regime Theory

A. Old Regime Theory

Transboundary issues, such as global trade, security, and climate change, are widespread and complex. With causes that transect international borders, the solutions to these issues must be multifaceted and facilitate cooperation among a host of international actors, from states to non-governmental organizations to corporate actors (Breitmeier 2013). In the classical realist tradition of international relations, the anarchic structure of the international system and human tendency to seek domination leads states to inevitable conflict (Morgenthau 1978, 3). This general preoccupation with individual power-building leads to an unwillingness to cooperate for collective gains. This reluctance, in turn, makes the prospect of solving transboundary issues, like the ones described above, nearly impossible.

In the years following 1945, however, the global system saw a sharp increase in cooperative efforts of states to mitigate global governance concerns through the creation of political and social institutions. From a realist perspective, states may engage in international cooperation if doing so was in their best power-building interest (Morgenthau 1978). However, with an increasing prevalence of large-scale cooperative efforts and a lack of scholarship to explain this phenomenon, international relations scholars began crafting regime theory to "capture, describe, and analyse the totality of cooperative efforts, assumptions, and behaviours in a given international issue area" (Sterling-Folker 2016, 89).

Traditional regime theory is built upon the structural realist idea that state behavior is "a function of the distribution of power among states" (Krasner 1982a, 499). States act and react to the changing power dynamics in the international system, or the relative power levels of states. This power, for structural realists, is equated to the material capabilities, both latent and military of the state (Mearsheimer 2001). The wealth of a state, thus, determines it ability to exercise influence over other states. In an anarchic society, these material and military capabilities place states at odds with one another as they drive decision making processes (Krasner 1982a, 497-8).

Regime theory, while similarly concerned with the consequences of state power distribution, approaches the topic through a more neoliberal lens. Neoliberalism argues that state actors are not trapped in a world of inevitable conflict but can act collectively to "mitigate the negative impact of anarchy" (Sterling-Folker 2016, 89). With cooperation as an attractive course of action, a stable global order is a real possibility for the

international system. Neoliberal scholars, therefore, seek to understand the conditions under which international cooperation can emerge and be sustained.

Regime theorists are interested in these instances of international cooperation within the social and political institutions called international regimes. These regimes emerge from the "combination of the distribution of power, shared interests, and prevailing expectations and practices" of international actors (Keohane 1984, 14). These factors, when taken together under certain conditions, can change the behaviors of states toward the collective pursuit of cooperation. With the knowledge that international regimes align state behaviors together, regime scholars argue that states may use these institutions to their advantage. States may participate in the shaping of international regimes as an exertion of their power (Krasner 1982a). Therefore, from a regime theory perspective, the global distribution of state power is constructed by a series of complex state interactions within these regime institutions.

While regime theory scholars generally agree that regimes have the power to impact state behavior on an international level, regimes have been defined in a variety of breadths. On a basic level, regimes are described as collections of rules, norms, and decision-making procedures that serve as loose governance around an area of international relations.[1] While these regimes may take different forms depending on the demands of the issues at hand, each intends to influence state behaviors, either by voluntary or legal means, and reinforce global norms and behaviors (Krasner 1982b).

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[1] Krasner defines regimes as "implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations" (Krasner 1982b, 186). Keohane interprets international regimes to be arrangements of "rules, norms, principles, and decision-making procedures" (Keohane 1984, 8). Young defines regimes as "clusters of rights, rules, and decision-making procedures that give rise to a social practice, assigns roles to participants in the practice, and guides interactions among occupants of these roles" (Young et al. 2008, xxii).

While they do have high set-up costs, established regimes gain stability over time due to the growing acceptance of international procedures and behavioral patterns (Krasner 1982a, 502).

Some scholars saw the inability to formulate a single definition for the phenomenon as a strike against the reliability of such a theory. Susan Strange, for example, argued that regime theory scholarship proved to be "woolly" in her famous critique of the field (1982, 479). Attributing the "woolliness" to the inability of regime theory scholars to agree on a single definition of the concept and single methodology for studying regime effectiveness, she argued that the regime theory literature was imprecise in nature, value-based in practice, and static in application (Strange 1982). Because of these reasons, she argued against the development of regime theory scholarship.

Many scholars also believe that the extension of regime theory into the neoliberal tradition is unnecessary. They argue that the international institutions and regimes, as argued in structural realism, are mechanisms by which powerful states continue to pursue their own personal interest and increase their power capabilities. Regime theory, thus, can be seen as a futile restatement of structural realism (Strange 1982, 341).

While Strange's early critique of regime theory was a valid interpretation of the scholarship, contemporary scholars of regime theory have strengthened the theory through its continued expansion. In an attempt to appease the two sides of this debate, Krasner explained regimes as intervening, interacting variables. In the international system, basic causal variables (such as the distribution of power and state interest) lead to related behaviors and outcomes. When a regime is implemented, it becomes an intervening variable that can both be affected by the basic causal variables and affect the

basic causal variables and the outcome of interest (Krasner 1982a, 500). This approach, while complex, allows state power to still take a prominent role in the theory, while looking at regimes as important causal variables as well.

Even in the face of criticism, regime theory scholars have moved forward in recent decades, seeking to create consensus and streamline the study of regimes. While regimes analysis is not capable of explaining the entirely of interaction around a global issue area, the complex causal relationship is still valuable for understanding how regimes are affected by and affect a variety of international factors (Young 2012). In moving forward, scholars of regime theory have looked to address two important expansions of the theory: the overlap of particular issue areas and the rising importance of non-state actors in regime creation and implementation.

B. Environmental Regime Theory

In general, the early scholarship on regimes aimed to establish the study of regimes as a legitimate academic pursuit. With the most high-profile institutions of the post-1945 era focusing on security and economic governance, the early scholarship revolved around on these issue areas. Krasner, in his early work, by explaining the general relationship between regimes and state power (Krasner 1982a, 1982b). Simultaneously, Keohane's scholarship aimed to explain how interdependence in international political economy could drive global cooperation in the form of regimes (Keohane 1984). However, with global governance expanding toward the end of the twentieth century, the growing network of international regimes allowed for the interplay of different issue areas.

One particular area that saw significant development in regime formation toward the end of the 20th century was environmental protection. While many smaller-scale, regional environmental agreements were in effect already, the 1972 United Nations Conference on the Human Environment (UNCHE) in Stockholm was the first major instance of transnational environmental governance (Downie 2015). [2] This conference served as the initial push toward the development of a larger collection of international environmental regimes.

In the decades since the UNCHE, the international system has seen environmental regimes blossom in areas related to the stratospheric ozone, climate change, biodiversity, desertification, toxic chemical use, and ocean pollution, among many others (Downie 2015). Within each of these regimes, one can find "international treaties and agreements, intergovernmental organizations, binding and nonbinding norms and principles, relevant national and local government institutions, and associated nongovernmental and private institutions that define and implement policies in different issue areas" (Axelrod and VanDeveer 2015, 4). These various structures, taken together, create a system of governance that helps to dictate the environmental-related behaviors of state and non-state actors.

Transnational issues, by nature, are difficult to solve. International actors face significant barriers to creating successful institutionalized regimes. For transboundary environmental issues, however, the international community faces a particularly hard

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[2] The UNCHE gathered 113 states to discuss the implications of climate issues on the international system. While no binding agreements were adopted at this first conference, there were three notable advancements for the future of environmental governance. Firstly, states set the precedent for multilateral diplomacy in the realm of environmental issues. Secondly, it established the twenty-six principles of international environmental law, including Principle 21 which upholds the importance of state sovereignty. Finally, the conference led to the creation of the United Nations Environment Programme (UNEP), which has since been the base for international environmental negotiations (Axelrod and VanDeveer 2015; Downie 2015).

challenge. Some of the barriers to effective transboundary environmental policy are outlined below.

First of the challenges arises from the range of contributors to environmental degradation and the recipients of the resulting issues. Global environmental degradation occurs because of the convergence of many actors' behaviors on an international scale. With contributors that transect international borders, the creation of solutions to environmental issues requires the cooperation of many contributing actors, including states, civil society, and multinational corporations (Downie 2015). This need for complex global coordination is, in itself, a significant barrier to effective policy creation and change.

Beyond this coordination challenge, however, is the reality that most damaging environmental practices can be traced to "a small number of highly industrialised states and firms operating within the triad of East Asia, North America and Europe" (Newell 1999, 1). While this selection of actors is the principle cause of climate disturbance, the resulting environmental changes "extend far beyond the power centres of the global economy" (Newell 1999, 1). The impact of environmental degradation, seeing no borders, can have serious consequences around the globe, even for actors who may not contribute to the severity of the issue. With this in mind, the creation of effective global environmental governance is an issue of global justice.

This distinction between those who contribute to the problems and those are harmed by the problems gives rise to a second barrier to the creation of effective international environmental regimes. Because of the importance of respecting a state's jurisdiction in the post-Westphalian international system, there remains a tension between

international environmental governance and state sovereignty. Early regime theory establishes that a state's choice to abide by either formal or informal regime rules or norms requires the sacrificing of some of its sovereignty (Krasner 1982a). This phenomenon is represented within issues of international environmental regimes by Principle 21 of the 1972 UNCHE, which outlines that "states have…the sovereign right to exploit their own resources pursuant to their own environmental policies." In addition to the establishment of state sovereignty, however, this principle also imparts onto states "the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction" (UN General Assembly1973, 5).

Effective regimes must remain respectful of state sovereignty in order to gain support from states. However, in order to achieve their goals of combatting environmental degradation, they must create certain restrictions. This principle from one of the earliest instances of international environmental governance outlines the tension of creating environmental governance that respects the sovereignty of states to operate freely on their own land without causing negative effects on other states.

The scientific complexity of environmental issues presents a third barrier to effective climate governance. Environmental degradation, from climate change to ozone depletion, are multifaceted in nature and complex to solve. Policymakers, thus, must be in communication with scientific experts in order to integrate environmental consciousness into their policy solutions. Furthermore, the novelty of anthropogenic environmental change leaves significant uncertainty about how to best mitigate or reverse

its effects (Downie 2015). This overall scientific complexity presents additional challenge.

A final challenge faced in crafting international environmental regimes is the overlap of environmental issues with other issue areas of global governance, in particular security and economic concerns. The protection of state security plays a central role in any state actor's evaluation of the international system. Traditional security threats, such as military capability and conquest, therefore, are considered issues of high politics, while environmental issues tend to remain lower on national and international political agendas (Axelrod and VanDeveer 2019, 12). This general distinction of the environment as a lesser political issue, however, is not reflective of the reality of environmental degradation around the world.

The changing nature of the environment poses a serious security threat to many states. Some nations face dangerous air or water quality levels that put individuals at risk, while others face the loss of coastline to rising sea levels. Despite these clear threats to human and state security emerging, many environmental institutions and regimes still "lack adequate funding" or "effective enforcement mechanisms" (Axelrod and VanDeveer 2019, 2). Instead of funneling resources into the mitigation of climate threats, states have largely elected to dedicating their efforts to combatting more traditional security threats. This clear relegation of environmental issues to an inferior status has led to a wide failure of states to act decisively in response to potentially dangerous climate changes (Axelrod and VanDeveer 2019).

Furthermore, there is complicated interplay of climate governance with economic trade governance. Some scholars argue that the mobilization of a free marketplace

through international trade regimes emphasizes the creation of "new technologies and the significance of the international environmental regulatory context," thus establishing a more conducive setting for environmental regimes to operate in (Eckersley 2009, 15). However, others abide by the notion that the two areas are opposed. They argue that environmental regimes present additional regulations to states and other non-state actors, which lead to incentive for defection in the name of economic free trade (Levy and Prakash 2003).

One particular example of this potential contention is in distributional responsibilities. While trade regimes advocate for the "principles of non-discrimination and reciprocity," environmental regimes tend to abide by the "common but differentiated responsibilities" (Eckersley 2009, 13-14). As seen in the "relocation of emissions-intensive industry to developing countries," economic actors have utilized the free trade policies of the WTO to circumvent emissions regulations imposed by the Kyoto Protocol (Eckersley 2009, 15). These types of discursive conflicts between trade and climate regimes, thus, can lead to serious consequences for the state of the climate. [3]

As illustrated in this previous section, the complex nature of environmental issues, the tension between international environmental governance and state sovereignty, and the interplay of environment governance with security and economic governance have the potential to present challenges to the creation of effective and widely supported international environmental regimes. This understanding will help to inform the difficulties in studying environmental regimes described in the next section.

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[3] Although not discussed in detail here, the next section will consider how multinational corporations, having considerable material capacity in the international arena, have become essential actors in the international environmental regime development process.

II.   Regime Effectiveness

To inform the future direction of global governance, many contemporary scholars of international regime theory aim to understand the factors that contribute to a functional and impactful regime. Similar to how sustained periods of observable regime impact can only emerge from a fully developed regime, the regime theory's current focus on regime impact has been a progression from a scholarship that originally focused on the regime development process. This process begins with the regime formation and regime implementation phases, followed by the regime impact on the issue area.

The distinction in these three phases of regime development is clarified in Figure 1.1 in the introduction to the book *Environmental Regime Effectiveness* (Underdal et al. 2002, 5-7). The first step in this regime process is behavioral *output*, or the formation of "the norms, principles, and rules constituting the regime itself" by involved actors. Following this output phase, there is the regime *outcome*, or the implementation of regime measures by involved actors. Finally, these behaviors lead to an *impact* on the target issue area. These three distinctive phases of output, outcome, and impact have informed the structure of regime theory scholarship for decades. The next section briefly discusses the first two phases of the regime development process before deeply exploring the literature of regime effectiveness.

A. Regime Formation

The early years of regime theory scholarship focused on the outcome of cooperative state behaviors, or on the regime formation process. The post-1945 era has seen unprecedented amounts of institution-building that has sparked the development of a literature on regimes. Operating within a realist-dominated international relations

discipline, however, scholars have been challenged to reconsider their understanding of the international system by developing alternative theoretical explanations for why international regimes were being created. With this new outlook on global political institutions, early regime theory scholarship asked questions such as why certain problems make the international system converge, how these issues make it to an international agenda, which states become involved in the regime formation process, and what bargaining processes look like (Breitmeier et al. 2006, 6; Young et al. 1995).

These informed discussions make clearer the conditions and factors that lead to the formation of regimes. The scholarship suggests that actors within the international system are more likely to formulate international regimes when there are lower costs of regulation and negotiation, when there is a high level of public concern, when there is scientific certainty around the issue, when there is support from important global actors, and when there is symmetry in power between the participants (DeVos et al. 2013, 110-111). Understanding these types of insights regarding the formation of regimes is a first step towards the creation of more impactful future institutions. "Still, a concentration on processes of regime formation," Breitmeier and his colleagues explain, "is obviously insufficient to produce a convincing case for the allocation of time and energy to the development of regime theory" (2006, 6). To better determine if and when regimes are a worthwhile use of resources for global actors, scholars have progressed into the implementation and effectiveness phases of the regime development process.

B. Regime Implementation

In uniting to form the principles, norms, rules, or decision-making procedures that constitute an international regime, global actors acknowledge the need for coordinated

change in the international arena. Even with legal commitment, however, change will not take place unless these actors follow through on their agreed-upon obligations (Victor et al. 1998). Therefore, the scholarship concerned with regime success and failure has moved past studying the regime *output*, or the regime formation phase, and looked to the regime outcome, or the regime implementation phase (Underdal et al. 2002, 5-7). These scholars are largely concerned with the conversion of regime "commitments into action" (Victor et al. 1998, back cover).

In operationalizing the degree of regime implementation, scholars often use measures of "goal attainment, compliance, behavioral change, social learning and the initiation of social practices" (Kütting 2000, 32). These types of indicators, when taken together, paint a well-rounded picture of how well the formation of the regime has changed the behaviors of participants toward the achievement of regime goals. In other words, an analysis of regime implementation measures how successfully the regime serves its role as a behavior-altering institution. [4]

Victor and his colleagues in their 1998 book on environmental regime implementation helpfully break down this investigative process into two separate levels of analysis. Firstly, they look at the global "institutions through which the parties share information, compare activities, review performance, handle noncompliance, and adjust commitments" (Victor et al.1998, 3). These mechanisms operate at the international level to hold actors accountable for their obligations. Moving beyond this international level of analysis, however, the authors focus on national implementation. The scholars concede

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[4]Serving as a behavior-altering institution does not necessarily indicate an effective regime outcome. Rather, a properly formed and well-implemented regime still may see an underwhelming impact on the issue area. This will be further discussed in the forthcoming section.

that there is no single pattern for domestic implementation practice. Rather, it depends on the participation and dedication of governmental bodies, corporate actors, environmental groups, and experts (Victor et al.1998). These international and national levels of regime implementation are pulled together by scholars to form a larger measure of how well the commitments to the institution are being fulfilled.

C. Regime Effectiveness: Institutional

Similar to how regime formation does not guarantee the implementation of its commitments, an implemented regime does not promise positive environmental change (DeVos et al. 2013). Therefore, to gauge how well the international community is handing the ecological problems at hand, a number of scholars have looked past the *output* and *outcome* phases of regime development to the *impact*, or effectiveness phase.

Regime effectiveness, in its basic form, can be defined as "the extent to which regimes contribute to solving or mitigating the problems that motivate those who create them" (Young 2014, 275). This critical assessment gauges how impactful these institutions are in dealing with their issue area (Young and Levy 1999; Andresen and Hey 2005). In an ideal world, regime effectiveness would measure how the presence of the regime changed its goal-related outcomes (Breitmeier 2013, 162; Young 2014, 275). However, this type of evaluation would involve comparing the resulting post-regime reality to a nonexistent non-regime reality (Breitmeier 2013; Young 2014). The lack of a genuine counterfactual for comparison, therefore, makes establishing causality between a regime's presence and an outcome challenging in most cases, if not impossible. Without a way to directly measure regime effectiveness, scholars within the field have debated the appropriateness of substitute measures for much of the past three decades.

The mechanisms for measuring effectiveness take a variety of forms, from goal achievement analysis to behavioral change monitoring. Instead of simply listing them, this next section will organize the commonly employed methods for measuring environmental regime effectiveness into five categories: problem-solving, legal, economic, normative, and political [5]. While there exists overlap between the categories, this classification provides a helpful synthesis of the approaches to defining and measuring regime effectiveness.

Some scholars of international environmental regimes still adopt a problem-solving approach that measures "the degree to which a regime eliminates or alleviates the problem that prompts its creation" (Young and Levy 1999, 4). By looking at the post-regime reality, scholars make judgements on how well or how poorly a regime performed in achieving desired solutions. As discussed above, however, there is difficulty in establishing a relationship between the presence of environmental regimes and changes to the environmental condition. With a range of actors and factors that are constantly contributing to the status of the environment, "it is perfectly possible, in most cases, that goal attainment is attributable to factors other than the existence and operation of the regimes themselves" (Breitmeier et al. 2006, 130). Without the ability to establish causality, many scholars have looked for more concretely grounded measurements. These include the legal, economic, normative, and political approaches.

The legal approach to defining regime effectiveness avoids this causality complication by assessing the outcome of the regime by "the degree to which contractual

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[5] These five categories have been taken from Young and Levy's effectiveness classifications from their 1999 piece on international environmental regime effectiveness.

obligations are met—rules are complied with, policies changed, programs initiated" (Young and Levy 1999, 4). A well-designed regime will feature rules and programs that properly address the problem at hand. In this case, the degree to which actors comply with these regulations serves as a substitute for how well a problem is managed.

While measures of legal compliance may be used for evaluating actors' responses to regime formation, it is worth noting that Breitmeier, Young, and Zürn conclude in their 2006 book that a strictly enforced approach to regime compliance, such as legal binding contract, actually results in less effective environmental regimes. Rather, they argue that a consensual management approach to compliance was more likely to lead to the fulfillment of regime goals.

The legal approach has been expanded into the economic approach, which looks at how efficient actors are in their pursuit of regime success. Between two regimes with identical compliance outcomes, the institution that imposes the least cost, whether related to startup or compliance, will be deemed more effective than the one with higher costs (Young and Levy 1999, 5). This approach is less telling of the problem-solving capacity of the regime. However, it may be incorporated by scholars into a larger measurement of regime effectiveness in order to assess how well the regime is functioning as an institution (Breitmeier 2013, 166-7).

The normative approach, while typically not used in and of itself, can be added onto other measurements of effectiveness to gauge the regime's participation, fairness, and justice (Young and Levy 1999, 5). On a base level, a regime with a wide range of participants will see the reinforcement of norms and institutions that are necessary for

regime success. Some scholars argue, however, that a just distribution of responsibility between these participants needs consideration.

Although concrete notions of fairness and justice may be difficult to apply across international borders, environmental regime formation has accounted for actors' relative contributions to environmental issues. The creation of a "just" environmental regime, thus, hinges on its ability to "include provisions which differentiate commitments or rights among industrialized and developing countries" (Stone 2004). [6]

Andresen and Hey also describe this phenomenon in their 2005 piece on environmental regime effectiveness and legitimacy. While the path to an effective environmental regime depends on both *developed* and *developing* states, the scholars argue that it is for different reasons. For developed states, who have contributed significantly to the degradation of the environment, regime effectiveness hinges on their willingness to invest financial and informational resources into policy creation and implementation. Developing states, who are navigating through what has been a historically detrimental development process, must also actively invest in the efforts to protect the environment (Andresen and Hey 2005). This differentiation between the role of developed and developing states demonstrates some of the benefits of using a justice-informed normative approach to regime effectiveness. While a normative approach to regime effectiveness may not fully account for the ability of a regime to change environmental outcomes, it does measures level of participation in the regime creation

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[6] One example of this "differentiation of commitments" can be seen in Article 3 Principle 1 of the 1992 United Nations Framework Convention on Climate Change (UNFCCC). This article states that "the Parties should protect the climate system for the benefit of present and future generations of humankind, *on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities*. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof" (United Nations Framework Convention on Climate Change 1992).

and implementation process and the distribution of responsibility for solving climate issues among participants.

Finally, Young and Levy describe the fifth, or political approach, to regime effectiveness. Based on the supposition that solutions to transboundary international environmental problems require the cooperation of many states, many regime theorists operate under the notion that functioning regimes are a precursor to solving environmental crises (DeVos et al. 2013, 102; Underdal 2002, 6; Young and Levy 1999). While a successful regime still may not fully resolve its issue area, they argue that no solution is even possible without one. Therefore, scholars of international environmental regimes employing this political approach conceptualize regimes as political institutions that cause changes "in the behavior of actors, in the interests of actors, or in the policies and performance of institutions in ways that contribute to positive management of the targeted problem" (Young and Levy 1999, 5). These institutions change behaviors, and thus, may lead to improvements on the environmental issue at hand.

This political approach, although similar, is distinct from the legal approach. While the legal approach uses an actor's compliance with contractual or noncontractual regime obligations to measure the regime's effectiveness, some scholars argues that this is not enough to capture the alignment of regime goals with an actor's interests. A regime, Breitmeier explains, can be considered an effective political body if the "compliance behaviour is caused by factors which are independent of the power and interests responsible for their initial creation" (Breitmeier 2013, 166). Therefore, rather than strictly looking at compliance, a behavioral change measurement assesses the ability of the regime to exercise power over actors. This analysis of how a regime can exercise

power over international actors is informed by the common practice of investigating power dynamics within international relations scholarship.

With these five approaches to employ, the regime effectiveness concept rarely abides by a singular approach. Breitmeier, Young, and Zürn, for example, define effectiveness as "the attainment of goals and progress toward solving the problems leading to their creation," using a combination of the problem-solving, legal, and political approaches (2006, 114). Wettestad and Andresen combine the political approach with regime design, as they measure "goal achievement of the agreement…and how far agreement content is equal to expert advice on what measures should be taken" (1991, 2, qtd. in Kütting 2000, 32). Rather than employing these measures in isolation, these five approaches are taken in conjunction by scholars to capture the wider breadth of the concept of regime effectiveness.

While the latter four of these five approaches are employed as measures of regime effectiveness, they are issues in using them as full substitutes for the solution attainment evaluation of the first problem-solving approach. Instead of evaluating the progress on the solution of transboundary environmental problems that caused the formation of the regime, the legal, economic, normative, and political approaches use behavioral change and regime goal attainment to infer how impactful it will be. These types of measurements are more indicative of how functional the regime is from a formation or implementation standpoint and less of how effective the regime is.

This problem in using implementation measurements for effectiveness is well-articulated by Werksman and his colleagues, who counter many traditional scholars when

they argue that "greater compliance is neither a sufficient nor necessary condition for effectiveness" (1996, 25). A regime that is unambitious in design may see high levels of compliance from participants but insufficient changes in regime impact on environmental improvement. Further, an actor's behavioral change may not be in full compliance with a regime with ambitious goals but may still be contributing to the solution of an environmental issue (Werksman et al. 1996, 25). As neither a necessary nor sufficient substitute for regime effectiveness, measurements of compliance and behavioral change are argued to be inadequate for accounting for regime effectiveness. Therefore, they argue that these substitute evaluations of regime formation, design, and implementation should be used with caution in scholarship about regime effectiveness.

D. Regime Effectiveness: Ecological

Because of the challenges presented by a problem-solving approach, international regime scholars have employed substitute measures of effectiveness, such as legal compliance and behavioral change. Many recent scholars, however, have rededicated themselves to using problem-solving measures to gauge regime effectiveness. In general, they argue that if environmental regimes have been created for the purpose of defending ecological values and if effectiveness is a measure of how well the regime achieved this purpose, there needs to be a greater effort by environmental regime scholars to deploy direct measurements of environmental problem solving (Kütting 2000; Underdal 2002; Jackson and Bührs 2015). This effort to assess the biophysical world, they argue, can be done through the adoption of ecological indicators into measures of regime effectiveness. In distinguishing between commonly employed strategies of studying effectiveness with this new ecologically minded approach, scholars describe the evaluation of regime

functioning as *institutional effectiveness* and the evaluation of the resulting environment as *ecological effectiveness*.

As explained earlier, using strictly institutional measures is helpful when assessing regime formation or regime implementation. These institutional measures capture the "consequences in the form of changes in human behavior" or regime *outcomes* (Underdal 2002, 6). These types of measures, however, cannot completely capture how much of an improvement the issues are seeing. Underdal argues for the measurement of regime *impact*, or the "consequences that materialize as changes in the state of the biophysical environment itself" (Underdal 2002, 6). These measures of regime impact, while difficult to employ, are necessary for the proper evaluation of the whole regime development process.

Kütting similarly critiques the use of strictly institutional measures of regime outcome. "If the paramount aim of an…agreement is to deal effectively with a specific environmental problem," she argues, "it is clear that neither the mere existence of an agreement nor possible high participation nor ultimate compliance should merit undue celebration without the crucial test of the adequacy of the international environmental agreement to deal with the specific problem nominally addressed" (Kütting 2000, 2-3). She argues that IR regime scholars have made too central the interactions of international actors without proper consideration for the outcomes of these interactions.

To remedy this tendency of IR scholars to hyper-focus on anthropocentric factors of "institutional" regime effectiveness, there is a need for the "re-embedding" of the interactions of international actors into its natural or environmental context. Through an evaluation of the economic, temporal, scientific, and regulatory structures at play in the

Mediterranean Action Plan (MAP) and the Convention on Long-Range Trans-boundary Air Pollution (CLRTAP), Kütting demonstrates how an institutional approach to effectiveness cannot both capture the outcomes and impact of regimes. While she does not present her own cohesive measure of environmental effectiveness, Kütting implores future scholars of environmental regime effectiveness to take "account of social, political, economic, scientific, technological, bureaucratic and temporal structures and factors" (Kütting 2000, 7). This "holistic approach," she argues, will be more conducive to the informing the future of international environmental regimes.

Wendy Jackson and Ton Bührs also acknowledge this methodological downfall within the existing environmental regime literature. "Behaviour change is an essential element of effectiveness and should also be part of any definition and evaluation," they acknowledge. "However, these evaluations are only half the task—the other half is examining if behavioural outcomes have resulted in any ecological impacts" (Jackson and Bührs 2015, 72). Like Underdal and Kütting, they argue that the inclusion of ecological factors into definitions of effectiveness is imperative to fully understanding the situational outcome. To achieve this, they suggest that IR scholars integrate cross-level and cross-temporal tactics used by conservation biologists to refine their conservation practices (Jackson and Bührs 2015, 81). However, recognizing that the establishment of causality is challenging, if not impossible, because of the variety of factors that play into ecological change, they believe scholars should aim for establishing "plausible correlation and explanations" rather than causality (Jackson and Bührs 2015, 77).

As demonstrated by the growing critique of strictly using institutional measures of effectiveness, there is a need for the employment of ecological effectiveness. While there

are a number of challenges to overcome in order to properly rededicate the scholarship to studying regime impact, it is a necessary progression. Another discussion of this topic can be found in the theoretical argument and methodology sections.

III. Non-State Actors and the Environment

Conventional regime theory scholarship has placed state actors at the center of its analysis (Levy and Prakash 2003, 131). This tendency to narrowly investigate state behavior is reflective of many traditional theoretical approaches to international relations, such as realist and liberal thinking. However, this focus has largely overlooked the complexities imposed by non-state actors, such as international governmental organizations, non-governmental organizations, and multinational corporations (Levy and Newell 2005). This section explores how non-state actors, in their respective ways, can have significant impacts on the international environmental governance system.

A. IGOs and Environmental Governance

With states as members, intergovernmental organizations (IGOs) are larger governing bodies formed for the purpose of facilitating action on transboundary issues. While states have the sovereignty to make autonomous decisions outside of the realm of an IGO, states may voluntarily agree to invest their time and resources into participating in the work of IGOs. This is because they are stakeholders in a host of international issues and because they have faith in the capabilities of IGOs in promoting cooperation and drafting solutions to complex issues (O'Neill 2019).

IGOs have formally been defined as "organizations that include at least three states as members, that have activities in several states, and that are created through a

formal intergovernmental agreement such as a treaty, charter, or statute" (Karns et al.

2015, 12). These formal institutions operate across borders internationally on a host of

issues, from global trade to economic development to human rights. As of 2014, about

265 different IGOs were in operation throughout the international system (Karns et al.

2015).

Despite their widespread use to solve a variety of issues, much of the work of

IGOs within the environmental realm has been completed by the United Nations System.

Since the 1972 UN Conference on the Human Environment in Stockholm and the

inception of the UNEP, the UN member states have seen coordinated efforts to reduce

carbon emissions, promote sustainable development, and create international

environmental law (O'Neill 2019).

Because of the voluntary nature of joining an IGO, these institutions face challenges,

such as lack of authority, difficulty in coordinating efforts, and inconsistent funding.

While this has caused setbacks in the creation of groundbreaking solutions to

environmental concerns, the secretariats and state diplomats and working in conjunction

with scientific subsidiary bodies have produced sustained, impressive efforts (O'Neill

2019).

B. NGOs and Environmental Governance

While IGOs can be seen as extensions of state power, non-governmental

organizations (NGOs) are often seen as extensions of civil society. As a range of

environmental problems have become increasingly important to members of the general

public, members of society, whether individuals or organizations, have increasingly

organized into coalitions of NGOs (O'Neill 2019). As entirely separate entities from

states with no direct decision-making capabilities, NGOs have entered environmental debated through nontraditional means.

These organizations aim to tackle a host of environmental topics through their influence over law and policy. During the agenda setting and negation stages, NGOs may lobby directly or partner with corporate actors to influence the decisions of policymakers. Information spreading tactics and public mobilization may also put pressure on state diplomats to be environmentally conscious in policy decisions (Burgiel and Wood, 2012). In the implementation stage, NGOs work to sustain the regime momentum by generating new information for public dissemination and monitoring the resulting actions of states and corporations. Beyond this, NGOs often work in transnational advocacy networks to exert pressure on international state actors (O'Neill 2019).

These NGO strategies have been increasingly impactful on global environmental governance since the 1990s. While their relative lack of monetary resources gives them a disadvantage to MNCs, these tactics caused the "dyadic bargaining between states and MNCs [to] develop into multiparty bargaining among NGOs, governments and firms" (Levy and Prakash 2003, 141). The collective voice of civil society has resulted in the growing prominence of environmental NGOs and the incorporation of NGO demands in bargaining agendas. Although this project is not focused on the implications of NGOs on climate governance, they are playing an increasingly vital role in the development of environmental regimes.

C. MNCs and Environmental Governance

The study of IGOs and NGOs in relation to environmental political realms is helpful in understanding how the international community attempts to deal with the

negative effects of environmental degradation. An analysis of the role of multinational corporations (MNCs) can also contribute to this discussion. Before delving into the role of MNCs in the creation of international environmental policy, however, it is helpful to trace the origins of environmental degradation to trends of globalization and harmful business practices.

The growth of global economic activity has demonstrated impacts on the environment. As globalization has flourished, particularly over the past half century, industrialized business practices have degraded ecological integrity. Mittelmann explains that the "large scale growth in world economic output...has not only quickened the breakdown of the global resource base, but also has upset the planet's regenerative system" (1998, 847). The decreasing cost and increasing accessibility of production and transportation practices have caused intensive growth in the amounts of waste and pollution contaminating air, land, and water sources around the world (Newell 1999). The export-led agricultural market has caused an increase in the use of "damaging pesticides" and "endangered local food security" (Newell 1999, 2). These few examples represent a small sample of the business practices that have simultaneously brought economic prosperity to many humans and harmful changes to the ecology of the earth.

This corporate force described above that give MNCs the power to destroy, however, also give them the ability to forge meaningful change. Newell (1999) sums up the impressive prowess of multinational corporations in the realm of international environmental regimes.

> With annual turnovers that dwarf the GDPs of most Least Developed
> Countries, and the ability to make investments with enormous natural
> resource implications, as well as control of the technology and capital that
> is likely to be the vehicle for the implementation of many international

environmental agreements, companies are central agents in the
environmental debate (Newell 1999, 4).

This base understanding of the relationship between corporate action and environmental

decay has informed the development of a new body of literature regarding the role of

multinational corporations (MNCs) in international regimes.

With MNCs being actors of considerable importance in the realm of climate

governance, many scholars have sought to define exactly how they interact and engage,

directly or indirectly, in environmental diplomacy. Falkner breaks these actions and

influences in environmental diplomacy into four categories (2008, 8-10). First, MNCs

engage in lobbying through both financial means and the generation and spread of

information (Kolk and Pinkse 2007). From having a "formal voice in advisory panels" to

"authoring and reviewing scientific reports," the voice of international business is strong

in the ears of politicians (Levy and Newell 2005, 4). Secondly, during the regime

implementation phase, MNCs may engage in the regulation of business practices or the

innovation of new technologies to comply with regime policies. They may alternately

decide to defect through the process of "regulatory capture" to weaken the national

implementation of environmental regulation (Falkner 2008, 9). Either way, corporate

actors are critical in the implementation and technological innovation of the regime.

Next, Falkner highlights MNCs' ability to shape public discourses around

environmental issues. With influence over consumer bases, MNCs may "inject a more

business-friendly perspective on regulatory politics" that garners wider support for

deregulation (Falkner 2008, 10). These public perspectives will, in turn, impact the

agenda of politicians. Finally, MNCs engage in their own private norm and rule-setting.

Some businesses actors, succumbing to pressure from activist or consumer groups, establish their own corporate rules for environmentally sustainable practices (Falkner 2008, 10; Kolk and Pinkse 2007). Although not widespread, this strategy of "self-regulation" is becoming more common with mounting pressure from civil society actors. This sampling of strategies explains how the profit-seeking tendencies of MNCs are able to influence the development of international environmental regimes.

While much of early regime theory took a state-centric approach to regime analysis, contemporary scholars have made an effort to account for the nuances imposed by business actors on regime development. Some regime theory scholars, therefore, have incorporated elements of international business and international political economy (IPE) literature (Levy and Prakash 2003; Vormedal 2010). By considering more seriously the pressures of the global economy concerns, scholars of this IPE-informed regime theory consider economic capital as a driver in political decision making. Hence, capital-driven, profit-seeking entities like MNCs can become powerful actors in the international system by directly influencing the decisions of state actors (Betsill 2006).

While some scholars aim to capture the influential nature of capital itself through the mere incorporation of IPE ideas, others prefer to describe the relationship between the state and corporate elites further. Seeing an inability for traditional realist or liberal theory to account for the influence of corporate actors in policy, transnational historic materialism (THM), a theoretical offshoot of the Gramscian tradition, has emerged (Palan and Overbeek 2012, 162). THM argues that a global political order is established by "a transnational historic bloc, comprising a coalition of businesses intellectuals and state managers that transcends any one class and is bound together through common identities

and interests by material and ideological structures" (Levy and Egan 2000, 139). When applied to international environmental regimes, the focus that THM has placed on the economic, social, and political influence of the transnational historic bloc allows for a wider analysis of the "relationship between regimes and broader relations of power" in the international system (Levy and Newell 2005, 86). This type of inquiry has thus balanced the importance of state actors in regime formation processes with other non-state actors and social factors.

Some regime scholars who are concerned with MNCs have fully integrated the corporate and social considerations of THM into their research. Others argue that the application of this Gramscian framework to international regime scholarship puts far too much weight on non-state actors during the development of global governance structures (Levy and Prakash 2003). Despite the argument over the source and strength of corporate influence, these scholars do agree that MNCs belong alongside states in scholarly discussion of regime development. Therefore, IPE-informed regime scholarship continues to seek insight on why and how MNCs involve themselves the development of international environmental regimes.

To acquire a full understanding of the corporate impact on international environmental regimes, we begin with a general description of the relationship of corporations to international regimes. Many international regimes through the enacting of rules, norms, and policies have an effect on the economic marketplace. Describing this phenomenon, Levy and Egan explain international regimes as exhibiting market-enabling or regulatory qualities. Market-enabling regimes, in general, offer "the infrastructure of a

neo-liberal world trade and investment regime and in which multinational capital is highly influential and supportive" (Levy and Egan 2000, 139). These regimes, through the propagation of the neoliberal principle of a fair but competitive marketplace, facilitate business practices and relations. In a later piece, Levy and Prakash further explain that "MNCs tend to support the creation of market enabling regimes at the international level" (2003, 147). These regimes cultivate an equally competitive global marketplace that benefits businesses.

Regulatory regimes, on the other hand, create barriers to business relations through the enacting of governing parameters for "negotiating and promulgating social, labour and environmental policies" (Levy and Egan 2000, 139). These rules, particularly when enacted at an international level, garner opposition from business actors (Levy and Prakash 2003, 147).

International environmental regimes, through the enactment of ecological rules, norms, and policies, are commonly classified as regulatory. Much of the early scholarship within the subfield, thus, abides by this notion that MNCs are resistant to global regulatory environmental governance during the regime formation and implementation stages. With widespread industrial business practices being a primary driver of environmental degradation (Mittelman 1998; Newell 1999), the introduction of a host of international environmental regimes brought MNCs increasingly restrictive conditions under which they had to operate. Due to these additional barriers, throughout the 1960s and 1970s "corporate involvement in international environmental politics was limited to occasional, and largely reactive, interventions to prevent burdensome regulations" (Falkner 2008, 4). Business, when faced with environmental regulation, had, and

continues to have, incentives to defect. Thus, the interaction between environmental regimes and MNCs was explained as oppositional and uncooperative.

While the literature suggests that corporations are generally opposed to environmental regulation, contemporary scholarship on corporate strategy has begun to look for circumstances where this does not hold true. Falkner argues that environmental regulation may offer corporations, for example, the opportunity to "reduce pollution while simultaneously reducing fuel and material expenses and the costs of waste disposal, insurance, legal fees, and liability" (2008, 92). These types of process improvements may provide economic incentives for firms to support regulatory policy. Additionally, he investigates the importance of a corporation's public image in its choice of environmental policy. He suggests that the advancement of environmental protection as a social value and the emergence of corporate social responsibility as a driving factor in corporate strategy has caused "a growing number of corporations [have begun] to integrate environmental objectives into their business operations…and develop more progressive political strategies" (Falkner 2008, 4). The positive public image that comes with environmental protection, thus, may drive corporations to pursue more regulatory strategies.

Analyses of a corporation's position in the wider marketplace also reveals an insightful interpretation of the subfield. Levy and Prakash suggest that companies may gain an advantage over competitors if they have "lower compliance costs" or are "better situated to innovate" in the face of environmental regulation (Levy and Prakash 2003, 137). Kennard further endorses this idea in her 2020 analysis of large oil firms' responses

to air pollution regulation. She concludes that certain firms may choose to support the enactment of regulatory climate policy when those policies impose higher costs on their competition (Kennard 2020). Climate regulation can, under certain circumstances, become a strategic way to gain competitive advantage to other firms. There is growing consensus that "MNCs pay close attention not to regulation per se, but rather to the regulatory costs they bear in relation to their market competitors" (Levy and Prakash 2003, 136).

Vormedal develops an alternative framework to explain the general stance of business actors facing environmental regulation. He argues that, in the life cycle of environmental regimes, there is a 'tipping point' after which business strategies shift "from opposition to support for international regulation through regimes" (2010, 252). This tipping point can be explained by the socialization of norms and the integration of these ideas into acceptable business practices. Although from a strictly material perspective, corporations may be at odds with environmental regulation, these scholars have demonstrated how discussions of corporate strategy in a dynamic social world can provide a more nuanced interpretation of the business relationship to regulatory environmental regimes.

These types of nuances in the interactions of MNCs and environmental regimes has led scholars to tweak the strict definition of a regime as market-enabling or regulatory. While classifying a regime as either market-enabling or regulatory is attractively simple, many acknowledge that regimes do not fit squarely into one category. Rather, "many regimes have a complex, hybrid nature, which requires decomposition for the sake of analysis" (Levy and Prakash 2003, 135). Addressing environmental regimes

specifically, Young concurs with this conclusion when he argues that "a sizeable proportion of the success of environmental regimes is attributable to activities that are not regulatory in the ordinary sense" (Young 2014, 279). These scholars contend that each regime, regardless of its issue area, features its own combination of market-enabling and regulatory characteristics that merit deeper analysis.

To complete this regime-by-regime analysis of its relationship to the market, Young suggests looking specifically at the practices and implications of the regime. For environmental regimes, this includes a deeper dive into the programmatic activities, knowledge generation and dissemination tactics, and generation of new markets for technologies (Young 2014). He suggests that this analysis will reveal some international environmental regimes to be less reliant on market regulatory activities and lean toward a market-enabling categorization. With this analysis, one can better understand the nature of an environmental regime as more market-enabling or regulatory.

IV. Theoretical Argument

The literature provides a good base for investigating the impact of multinational corporations on international environmental regime effectiveness. It is clear that non-state actors, such as MNCs, are playing an increasingly important role in the development of international environmental regimes. By looking to the implications of environmental regimes on the market, we can define these regimes according to Levy and Egan's classification of regimes as *market-enabling* or *regulatory*. Then, we may generalize the tendencies of MNCs to support or oppose the regime (Levy and Egan 2000; Levy and Prakash 2003). With the support or opposition of powerful multinational corporations, I

offer two hypotheses regarding the resulting effectiveness of international environmental regimes.

A. Hypothesis One

When an international environmental regime is market-enabling, it will be more institutionally effectively than one that is regulatory.

If evaluating regime effectiveness through institutional indicators such as behavioral change, compliance, and goal attainment, I expect to see higher levels of effectiveness from regimes that are enabling rather than regulatory. In general, multinational corporations tend to support market-enabling regimes over regulatory regimes. Thus, when a regime's provisions are conducive to corporate interest or action, the involved MNCs will be more willing to exercise their economic power, resources, and efforts to abide by regime standards. These higher levels of actor compliance and behavioral change will, thus, lead to a more institutionally effective regime. In a more regulatory regime, on the other hand, the regime's primary goal is to constrain the free market economy. As a result, there would presumably be more pushback from the actors involved during the regime formation and implementation process, creating a less institutionally effective regime.

B. Hypothesis Two

When an international environmental regime is market-enabling, it will be less effective ecologically than one that is regulatory.

While institutional support is essential for the implementation of a regime, scholars have demonstrated the need for an environmentally informed approach to determining the impact of international environmental regimes. By implementing environmental, or impact-driven, indicators in a measure of ecological regime

effectiveness, I expect to see that market-enabling environmental regimes are less

ecologically effective than those that are regulatory. This expectation comes from the

notion that globalized corporate practices are environmentally damaging. A regime that

employs a market-enabling approach, as opposed to a regulatory approach, will be more

conducive to the continued use of these practices by corporate actors. This freedom to

continue operating in an unregulated marketplace will, thus, cause negative impacts on

the environment, as it has historically. A regulatory regime, on the other hand, will

impose harsher regulations or restrictions on state and firm behavior. While some state

and corporate actors will push back against these harsher regulations, I argue that the

positive behavioral changes brought about by these additional regulations will cause an

overall benefit in the level of observable ecological regime impact. The two hypotheses

are illustrated diagrammatically in the table below.

Table 2.1 Diagram of Hypotheses

| Independent: Whether the regime is market-enabling | + → | Dependent: Level of institutional regime effectiveness |
| | − → | Dependent: Level of ecological regime effectiveness |
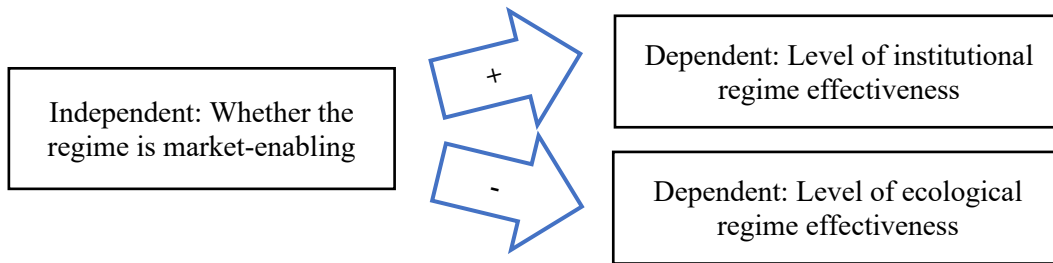
C. Additional Comments and Expectations for Findings

In creating the arrow diagram, there was some uncertainty over the proper

treatment of institutional and ecological effectiveness in relation to one another. This

section explains reasoning for employing them as two separate independent variables.

As discussed in the review of regime effectiveness literature, scholars commonly argue that the solution to transnational environmental issues require the cooperation of a host of state, corporate, and civil society actors (Young and Levy 1999; Underdal 2002, 6; DeVos et al. 2013, 102). The effective functioning of an environmental regime, thus, is considered a precondition to the solution of problems. If this functioning of a regime can be equated to its institutional effectiveness, and the resulting impact of the regime equated to ecological effectiveness, then this argument from scholars suggests that a high level of institutional effectiveness is a necessary but not sufficient condition for a high resulting level of ecological effectiveness.

Broken down, this argument would have two parts. A regime that is defined as institutionally effective may be either ecologically effective or ineffective. However, if a regime is institutionally ineffective, it may only be ecologically ineffective.

This type of theoretical explanation, when applied to this project, would result in a more linear argument like the arrow diagram illustrates. A regulatory regime could result in a higher ecological effectiveness if, and only if, there was an increase in the institutional effectiveness of the regime.

Table 2.2 Preliminary Arrow Diagram of Hypothesis
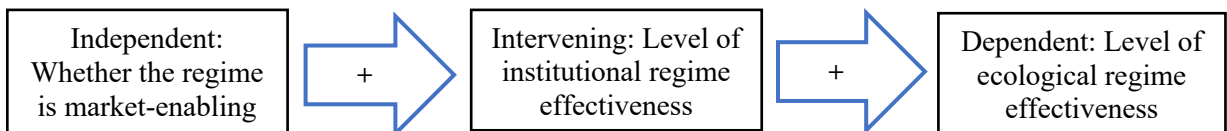
While these types of effectiveness may move together in many cases, I expect to see that differences in the regime's treatment of the economic marketplace will cause their decoupling. Thus, when the regime is considered regulatory, institutional

effectiveness is not a precondition for ecological effectiveness. That is, a regulatory regime can be simultaneously institutionally ineffective and ecologically effective.

The commonly used measures of institutional effectiveness, such as compliance, behavioral change, and goal attainment do relate to regime impact, or in this case, the ecological effectiveness of the regime. However, these institutional measures may be, under certain conditions, neither "necessary nor sufficient condition[s] for effectiveness" (Mitchell 1994, 25; Kütting 2000, 30). With this in mind, I argue that a regulatory regime is one condition where institutional and ecological effectiveness are not linked.

Regulatory regimes, because of their goals of seriously altering the behaviors of state and corporate actors, are innately ambitious. When these ambitious regime goals are not fully met by participants, they may be considered institutionally ineffective. However, in this case, the behavioral changes that do take place still may result in positive environmental or ecological effects, rendering the regime ecologically effective. This potential for the decoupling of institutional and ecological effectiveness is why these concepts are employed as two separate independent variables in this study. While they may move together in certain circumstances, it is possible that they will not when the regime is strictly regulatory.

This study operates at the largely understudied overlap of environmental regime effectiveness literature and corporate interest in environmental regulation. While there is extensive literature building in each of these areas, a solid marriage of the two field concepts has still not developed. This project is complex by nature but could serve as a valuable base for the expansion of a market-informed regime analysis.

If both of these hypotheses are supported by the research, it will have two main implications on the future of environmental regimes. Firstly, supported hypotheses would demonstrate the value of regulation to the creation of impactful environmental change. There is a complicated relationship of corporate actors to environmental regime regulations. While tough regulations may lead to push back from corporate and state actors, confirmed hypotheses would show that the benefits from regulating more strictly could outweigh the cost of noncompliance.

Additionally, if supported, however, the hypotheses would bring further evidence against the use of strictly institutional measures for capturing the concept of environmental regime effectiveness. The scholarship is currently relying on institutional indicators of success. However, by demonstrating how the measures of institutional and ecological effectiveness can be decoupled, this project could lead to additional speculation on this academic practice.

Chapter 3: Methodology

This third chapter begins by revisiting the study's hypotheses regarding the relationship of market-enabling or regulatory regime structure to environmental regime effectiveness. The next section outlines the most similar comparative case study methodology which is used assess the research question. The final section justifies the case selection and sets forth a plan the operationalization of the variables, particularly an explanation of how to properly code international environmental regimes as regulatory or market-enabling and assess their effectiveness, both institutionally and ecologically.

I.   Hypotheses

The hypothesis states that that market-enabling environmental regimes will be more institutionally effective than regimes that strictly regulate the marketplace. Simultaneously, market-enabling regimes are expected to be less ecologically effective than those that are regulatory in nature. These two hypotheses are illustrated in the table below.

Table 3.1 Table of Hypotheses Relationship

		Type of Effectiveness	
		Institutional Effectiveness	Ecological Effectiveness
Regime Type	Market-Enabling	+	—
	Strictly Regulatory	—	+

II.   Methodology

In order to carry out a comprehensive analysis of the impact of enabling the marketplace in international environmental regimes on their effectiveness, this project

employs a comparative case study methodology. An in-depth qualitative examination of two or more particular instances of a phenomenon, the comparative case study is an appropriate way to begin investigating the relatively small population of international environmental regimes (Howard 2017).

The comparative case study method to be deployed is Mill's Method of Difference, which is named for its treatment of the study-variables, or variables of interest (Mill 1869). Researchers select cases with different values on the independent variables, similar case characteristics, and different values on the dependent variables (Van Evera 1997, 57). By "comparing multiple cases that have been selected to be as similar as possible on as many variables as possible," one can "logically preclude these variables as possible causes" (Powner 2015, 124). In other words, when there is a difference in the outcome of interest and the other case characteristics are controlled for, one can eliminate many potential causes eliminated and may begin to see a relationship emerge between the variables of interest. This project investigates four cases, two market-enabling regimes and two regulatory regimes, whose comparison will allow for the analysis of both of the hypotheses.

While there are drawbacks to any non-experimental design, Mill's two methods are generally seen as weaker options for comparative case methodology within the social sciences because their reliance on case selection often compromises the validity of the research. Nonetheless, a comparative case study methodology has the potential of maintaining high levels of internal validity, or the demonstration of a relationship (or lack thereof) between the independent and dependent variables. Within Mill's Method of Difference, the selection of cases with similar values of control variables allows the

relationship of interest to emerge. However, because political phenomena cannot be experimentally altered to control for confounding variables, it can be difficult to find a sample cases that will allow for the proper and logical application of the method (Van Evera 1997, 58; Powner 2015, 125). The selection of these most similar cases, while unlikely to be perfect, will be absolutely essential for guaranteeing higher levels of internal validity in the study.

Comparative case study methods, like the Method of Difference, can also have high external validity, or applicability to a non-study context. This is because the sample of cases that a researcher selects within an observational research design comes from directly from the wider population of cases. By becoming familiar with nuances of the relevant cases, researchers employing a comparative case study can understand their workings of their samples and make well-informed conclusions. Small-n comparative case studies, however, do face a breach in external validity (Powner 2015, 125). Because this method uses a much smaller selection of cases to explore a larger population, there can be questions of how generalizable those cases are to a wider context.

Seeing that the population of international environmental regimes is relatively small, it must be recognized that the conclusions to this study will not be sufficient for application to a wider context without additional trial. The value of Mill's Method of Difference, however, is not in establishing causality, but in "identifying covariation as a precursor to causal claims" (Powner 2015, 126). With this in mind, this investigation of cases will be a strong base on which future research can expand. The external validity of the study will grow as more cases are explored.

III.   Justification of Case Selection

Van Evera, in his chapter on the case study methodology, argues that scholars should "select cases that best serve the purpose of their inquiry" and that "maximize the strength and number of tests they let the investigator perform" (Van Evera 1997, 78). Considering his list of important factors to consider when selecting the sample for a comparative case study [7], the cases for this study have been selected based on similarity in background conditions, the availability of data, relevance to current policy concerns, and variance on the independent and dependent variables.

In narrowing down the cases, I compiled a list of seventeen commonly cited international environmental regimes from the literature. This list could be categorized into regimes that involved wider global action, such as the hazardous waste regime, versus narrower regional action, such as the pan-European air pollution regime. Taking the nine global regimes on the list, I looked to the cases of with markedly similar calibers of problems, comparable periods of regime formation and development, and available data. Because of the small population of cases to begin with, there will be variables that cannot possibly be controlled for between the four cases. However, these aforementioned similarities led to the selection four cases: the stratospheric ozone regime, the climate change regime, the global oceans regime, and the biodiversity regime.

The stratospheric ozone regime and climate change regime can generally be described as market-enabling regimes. On the other hand, the global oceans regime and the biodiversity regime are more strictly regulatory. These four regimes are all embedded

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[7] For a method of difference methodology, the most important considerations were "data richness; extreme values on the independent variable, dependent variable, or condition variable; the resemblance of case background conditions to the conditions of current policy problems; the appropriateness for controlled comparison with other cases; and appropriateness for replication of previous tests" (Van Evera 1997, 77-8).

within the United Nations system, a major institution in environmental governance, giving them institutional comparability. Although there are varying degrees of civil society mobilization around each particular issue area, these four issues are widely recognized and publicized by actors around the globe as serious concerns. The timeframes are a bit widespread, with the earliest institutional concretization of the biodiversity regime in 1973, the ocean regime dating to 1982, the stratospheric ozone regime formalizing in 1985, and the climate change regime coming into being in 1992. However, as each regime has been in place for nearly three decades and has seen follow up action from the participants, there is a considerable degree of comparability across the cases.

IV. Operationalizing Variables

A. Independent Variable: Market-Enabling or Regulatory

As discussed in the literature review, international environmental regimes are generally seen as regulatory because of their tendency to "restrict market opportunities for MNCs and create costly compliance requirements" in order to achieve their goals (Levy and Prakash 2003, 133). Despite these clear constraints on business, environmental regimes often utilize non-regulatory mechanisms as well (Young 2014). Some regimes are able to use of restrictions to encourage new technologies to be created by the private sector (Levy and Prakash 2003). This creation of new markets opportunities to be filled by corporations stimulates certain MNC businesses, encouraging compliance even when there are regulations present.

While looking at the action plans of the regime agreements in question, this distinction in the regime design's main practices will be used to code an international

environmental regime as *market-enabling* or *regulatory*. A regime whose method of

action relies strictly on changing actors' behaviors through guidelines or regulation will

be coded as *regulatory*. Regimes that rely more heavily on technology development as a

means of encouraging compliance, will be coded as *market-enabling*, even if regulation is

also an implemented strategy.

A. Dependent Variable 1: Institutional Effectiveness

There is an ongoing scholarly debate over how to create a measure of regime

effectiveness. Much of the literature suggests that institutional effectiveness can be

gauged at both the design stage and implementation stage of the regime process

(Breitmeier 2013, 166-7). Both of these stages are considered in the four-point scale seen

in *Table 3.2*, which measures institutional effectiveness. The first two indicators deal

with the efficiency and persistence of the regime's inception, while the second two

indicators largely tackle the implementation of the regime's agreement. With one point

rewarded for each indicator checked off, the point system works as follows.

Table 3.2 Measure of Institutional Effectiveness

	The agreement was completed on the prescribed timeline without major hold ups. (1)
	The institutional framework has been revisited and updated at least once since its original inception. (1)
	There are mechanisms in place for the enforcement of the agreement, such as inspections or reporting. (1)
	The regime features mechanisms for the generation and widespread distribution of information. (1)
Total	*4 – institutionally effective, 3 – largely institutionally effective, 2 – partially institutionally effective, 1/0 – institutionally ineffective*

With the presence of all four indicators, a regime is considered *institutionally*

effective, as it has been expertly drafted and carried out. With three of the indicators met,

the regime is deemed *largely institutionally effective*. Two indicators yield a *partially institutionally effective* regime. Finally, with one or zero indicators met, the regime is coded as *institutionally ineffective*.

B. Dependent Variable 2: Ecological Effectiveness

Because variety of influences that contribute to environmental issues, attributing the post-regime environmental reality to the action of the regime is incredibly difficult, if not entirely impossible (Jackson and Bührs 2015). As a result, strictly using pre-regime and post-regime indicators of overall global environmental health for comparison will not be fruitful. To avoid this issue while gaining an understanding of how well a regime solves its problem, researchers have historically used measures of goal attainment. While using a regime's own guidelines for success may be helpful in measuring effectiveness, one must be critical of the goals themselves, as they may be achieved thoroughly but fail to address the original problem (Breitmeier 2013). While each measurement method is problematic individually, using them together can help balance out these issues.

This study makes use of a behavioral-environmental hybrid measurement method, which takes into account the regime's goal attainment in addition to ecological measures. Noting that the regimes in question are environmental in nature, the chosen indicators aim to capture the behavioral-environmental balance described above by engaging with the goals of the agreements themselves.

Below is the four-point system for categorizing a regime's level of ecological effectiveness. The first indicator looks at the ecological validity of the regime design. A regime may be able to change behavior to meet its goals, but if those goals are not ground in the recommendations of scientific discourse, their impact on the environment would be

minimal. Finally, the fourth indicator considers the overall environmental changes taking place. When taken alone, overall biophysical indicators cannot be traced back to a regime. However, taken with these other three measurements, it can hold value in assessing the larger impact of the regime.

The second and third indicators focus on behavioral change and goal attainment. If the main means by which international regimes attain their goals is to change the accepted social, political, or economic norms, it seems fair to judge the regime on the breadth and depth of its impact on behavioral change. A threshold of 85% of signatories changing their behavior would indicate a strong social pressure and a significant change in the accepted norms. If a strong majority, or 70% of the signatories were to meet the regulations set forth by the regime, it could be said that this social change being implemented largely met the goals of the regime. Although there are no widely accepted thresholds for determining effectiveness in behavioral change, these two measures together signify tangible change.

Similar to the measure of institutional effectiveness, the scoring of ecological effectiveness can deem the regime *ecologically effective*, *largely ecologically effective*, *partially ecologically effective*, or *ecologically ineffective*.

Table 3.3 Measure of Ecological Effectiveness

	The regime's specific goals were created in response to scientific discourse. (1)
	Over 85% of the state signatories changed their behavior during the implementation phase of the regime. (1)
	Over 70% of actors meet the regime's regulations in their respective issue areas. (1)
	Positive biophysical impacts are observable after regime implementation. (1)
Total	*4 – ecologically effective, 3 – largely ecologically effective,* *2 – partially ecologically effective, 1/0 – ecologically ineffective*

C. Summary and Expectation

This project's most similar comparative case study method analyzes the relationship between market-enabling regimes and effectiveness. The previous sections have operationalized the variables of interest by using indicators frequently used by the literature or by creating new indicators from scholarly suggestions. Upon completing the analysis of the cases, the conclusion will compare the scores of each regime on each respective measurement scales. If the hypotheses are to be accepted, the data would need to indicate that regimes coded as market-enabling have higher scores in institutional effectiveness and lower scores in ecological effectiveness. If one is true, but not the other, one hypothesis may be accepted and the other rejecting.

Chapter 4: Analysis

After analyzing the literature surrounding multinational corporate actors and international environmental regimes and establishing a methodology for analyzing the relationship between the two, this chapter will turn to a deep study of four cases: the stratospheric ozone regime, the climate change regime, the global oceans regime, and the biodiversity regime. The introduction to each case will document its formation and progression as an international force. Then, the discussion will focus more intentionally on how the regime has created barriers or opportunities for its related economic markets. Using the indicators of effectiveness discussed in the previous section, the final analysis will assess the success of the regime, in both an institutional and ecological sense. Finally, each case study will conclude with a discussion of the relationship between the regime's economic mechanisms and its resulting levels of effectiveness.

As per the hypotheses, I have two expectations for this relationship. Firstly, market-enabling regimes will be more institutionally effective than their regulatory counterparts. Simultaneously, these market-enabling regimes will have a lower level of ecological effectiveness than regulatory regimes.

Case 1: Stratospheric Ozone Regime

The realization in the mid-1970s that chlorofluorocarbons (CFCs) were causing significant damage to the Earth's ozone layer resulted in a considerably quick move to action by international actors. Following about a decade of widespread scientific knowledge sharing and negotiation, the international stratospheric ozone regime was solidified under the authority of the United Nations Ozone Secretariat. Through enacting national and global regulations on the corporate production and use of CFC and other ODSs, the international community has seen a significant reduction in the threat to the ozone. Today, the stratospheric ozone regime remains intact and is seen as one of the most successful instances of global collective action.

The case of stratospheric ozone governance seems to indicate that a regime's relationship to the market is a phenomenon worth considering while assessing its effectiveness. By regulating dangerous substances and encouraging the development of new technologies, the ozone regime simultaneously disabled the existing business practices of the chemical industry and realigned future market actions with specific and sustainable goals. After completing an assessment of the institutional and ecological successes of the ozone regime, I argue that the regime structure in relation to the market and the consequent response of business actors created conditions that contributed to the regime's overall success.

I. Background
A. Discovery of Ozone Depletion

Ozone is a naturally occurring substance comprised of three oxygen atoms that can be found in higher concentrations between 15 and 35 km above the surface of the

Earth in the stratosphere (UNEP Ozone Secretariat 2020). This *ozone layer* acts as a shield for life on Earth, as it filters out the sun's damaging ultraviolet (UV) radiation (Andersen et al. 2013; UNEP Ozone Secretariat 2020). However, the beginning in the 1960s, some scientists began to see evidence of disruption to this process; many began "suspecting that pollutants from several kinds of human activities risked disrupting the ozone layer" (Parson 2003, Chapter 1, 3).

Throughout the 1960s and 1970s, this scientific literature surrounding the ozone layer and ozone depleting substances (ODSs) developed significantly. Culminating with the 1974 publication from Molina and Rowland that concluded that the release of chlorofluorocarbons (CFCs), often found as propellants in aerosol cans, into the atmosphere was a serious threat to the ozone layer. They explained that continuing on the current global business path, which was producing over 500,000 metric tons of CFCs per year, would result in a 7-13% decrease in the atmospheric ozone (Molina and Rowland 1974; Andersen et al. 2013, 612). Cited as one of the most influential findings of the time, Molina and Rowland's stark findings about the prospect of ozone loss pushed scientific and governmental bodies across the globe into action.

B. Early Instances of National Regulation

In the subsequent years, the scientific community continued to research how CFCs and other ODSs could present serious challenges for the sustenance of human life on earth. Scientists explained how the loss of the ozone layer would "increase the intensity of UV radiation reaching the earth's surface," and result in catastrophic climate changes, food insecurity due to agroecosystem changes, and significant increases in health problems like skin and eye diseases (Parson 2003, Chapter 1, 3; Andersen et al.

2013). With the prospect of disaster in mind, some countries, including the United States, Canada, Sweden and Norway, established national restrictions in 1978 to limit the production of CFCs and the use of non-essential chemical aerosol propellants (Parson 2003, Chapter 3). However, facing growing evidence of the consequences of using ODSs, it became clear that a more global effort would be needed to tackle the problem (Parson 2003, Chapter 1, 3).

C. Building Global Effort

The first major international effort to combat ozone depletion began in 1977 with the creation of the UNEP Coordinating Committee on the Ozone Layer (CCOL). Bringing together the efforts of 16 countries, the European Economic Community (EEC), the Organization for Economic Cooperation and Development (OECD), the Chemical Manufacturers Association, and the International Council of Scientific Unions, the CCOL served as a place to both coordinate the collection of scientific data and exchange the results of these scientific explorations (Glas 1989; Andersen et al. 2013, 614). While there was no direct agreement produced from these efforts, the group met annually to compile a status report on the ozone. By shedding light on the consequences of inaction, these combined and individual scientific efforts set forth a plan of action that would need adopting in the future.

In the early 1980s, research teams, such as the Japanese Meteorological Research Institute and the British Antarctic Survey, first discovered evidence of an area of depleted ozone above Antarctica (Andersen et al. 2013). What was assumed to be an equipment measurement error in early years of research was soon widely accepted as a dangerous and actively growing "ozone hole" in 1985 (Glas 1989, 145; Andersen et al. 2013, 615).

This discovery, combined with the already mounting evidence of the ozone depleting properties of CFCs and similar chemicals, further pressured governmental bodies to take action collectively.

D. Creation of Vienna & Montreal

With a need for international action noted by the CCOL reports, the UNEP invited the CFC producing nations and a number of developing nations to attend meetings with an ad hoc group on the ozone layer beginning in early 1982 (Glas 1989; Parson 2003, Chapter 5, 6). While early meetings focused on compiling and presenting scientific reports and assessments from organizations such as UNEP's CCOL, the U.S. National Aeronautical and Space Administration (NASA), and the World Meteorological Organization (WMO), discussions soon moved into the creation of a global convention for the monitoring and control of CFCs (Glas 1989; Parson 2003, Chapter 5).

Negotiations stalled for the next few years, as nations disagreed on what provisions would best serve their personal and global interests. However, the group continued to meet until the 1985 Vienna Convention for the Protection of the Ozone Layer emerged from their efforts (UNEP). The Vienna Convention, based on the provisions set forth in the 1977 CCOL plan of action, adopted a "hybrid system: compulsory participation in a nonbinding process" (Parson 2003, Chapter 5, 15). This system, which allows nations who ratify the agreement to self-determine the provisions by which to abide, has had a limited ability to change and enforce global actors' behaviors. Nonetheless, the Vienna Convention has provided a framework for the continued cooperation of nations and has strengthened the legitimacy of the UNEP to spearhead these environmental efforts (Parson 2003, Chapter 5, 16).

Emerging from this UNEP ozone framework, the Montreal Protocol on
Substances that Deplete the Ozone Layer was opened for signature in September 1987
(Glas 1989). This Protocol creates legally binding restrictions on the production and
consumption of six classifications, or Annexes, of ozone depleting substances (UN
Ozone Secretariat 2020). By 1989 when the Montreal Protocol entered into force, it had
46 signatories (Glas 1989). Twenty years later, all 198 UN Member States had ratified
the Montreal Protocol, making it the only universally ratified UN treaty in the
organization's history (UN Ozone Secretariat 2020).

II. Relationship to Market (Independent Variable)

The regulations introduced by the Vienna Convention and Montreal Protocol have
placed limitations on state and corporate use of chemicals that harm the ozone. By
looking both at these regulations imposed by regime agreements and at the market
opportunities created by these regulations, this section will analyze the relationship
between the regime and the global market for producing and using CFCs and ODSs. This
analysis should provide a full understanding on how the behavior of industry actors has
played into the larger narrative of the stratospheric ozone regime.

A. Early Use of CFCs

CFCs were discovered in 1928, as scientists searched for safer and more efficient
refrigeration methods for homes (Glas 1989). Soon, it was discovered that CFCs could
enhance other products as well, from air conditioning, insulation, electronics, aerosols,
medical devices, and more (Glas 1989, Alliance for Responsible Atmospheric Policy
2014). With so many uses and a growing market, the industry for CFC production and
use expanded rapidly throughout the mid-twentieth century.

The mounting evidence of the role of CFCs in the depletion of ozone, however, caused growing concern in the international community throughout the 1970s. As discussions of CFC regulation began, the CFC industry noticed the threat and took an initial combative position (Falkner 2008). In the United States, for example, the chemical industry, with the scientific evidence of the time, argued for an unregulated CFC market. Their initial scattered lobbying efforts had been unable to prevent the 1978 enacting of regulation on CFC use in aerosols. Consequently, the U.S. industry, led by chemical powerhouse DuPont, formed the Alliance for Responsible CFC Policy in the summer of 1980 (Falkner 2008; Alliance for Responsible Atmospheric Policy 2014). The Alliance, in its early ears, coordinated scientific, economic, and legal efforts to halt the efforts of the U.S. government to enact further regulation on CFCs. However, as the strategies of CFC producers shifted with time, the Alliance has remained a representative of the interests of CFC producers and users.

B. National Regulation Causes CFC Market Shifts

As regulations on the non-essential production or use of CFCs emerged in the U.S., Canada, Norway, and Sweden in 1978, and then throughout the European Economic Community (EEC) in 1980, the overall CFC industry began to move away from their anti-regulatory stance (Dudek, LeBlanc, Sewall 1990). While the United States' production and use of CFCs in products, such as automobile air conditioning, continued to increase during the late 1970s, there was sharp decline in aerosol CFC products (Glas 1989; Parson 2003, Chapter 5, 4). With CFCs in aerosols representing a significant portion of the overall CFC production, "total U.S. production of CFCs 11 and 12 fell 45 percent from 1974 to 1980" (Parson 2003, Chapter 5, 5). In Europe, this

decline was mirrored, but much more gradually, with aerosol CFC production contracting by 37 percent by 1982 (Parson 2003, Chapter 5, 5). Despite the market shifting away from aerosol use, the overall production of CFCs outside of North America and Europe continued to rise (Parson 2003, Chapter 5, 5).

Overall, the national and regional CFC regulations enacted from 1978 to 1980 did not result in the reduction in CFC production growth that the governments had hoped for. Despite its failure in the direct sense, these regulations did provide a nudge for CFC industry leaders to begin the research on and the development of CFC alternatives. Many industry leaders in CFC production, including DuPont and Imperial Chemical Industries, launched research programs into CFC substitutes in the mid-1970s (Parson 2003, Chapter 5). As early as 1980, they had determined that other substances, like hydrofluorocarbons (HFCs) and hydrochlorofluorocarbons (HCFCs), could replace many of CFC technical functions without dealing as much damage to the ozone (Parson 2003, Chapter 5).

Although technically feasible CFC alternatives had been discovered, projects estimated that the production of these substances could cost up to five times more than that of CFCs and would require about five years of development to bring to market (Parson 2003, Chapter 5). These high development costs made the substitutes far from ideal products in the existing global marketplace. As a result, industry actors had largely abandoned their research efforts by 1981.

CFC-producing industries continued to hold their combative position against CFC regulation. They maintained that CFC regulation was neither necessary nor favorable because (1) "scientific evidence remained too uncertain," (2) "viable CFC alternatives did not exist for most uses," and (3) "CFC markets were likely to grow little, if at all"

(Parson 2003, Chapter 5, 20). Despite their assertions, the international community witnessed the breakdown of this argument in the mid-1980s. Firstly, scientific publications, particularly the discovery of the ozone hole over Antarctica, continued to point to severe ozone destruction from excessive CFC usage (Andersen et al. 2013). Secondly, DuPont widely publicized the findings of their CFC substitute research in March of 1986, fully informing governmental actors and activists that more sustainable substitutes for many CFC uses were, in fact, "technically feasible" (Parson 2003, Chapter 5, 17). Finally, the CFC production continued to have a positive growth following a period of stability in 1981 and 1982 (Parson 2003, Chapter 5). With very little ground left to stand on against the prospect of additional national and international regulation, the CFC producers and users were forced to confront a reality of impending CFC regulations.

C. CFC Producers Begin Shifting Position

The American-based Alliance announced in 1985 that it "would support internationally negotiated limits on future rates of CFC emissions growth" (Parson 2003, Chapter 5, 20). This dramatic shift was led by the three largest American CFC producers — DuPont, Allied, and Pennwalt. Alliance Chairman Richard Barnett explained that the group had decided "on the basis of current information," that the "large increases in fully halogenated CFCs. . . would be unacceptable to future generations" (Barnett 1986, qtd. in Parson, Chapter 5, 20). Considering the implications of potential CFC growth, the Alliance would support a "reasonable global limit on the future rate of growth" of emissions and would resume its corporate efforts to develop CFC substitutes (Barnett 1986, qtd. in Parson, Chapter 5, 20). This shift in the position of industry leaders represented a major turning point in the relationship between the stratospheric ozone

regime and related businesses. Following this moment, businesses were less opposed to both accepting and complying with CFC regulations.

D. Analysis of Regime-Market Relationship

The stratospheric ozone regime, with the introduction of the 1987 Montreal Protocol, placed significant binding regulations on the use of CFCs and other ODSs. However, the gradual introduction of some national and non-binding global regulations prompted industries to search for creative solutions to the issue before the global regulations entered into force. The corporate development of technically comparable substitutes allowed the binding regulations of the Montreal Protocol to increase the market price of ODS, making the once costly substitutes more competitive in the chemical marketplace. Although the stratospheric ozone regime has certainly imposed strict regulations on businesses, its effort toward developing new sectors of the chemical market renders the regime *market-enabling*.

III. Effectiveness (Dependent Variable)

In looking back at the creation, development, and impacts of the stratospheric ozone regime, this section evaluates its effectiveness. Beginning with institutional effectiveness and then proceeding to ecological effectiveness, the selected indicators from the literature are employed to give the ozone regime a ranking from 0-4.

A. Institutional Effectiveness

   i. *The agreement was completed on the prescribed timeline without major hold ups.*

The 1974 publication of Molina and Rowland's scientific report on the dangers of widespread CFC use on the Earth's ozone served as the major call to action for

international community to take action on ozone depletion. The subsequent information sharing efforts of the UNEP's CCOL, which began meeting in 1977, led into the 1985 establishment of the Vienna Convention. This framework, which marked the first formal institutionalization of the ozone regime, directly translated into the Montreal Protocol in 1987. While this period of 13 years between the major scientific publication and the binding international agreement is not negligible, it is quite impressive that the majority of state actors collectively accepted the threat of ozone depletion, funded and completed scientific research, created a plan of policy action, and came to a comprehensive agreement in this short amount of time. (1 point).

      ii. *The institutional framework has been revisited and updated at least once since its original inception.*

Following the creation of the Vienna Convention Framework in 1985, the UN Ozone Secretariat has continued to organize and host the meetings the goals and progress stratospheric ozone regime (UNEP Ozone Secretariat 2020). Following the implementation of the Montreal Protocol in 1989, the signatories have reconvened for the addition of amendments to the Protocol at London in 1990, Copenhagen in 1992, Vienna in 1995, Montreal in 1997, Beijing in 1999, and Kigali in 2016 (UNEP Ozone Secretariat 2020). As scientific research has progressed and technologies have been developed, these additions have updated the original regulations to account for additional ODSs, like hydrochlorofluorocarbons (HCFCs). To this day, the Ozone Secretariat has continued to bring signatories together in approximate three-year increments to monitor the regulation of substances, continue sharing information, and draft new policy options for the protection of the ozone. (1 point).

There are mechanisms in place for the enforcement of the agreement, such as inspections or reporting.

Article 7 of the Montreal Protocol outlines the procedures for the Reporting of Data related to regulated ozone depleted substances. With slight variation based on the nation and substance in question, Article 7 states that "each party is required to report its annual production, imports and exports of each individual controlled substance" (UN Ozone Secretariat 2020, 391). Today, the Ozone Secretariat operates an online reporting system into which nations can input their data. In each Meeting of Parties, the group monitors each nation's reporting activities and takes action against any non-compliance, as outlined for each individual signatory nation in Article 8 (UN Ozone Secretariat 2020). (1 point).

iv. *The regime features mechanisms for the generation and widespread distribution of information.*

Because of the instrumentality of proper and up-to-date scientific knowledge to the protection of the ozone layer, the Montreal Protocol has explicitly outlined how the Parties should produce and share this information in Article 9: Research, development, public awareness and exchange of information. Firstly, it explains that nations, as Protocol signatories, have the responsibility of "promoting, directly or through competent international bodies, research, development and exchange of information" related to "best technologies," "possible alternatives to controlled substances," and "costs and benefits of relevant control strategies" (UNEP Ozone Secretariat 2020, 25). This sharing of information amongst Protocol signatories and the public continues to bring widespread awareness and understanding to the issue of ozone depletion. Examples of efforts brought about by Article 9 can be seen in the Secretariat's production and dissemination of

scientific reports, hosting of scientific panels and workshops, and presentation of accessible materials for the public on the Ozone Secretariat's website. (1 point).

B. Ecological Effectiveness

      i.   *The regime's specific goals were created in response to scientific discourse.*

The stratospheric ozone regime emerged in direct response to the developing scientific knowledge on the damaging effects of ODS usage, particularly the 1974 publication from Molina and Rowland and the discovery of the Antarctic "ozone hole" (Andersen et al. 2013). With scientific development as the main force behind the jump to regime institutionalization, international actors have paid particular attention to the voices of the scientific community throughout the regime development process. Globally organized groups, such as the environmental committee of the OECD and the UNEP's CCOL, have brought forward novel global scientific predictions on the causes and effects of ozone depletion to inform the policy options (Parson 2013, Chapter 3). As novel scientific research has been published since the inception of the Montreal Protocol in 1987, the agreement has been amended to include more restrictive limits on the original classes of regulated chemicals, novel regulations on new classes of chemicals (such as HCFCs), and suggestions on new ODS-substitute technology (Andersen et al. 2013). This demonstrates a clear dedication to including scientific ozone discourse in the development of the stratospheric ozone regime. (1 point).

      ii.   *Over 85% of the state signatories changed their behavior during the implementation phase of the regime.*

As of 2009, the Montreal Protocol had garnered the support of every United Nations member state. The mere act of signing and ratifying the legislation demonstrates

a willingness by these signatories to work toward the mission of the Protocol. This dedication to bringing behavioral change becomes even more evident when looking at the progress made in the phasing out of CFCs, Montreal Protocol's Annex A, Group I of regulated chemicals. In 2019, over 90% of the ratifiers reported data on their CFC consumption levels. Of those reported, all had reduced their CFC consumption to a zero or below-zero value (UNEP Ozone Secretariat 2021). While the Montreal Protocol has expanded since its inception to regulate a whole host of other harmful chemicals, states have demonstrated, by reporting and regulating their consumption of CFCs, their dedication to ozone protection, regardless of their individual interests. The Protocol, through its policy implementation and norm building, has created significant behavioral change. (1 point).

        iii.   *Over 70% of actors meet the regime's regulations in their respective issue areas.*

While the Montreal Protocol has clearly prompted widespread behavioral change, as discussed above, it has also generated the ability for signatories to fulfil the regime objectives. Through the adoption of a noncompliance procedure and a multilateral fund, the Protocol has established clear incentives and a means for all types of actors to reach long-term compliance (Murase et al. 1995; UN Ozone Secretariat 2020). These mechanisms, although complex to build and implement, have led each of the 193 ratifying nations to achieve full compliance with the provisions of the Protocol (Andersen et al. 2013, 640). The stratospheric ozone regime's established regulations have been fully met by all actors. (1 point).

iv.   Positive biophysical impacts are observable after regime implementation.

The 2018 Scientific Assessment of Ozone Depletion completed by the World Meteorological Organization (WMO) and the UNEP represents the most recent information regarding the state of the ozone. This assessment states that the "actions taken under the Montreal Protocol have led to decreases in the atmospheric abundance of controlled ozone-depleting substances (ODSs) and the start of the recovery of stratospheric ozone" (World Meteorological Organization 2018, ES.3). Despite a recent resurgence of global CFC-11 emissions, scientists are estimating that with the continued compliance to the Protocol's regulations, the ozone above the Northern Hemisphere will return to its 1980 levels in the 2030s and the ozone above the Southern Hemisphere will return in the 2060s (World Meteorological Organization 2018). This observed recovery following the implementation of stratospheric ozone regime regulations indicates a high level of ecological regime effectiveness. (1 point).

IV.   Conclusion

Stratospheric Ozone Regime
Market Relationship: Market-Enabling
Institutional Effectiveness: 4/4 (institutionally effective)
Ecological Effectiveness: 4/4 (ecologically effective)

The two project hypotheses, which make relational statements about different types of regimes, require a cross-case comparison to be properly evaluated. However, this conclusion section will pull out some of the main points highlighted throughout the investigation of the stratospheric ozone regime.

The stratospheric ozone regime case is well-known by policymakers and scholars alike as a prime example of global governance. After having evaluated the regime for the

selection of eight effectiveness indicators, I can better understand why this is the case. As demonstrated by the perfect score of four (4/4) within the institutional effectiveness indicators, the threat of ozone depletion prompted international actors to make quick, decisive action to rid industry of ODS usage. The regime simultaneously established an effective system of accountability and mechanisms to keep the regulatory framework up to date with new information and policy.

With a strong institution beneath it, the stratospheric ozone regime was able to promote behavioral change among state and corporate actors, eventually reaching full UN participation and full compliance. Also receiving a perfect score of four (4/4) within the ecological effectiveness indicators of this study, the regime has created the changes that have led to a reversal or ozone depletion trends and clear ecological progress. While the regime is not perfect, it has demonstrated an ability to overcome the difficulties in crafting and implementing global environmental policy.

The 2013 journal article from Andersen et al. gives a valuable and succinct account of the stratospheric ozone regime's success.

> Every United Nations state is a member of the Montreal Protocol and every country is in full compliance. Ninety-eight percent of ODS production and consumption of nearly 100 industrial chemicals has been phased out to the satisfaction of public, corporate, and government stakeholders. The transition has been so smooth that science skeptics are silent, few scholars find fault with the treaty or its implementation, companies and military organizations are proud of what has been accomplished, and consumers have hardly noticed (640).

By taking account of the interests of a wide variety of actors, from statespeople to members of civil society, the stratospheric ozone regime was able to garner widespread support and compliance. This enabled the regime to find success in realizing of its goals

of ozone protection. Of particular interest for this study, however, is how the relationship of the regime regulatory structure to corporate actors played into the regime's success.

In placing regulations on the production and consumption of CFCs and other ODSs, the stratospheric ozone certainly has imposed high costs for chemical market actors to continue with their business as usual. Without an attractive and practical path forward within the limits of the regime, this could have provided sufficient incentive for international actors to be non-cooperative or defect in the face of regulation.

However, the early introduction of national bans on CFCs had prompted fruitful technical research by leading chemical firms, leading to the discovery of feasible substitutes to replace the technical functions of ODSs. Although these technologies were initially far more expensive to produce, the Montreal Protocol raised the cost of using the damaging ODSs and made the substitutes more competitive in the market. Therefore, when powerful chemical firms were faced with costly Montreal Protocol regulations, they often chose to adopt these economically viable, new technologies and advance their businesses within the limits of the regime, rather than defect and pay the subsequent penalties.

All in all, it seems that corporate actors were more likely to comply with the regulations set forth by the regime because the costly, legally binding regime regulations coupled with the scientifically viable ODS substitutes caused the cost of compliance to fall below the cost of defection. This relatively low cost of compliance is why the stratospheric ozone regime produced such high levels of both institutional and ecological effectiveness.

Although not directly related to the hypothesis, this case also demonstrates the importance of the scientific nature of the global environmental issue is to the ability of international actors to find a solution. Early advancements in scientific literature indicated that ozone could be destroyed by the use CFCs and ODSs. With this understanding established, the international scientific community was able to trace the rapid depletion of the earth's ozone to the use of a small class of chemicals by a relatively small group of market actors. With a clear cause to the environmental problem identified, the regime was able to provide a focused path forward for state and corporate actors.

Finally, another potentially influential aspect of the regime's effectiveness is the timing of regulation introduction. As noted above, many national actors, such as the US and Norway, introduced a ban on aerosol CFCs in the 1970s. By introducing these regulations at an earlier time, policymakers gave an indication of their future intent to market actors, allowing them some time to react before the later, more arduous regulations were introduced.

Case 2: Climate Change Regime

Climate change is recognized by all types of international actors as one of the most threatening challenges of today. Since the 18th century, scientists have witnessed a steady increase in the surface temperature of the Earth (Falkner 2008). Although many elements of climate science still are fraught with uncertainty, the general consensus has attributed this *global warming* phenomenon to the rapid industrialization of agricultural and manufacturing practices. These practices, which include shifts in land use and increase in amounts of fossil fuels burned, have caused a spike in the atmospheric concentrations of three main greenhouse gasses: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) (Falkner 2008, 95). These high concentrations of greenhouse gasses have trapped heat within the Earth's atmosphere and caused the warming of the Earth's surface.

While warming and cooling are natural earthly processes, it is the rapidity of the current trend of global warming that has been the foundation of global concern. The overall increase in temperature has amplified the chance for environmental disasters, such as rising sea levels, destructive weather patterns, desertification, and draught, among others (Patrick 2013). For many nations, particularly developing states, these events may lead to the loss of coastal land, reduced agricultural yield, higher levels of infectious diseases, and significant water shortages (Falkner 2008). These events, then, threaten to cause a host of secondary problems, such as regional conflict and instability.

With this eminent threat, state governments, nongovernmental organizations, scientific panels, corporate bodies, academics, and civil society actors have coalesced to find solutions for both the mitigation of and adaptation to climate change. The resulting

international climate change regime is situated largely within the United Nations system under the Framework Convention on Climate Change (UNFCCC).

Although the climate change regime has been designed to handle an ecological issue, it does not operate in isolation. Through a discussion of the history of climate change governance, it becomes evident that the regime is part of a much larger and complex web of international issues. In particular, the integration of climate change regulation with the fossil fuel industries ties it to issues of security, economic development and finance, public health, and energy (Patrick 2013). Although the forthcoming evaluation focuses on environmental implications of the climate change regime, it must be situated within the greater complex of international issues.

This case study further discusses this relationship between the climate change issue with prominent energy-related industries, as one that has both imposed regulations on many existing firms and created opportunities for market expansion through new technologies, such as renewable energies and carbon capture and storage (CCS). The current literature on business strategic responses to regulatory policy will inform the connection between the presence of market opportunities and the responses of corporate actors to regime regulations. Despite the ecological threats presented by climate change and the potential for sustainable growth of clean energy markets, many firms have continued to oppose the creation of emissions regulations.

The final section is an evaluation of the regime's overall effectiveness using institutional indicators to determine the functionality of the regime design and mechanisms and using ecological indicators to determine how well the regime has addressed the issue of climate change. Overall, the regime is considerably effective in an

institutional manner, but has been unsuccessful in converting this momentum into positive climate impacts. The chapter concludes with a discussion of the environmental, contextual, and corporate factors that may be contributing to this outcome.

I. Background

A. Scientific Discovery and Progress

The scientific connection between the use of fossil fuels and global warming can be traced to the late 19th century. While scientists recognized this relationship, the true threat of greenhouse gasses was not fully realized until the late 1960s when meteorologists Manabe and Wetherald published their initial projections on forthcoming global temperature increases (Patrick 2013; Council on Foreign Relations 2021). The alarm bells sounded by this study prompted many international actors, from states to NGOs, to further research climate change. These efforts were scattered for a couple decades. It was not until the 1980s and 1990s that the international community began to coordinate the development of "a better understanding of climate change and its effects" (Falkner 2008, 96).

In 1985, UNEP, the WMO and the International Council for Science (ICSU) organized the first major international effort to compile scientific assessments on climate change and draft relevant policy solutions (Franz 1997). While no agreements were made at the Villach Conference, the attempt to align scientific discourse increased the sense of urgency for international action.

Another major step toward the institutionalization of a climate change regime was the creation of the Intergovernmental Panel on Climate Change (IPCC) in 1988. Organized by UNEP and the WMO, the IPCC consists of 195 member states that work

together "provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation" (IPCC Secretariat 2013). For the past three decades, the IPCC has compiled this information on climate science and related policy options into series of accessible publications.

B. Development of the UN Climate Framework

With global efforts in place to coordinate the development and dissemination of scientific information on climate change by the start of the 1990s, global actors moved to take more direct action. In 1992, the UN Framework Convention on Climate Change (UNFCCC) was launched. Recognizing the environmental threat presented by excess greenhouse gasses, the UNFCCC has aimed to avoid anthropocentric damage to the ecosystem (United Nations Framework Convention of Climate Change 1992). Today, there are 197 parties to the Convention who meet annually in the Conference of Parties (COP) (Patrick 2013).

During the third Conference of Parties (COP-3) in 1997, the Kyoto Protocol was adopted as the first major piece of global climate change legislation. Entering force in 2005, the Protocol is a legally binding commitment of signatories to meet individual targets for levels of greenhouse gas emissions. In order to appropriately address the concentration of emissions that come from industrialized nations, the Kyoto Protocol separated the responsibility of emission reduction based on industrialization level and created the base of an emissions trading system (Napoli 2012).

Following the enactment of the Kyoto Protocol, international climate change related effort focused on its achievement. The yearly COP meetings continued to support stronger international action within the realm of Kyoto's provisions. The 2009

Copenhagen Accord (COP-15), for example, provided strength to the regime's mechanisms for reporting emissions levels and supporting developing nations.

At the same time, the COP meetings highlighted the lingering disagreements on how to best enforce emission targets (UNFCCC 2021a). These heated disputes informed the need for a new international agreement for dealing with climate change. In the meantime, the parties present at the COP-17 meeting, facing the expiration of the Kyoto Protocol at the end of 2012, agreed on the 2011 Durban Platform for Enhanced Action. The Platform extended the Kyoto Protocol through 2017, while this new treaty framework was being developed.

The twenty-first session of the UNFCCC COP (COP-21) in 2015 resulted in the signing of the Paris Agreement. Although the agreements from Kyoto and Paris were theoretically meant to work tangentially, the Paris Agreement has essentially superseded the Kyoto Protocol in practice. Unlike the top-down emissions targets established by Kyoto, the Paris Agreement requires signatories to set their own emissions targets, or nationally determined contributions (NDCs) (Conference of Parties to the UNFCCC 2015; Maizland 2021). These NDCs must be crafted in consideration of the Agreement's overall goal of achieving global net-zero emissions and limiting the increase in average global temperature to 2 degrees Celsius above pre-industrial levels. Every five years, the progress of each nation toward achievement of their NDCs is to be transparently self-monitored during the global stocktake (Conference of Parties to the UNFCCC 2015; Maizland 2021). The first global stocktake is scheduled for 2023.

Because the Kyoto Protocol mainly targeted developed states in its provisions, the 2011 Durban Platform flagged the common but differentiated responsibilities of so-called

developed states and developing states as an important consideration for future climate governance. The Paris Agreement negotiation addressed this concern by creating a plan to assist these developing nations. With a $100 billion pledge from developed states, more of the financial load of climate mitigation research and development has been placed onto industrialized states. This Paris Agreement mechanism hopes to further the global achievement of emission targets by supporting a wider variety of global states (Council on Foreign Relations 2021).

As described throughout the narrative above, the international climate change regime has been largely embedded within the UNFCCC. This framework supported the Kyoto Protocol, the original piece of global climate policy, and later fostered the enhanced Paris Agreement. Although it still in the early years of its lifespan, the Paris Agreement is at the forefront of the current global climate change policy.

C. Other Relevant Conventions and Bodies

The UNFCCC and its two major treaties represent concentrated global efforts to enact emission regulation. Supporting these initiatives with specific projects, the United Nations system features about twenty different agencies that address climate-related issues (Council on Foreign Relations 2021). These include the UNEP, the UN Development Program (UNDP), the Global Environment Facility (GEF), the International Monetary Fund (IMF), and the World Bank, among others. Each agency, by nature of their work, tackles distinctive causes and effects of climate change by slightly different means.

Outside of the realm of the UN system, many international groups have organized to find solutions to the climate crisis. The Major Economics Forum on Energy and

Climate (MEF) and the Group of 20 (G20) are voluntary governmental organizations that have aimed at brainstorming feasible emission-reduction policies with particular consideration given to creating market opportunities for relevant industries (Patrick 2013). The C40 Cities Climate Leadership Group, a collection of 97 global cities, have committed to taking concrete steps, such as introducing all-electric public transportation, toward reducing the carbon-dependency of urban living (C40 Cities 2019).

Other groups, such as the Marrakech Partnership for Global Climate Action and the Group on Earth Observations (GEO), combine the expertise and resources of governmental, scientific, corporate, and civil society actors to brainstorm and implement climate-related solutions (Luomi 2020; GEO 2021). While none of these aforementioned bodies are as organized and comprehensive in scope and terms as the UNFCCC, their collective action aims to advance humanity toward climate solutions.

II. Relationship to Market (Independent Variable)

Through the developments of recent decades in climate science, researchers have been able to pinpoint the most dominant sources of climate change: the wide use of fossil fuels. In order to meet the growing global demand for energy, fossil fuel industries have increased the levels of coal, oil, and natural gas being burned. The burning releases greenhouse gasses into the atmosphere, which have built up to dangerous levels and caused the global warming phenomenon. To combat this trend, climate change regulations, both at the national and international level, have aimed at restricting these industry activities in favor of more sustainable energy practices. Despite the need for reduced emission targets, the designers of the climate change regime have deliberately

incorporated industry interest by means of market-enabling mechanisms, namely the carbon market, renewable energy, and carbon capture and storage.

A. Regime Mechanisms for Enabling the Market

The so-called *carbon market*, the first of these market-enabling mechanisms, is a designated place for firms to gradually reduce their greenhouse gas emissions while still operating within a marketplace. Established as part of the Kyoto Protocol, the carbon market allows for emissions efficient Annex I countries to sell their excess carbon permits to less-efficient Annex I countries (Napoli 2012; UNFCCC 2021b). [8] Examples of functioning carbon markets include the European Union emission trading system (ETS), which was established in 2005 as the world's first and largest carbon market (European Commission 2016). The EU ETS operates as a *cap-and-trade* system that allows companies to buy and sell their emissions allowance under a gradually shrinking total regional threshold. Since 2007, the International Carbon Action Partnership (ICAP) has overseen the EU ETS and other local, national, and regional carbon markets (International Carbon Action Partnership 2021). These carbon markets have allowed fossil fuel-dependent corporations to work together to meet global standards of emission.

The Protocol also has employed two other programs for the progression of its emission reduction goals: Joint Implementation (JI) and the Clean Development Mechanism (CDM). While slightly different in scope in terms, both programs reward carbon credit to Annex I countries who implement emissions reduction projects in other

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[8] According to the UNFCCC, "Annex I Parties include the industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States" (UNFCCC 2021c).

nations (Napoli 2012; Patrick 2013). By creating an entirely new market for the trading of greenhouse gas emissions allowances, these mechanisms have provided actors with economic incentives to meet their emission goals and help other nations do the same.

Beyond emissions trading, however, the ultimate goal to regulate fossil fuel burning and reach net zero global emissions by 2050 has opened up opportunity to move to away from fossil fuels altogether. While the current energy infrastructure is largely centered around fossil fuel industries, there are many renewable substitutes to fossil fuels that have been developed and implemented on smaller scales that could serve the interest of the wider energy market. These low-carbon energy sources include solar, wind, hydro, geothermal, biomass, and nuclear energy, among other types of hybrid energy systems.

While adjusting the global energy grid to implement these new technologies will surely have high initial costs, the regulations on fossil fuels could allow for the development of this renewable energy market. The hope is that as the industry progresses and new technologies are applied, the high initial costs will subside. Some economists have even projected that many renewable energy sources have the capacity to become more cost effective than coal (Gillingham 2019). With the prospect of significant growth of the low-carbon energy technologies, the renewable energy market represents a major opportunity for industry.

The final market-enabling mechanism from the climate change regime is development of carbon dioxide capture and storage (CCS) technologies. According to a 2005 IPCC special report on carbon capture, CCS "is a process consisting of the separation of CO_2 from industrial and energy-related sources, transport to a storage location and long-term isolation from the atmosphere" (IPCC Secretariat 2005). By

collecting already emitted greenhouse gasses from the atmosphere, environmental impact assessments have suggested that CCS has the potential to reduce the global warming potential of power plants by 63–82% (Cuéllar-Franca and Azapagic 2015). This practice could both facilitate the gradual transition away from fossil fuels and the achievement of net zero global emissions.

Even two decades after the Kyoto Protocol's introduction, these technologies are still in early phases of development and not ready for widespread use. It seems appropriate to attribute this insufficient investment to the high costs of technology research (Patrick 2013). Despite the slow move to innovation, the technical feasibility of extracting excess carbon dioxide from the atmosphere is reason for hope for future development.

B. Overview of Industry Response

Despite these mechanisms for enabling corporate actors to progress within a variety of industries, the regulations enacted by Kyoto, Paris, and other agreements have caused considerable conflict between industry and the climate change regime. As discussed above, the global dependence on fossil fuels for the functioning of society has pervaded nearly every major business sector. In general, any one firm's climate-related business strategy can be seen as a response to "whether climate change presents itself as a threat or opportunity" (Falkner 2008, 99). This designation can be seen clearly in the climate policy stances that different types of corporations have taken. [9]

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[9] While this distinction between the general strategies of fossil fuel-dependent and fossil fuel-averse industries can be made, it is worth noting that there are a host of business strategies found between a full supportive and a full oppositional stance. As climate science has developed and public pressure has shifted, corporate climate strategy has taken a variety of forms, depending on the individual interests of each firm. However, a more nuanced discussion of these corporate strategies is outside of the realm of this study.

Firms that would experience positive externalities from the global banning of fossil fuels have tended to support climate-related governance. These industries, which include renewable energy, nuclear energy, and insurance, have employed public relations strategies and government lobbying efforts to encourage the introduction of greater regulation (Falkner 2008, 98). These strategies, however, have generally paled in comparison to those of more pervasive industries.

Corporations that are heavily dependent on fossil fuel usage, such as oil, gas, electricity, manufacturing, and transportation industries, have historically opposed the strengthening of emissions regulations. This stance aligns with their strictly economic interests of producing a good or service by means of low-cost fossil fuel energy.

A particular striking example of this resistance to global climate change policy is the creation of the Global Climate Coalition (GCC) following the formation of the IPCC. In the face of threat from costly regulation, dozens of major American oil, gas, and manufacturing companies organized "the world's first dedicated climate change lobbying group" (Falkner 2008, 102). From its formation until it was disbanded in 2001, the GCC represented the interests of fossil fuel-dependent companies by challenging climate regulations at both a national level within the United States and later at the international level.

Once the UNFCCC was established in 1992 and it had become clear that mandatory emissions reductions were inevitable, some previously oppositional businesses, particularly those in Europe, began "seeking to shape, not prevent a protocol to the framework convention" (Falkner 2008, 119). Although these firms still have tried to minimize the cost of climate regulation born by industry actors, this signified a clear

strategy change. Many of these firms, facing the threat of business-halting regulation, also have participated in individual and global efforts to develop innovative technical solutions for the energy sector (Luomi 2020). While some progress over the past decades is visible, it has been not been implemented on a wide scale. Instead, the globe still relies predominately on a fossil fuel-based energy system.

The mass of powerful fossil fuel corporations, particularly in the United States, have continued to resist international climate governance. Holding firmly to this anti-regulatory position, there are still aggressive lobbying efforts and public campaigns to decrease support for emissions regulation (Falkner 2008, 120). With the threat of climate change becoming more evident, a major shift in current business practices has become increasingly urgent. However, as the climate change regime currently exists, the hope for corporate-driven climate solutions has largely stagnated.

C. Analysis of Regime-Market Relationship

Despite global industry's continued resistance to participation within and compliance with the global climate change regime, the regime mechanisms have demonstrated clearly that it is not strictly regulatory. By allowing a variety of industries direct benefits through the introduction of emissions regulations, the regime can be said to enable certain existing market activities. It couples this with the conscious promotion of opportunities to advance new innovative technologies. These considerations have led me to categorize the climate change regime as *market-enabling*.

III. Effectiveness (Dependent Variable)

This section considers the context, progression, and consequences of the global climate change regime in order to evaluate its effectiveness. Beginning with institutional

effectiveness and then preceding to ecological effectiveness, the selected indicators from the literature are used to give the regime two rankings between 0 and 4 points.

A. Institutional Effectiveness

> i. *The agreement was completed on the prescribed timeline without major hold ups.*

While contemporary science still is fraught with disagreements over specifics of global warming and its effects, the connection between excessive fossil fuel usage and climate change can be traced back to the 1960s. The next decade was spent, predominately by individual state actors, trying to grasp the nature of the issue. Once the urgency of the problem became clearer in the mid-1980s, coordinated global effort truly commenced, culminating in the 1992 UNFCCC agreement. Although a concrete regulatory agreement did not emerge for another five years, the laying of the climate change regime framework was considerably quick. (1 point).

> ii. *The institutional framework has been revisited and updated at least once since its original inception.*

The institutional climate change framework lies largely within the UNFCCC. While the written terms of the overall framework have not changed since its inception in 1992, the Secretariat and Parties to the Framework Convention have convened regularly to discuss how newly negotiated treaties, such as the Kyoto Protocol and the Paris Agreement, have shifted the framework's relevance and take concrete actions on dealing with new climate science. (1 point).

> iii. *There are mechanisms in place for the enforcement of the agreement, such as inspections or reporting.*

One of the major critiques of the climate change regime has been the lack of enforcement mechanisms. Parties to the UNFCCC, specifically signatories under the

Durban Platform and Copenhagen Accord, have been encouraged to transparently report their emissions data to the UNFCCC secretariat (UNFCCC 2021a). In many cases, global climate norms have succeeded in encouraging signatory nations to both report their data and adopt relevant national regulations to meet global emissions limits (Patrick 2013). However, without an international body to enforce this practice, this system is not always successful.

The recent Paris Agreement also operates under this type of system without enforcement mechanisms. Under the Agreement, each nation's achievement of their NDCs is to be transparently self-evaluated in five-year intervals (Conference of Parties to the UNFCCC 2015). If and when actors do not meet their emission targets, they face no enforceable punishment. While the first regulatory period of the Paris Agreement has not yet arrived, it is foreseeable that this lack of an authoritative monitor will lead actors to skimp on potential progress, as it has in the past.

While reporting measures are in place, the lack of a governing enforcement body to monitor the progress of various actors within the climate change regime is a clear cause for concern. (0 points).

> iv. *The regime features mechanisms for the generation and widespread distribution of information.*

Articles 5 and 6 of the UNFCCC have briefly outlined the ways that the framework convention will promote the progression of global "research and systematic observation" and "education, training and public awareness" (United Nations Framework Convention of Climate Change 1992). Through ongoing initiatives, such as the IPCC, global actors are compiling scientific literature into synthesized and accessible reports on the evolving condition of the climate. Research efforts, though falling short in the realm

of technological development for fossil fuel substitutes, have been furthering the global understanding of the climate crisis.

The accessibility of information to policymakers and the general public is also an essential piece of the regime. Individual nations, regional groups, such as the European Union and the African Union, and IGOs and INGOs, such as the United Nations and Greenpeace, have sought to bring make information publicly available. These types of efforts have increased furthered the generation and distribution of regime-related information. (1 point).

B. Ecological Effectiveness

  i. The regime's specific goals were created in response to scientific discourse.

The IPCC operates as the transnational body responsible for informing the climate policy choices of the international community. The first five IPCC Assessment Reports from 1990, 1995, 2001, 2007, and 2014 have synthesized findings of relevant climate science into key takeaways for policymakers (IPCC Secretariat 2013). The terms of the resulting UNFCCC treaties, such as the Kyoto Protocol, Copenhagen Accord, and Paris Agreement, have been directly based off of this scientific discourse.

Despite having scientific bodies provide the base knowledge for the goals of the overall climate change regime, the specific regulations on emissions levels are determined by each nation. Within the Paris Agreement, for example, the goal of the Paris Agreement to limit the global temperature rise to 2 degrees Celsius has been informed by scientific indication of disaster beyond this level. However, each Party to the Agreement can establish their own emissions targets. As a result, Germany-based nonprofits Climate Analytics and NewClimate Institute have suggested that "if

governments follow through on pledges they have made so far under the Paris

Agreement, it will still result in a 2.7 ºC rise" (Climate Action Tracker 2020; Maizland

2021, 7). This criticism from scientific and civil society actors argues that the current

agreements are insufficient to both meet the goals of the climate regime and mitigate the

worst effects of climate change.[10] (0 points).

> ii. *Over 85% of the state signatories changed their behavior during the implementation phase of the regime.*

If behavior change is equated to the reduction of emissions from what a nation

would have produced in the absence of the regime, it is difficult to concretely determine

just how many states have changed their behavior. Because the fossil fuel industry has

continued to grow in some regions, while stagnating or even shrinking in other areas, no

definite conclusions can be drawn about the exact level of behavioral change being made

by state and corporate actors.

Nonetheless, in general, participation in the climate regime has coincided with

nations being receptive to change. The Kyoto Protocol had relative success in changing

the emissions behaviors of the Annex I (developed) signatories (European Environment

Agency 2012, 7; Luomi 2020). Without limitations in place for developing countries,

however, it fell short. The Paris Agreement was designed to account for this shortcoming

and has shown promise for garnering compliance with each signatory drafting their own

NDCs (Luomi 2020). By setting personal targets for emissions goals, each signatory

nation has taken the first step toward changing their behavior. (1 point).

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[10] As discussed in the previous section, many powerful fossil fuel corporations have criticized the climate change regime for being too harsh on economic actors. In taking the opposite stance to many scientific bodies and civil society actors, many firms, through efforts like the GCC group, have tried to prevent and avoid regulatory policy (Falkner 2008).

    iii. Over 70% of actors meet the regime's regulations in their respective issue areas.

  Overall, there has been a high level of compliance within the provisions of the climate regime. All parties to the Kyoto Protocol, for example, reached full legal compliance during the first commitment period from 2008 until 2012 (Grubb 2016). With the second Kyoto commitment period just having ended at the close of 2020 and the first global stocktake of the Paris Agreement not yet having taken place, it is not certain how compliance will look for current climate governance. However, it would be reductionist to undermine the achievements of the climate change regime thus far based on future prospects of non-compliance. Rather, it is more beneficial to acknowledge the achievement of widespread compliance while remaining skeptical of how these commitments translate to progression away from greenhouse gas emissions. (1 point).

    iv. Positive biophysical impacts are observable after regime implementation.

  Since the inception and adoption of the UNFCCC and other global climate governance initiatives, there have been no observable biophysical improvements in the condition of the global climate. In fact, the climate situation has become even more dire than in years past, with more widespread and intense heat across the entire globe (Luomi 2020). While this lack of positive change could be attributed to a host of non-human-related phenomena, the inability of humans to limit greenhouse gas emissions seems a more likely cause. According to the 2019 UNEP Emissions Gap Report, "GHG [greenhouse gas] emissions have risen at a rate of 1.5 per cent per year in the last decade, stabilizing only briefly between 2014 and 2016" (UNEP 2019). This overall growth in

global emissions since the inception of the Kyoto Protocol seems indicative of the failure of the climate regime to produce positive biophysical results. (0 points).

IV.   Conclusion

Global Climate Change Regime
Market Relationship: Market-Enabling
Institutional Effectiveness: 3/4 (largely institutionally effective)
Ecological Effectiveness: 2/4 (partially ecologically effective)

The climate change regime, which aims to mitigate one of the most pressing global environmental issues of contemporary consideration, has had limited success in producing positive biophysical impacts. This conclusion begins by discussing how industry actors played a role in the regime's resulting levels of effectiveness. Then, it will engage in a short discussion of the drawbacks of the chosen measures.

Although the enforcement of regime-based regulations has clear weaknesses, the global climate change regime has shown impressive ability to dynamically coordinate global effort around the creation and progression of climate change governance with a score of three (3/4). Through the management of scientific bodies, the organization of annual conventions, the creation of complex market-enabling mechanisms for the bolstering of corporate support, the climate change regime has been largely effective as a global institution.

In an ecological sense, the regime scored two (2/4), demonstrating its ability to change global actors' behaviors within its regulatory provisions but its larger failure to bring about sustained emission reductions. The regime's inclusion of carbon credit trading and promotion of energy alternatives and carbon cleanup technology development has enabled signatories of the Kyoto Protocol to meet their regulatory targets. However,

the weakness of these emission targets has contributed to the regime's larger failure to bring about significant reductions in global emissions levels.

Despite many market-enabling mechanisms scattered throughout the regime, many powerful global firms have continued to oppose the introduction of emissions regulations, contributing to the overall failure of policy solutions. In order to better understand this failure, the discussion shifts back to corporate actors and their relationship to the regime regulation.

As the international energy system stands now, the fossil fuel industry is central to the functioning of society. The increasing levels of global consumption creates a high energy demand that is currently met by a fossil fuel-based infrastructure. Facing a growing need for energy in the early days of the climate regime's institutionalization, many powerful companies and, as a result, government officials were not comfortable risking damage to the economy to transition to alternative energy systems (Falkner 2008, 103). Instead, their resistance has supported the continued reliance of the globe on a pollution-heavy fossil fuel-based energy system.

Another plausible reason for the failed transition away from fossil fuels is the lack of institutional enforcement. As discussed above, the climate regime operates without legally binding regulations. As a result, the consequences for noncompliance are minimal, if there are any at all, and no international body is tasked with enforcement. Patrick sums up the issue with this well when he says, "the core policy and regulatory instruments to curb greenhouse gas emissions exist at the national level, and performance therefore varies from country to country" (2013, 5).

Finally, there is a lack of clear, economically competitive energy substitutes to fossil fuels (Falkner 2008). While developing technologies, such as renewable and nuclear energy markets, could provide alternatives to the fossil fuel dependence, they have not been sufficiently developed yet.

This fact, taken with the two considerations above, has caused climate change regulation progress to stagnate with respect to fossil fuel industries. In order to comply, market actors would have to incur high costs for their development of a new energy infrastructure. While the cost to comply is incredibly high, the lack of legally binding and enforceable provisions has made the cost of defection minimal. If directly weighing the cost of complying versus defecting from climate governance provisions, market actors would be prompted to continue using highly polluting practices. This is, generally, what has occurred.

This case serves as a demonstration of the importance of differentiating between compliance and ecological effectiveness. When scholars equate behavioral compliance with effectiveness, they may erase important distinctions between the regime outcome and regime impact. While the global climate change regime has seen high levels of compliance, particularly with the 100% compliance with the Kyoto Protocol, it has failed to reduce global emissions levels. Rather, since the first commitment period of the Kyoto Protocol, greenhouse gas emission levels have continued to rise at about 1.5 percent annually (UNEP 2019). Even though the climate change regime has been highly successful in garnering high levels of compliance, there have been clear failures to meet the scientifically minded regime goals.

This can be attributed to three failures in the institutional design of the climate change regime, as described by Patrick and Grubb. Firstly, the regime, for a long time, was unable to gain the support of key industrialized greenhouse gas emitters. Two of the largest emitters of greenhouse gases were not participating in the Kyoto Protocol, as the United States never became a signatory and Canada later withdrew (Patrick 2013; Grubb 2016). Without responsibilities taken by these important global actors, the efficacy of regime compliance toward the overall goal of emission reduction has been diluted.

Additionally, Kyoto's focus on creating provisions for so-called developed nations excluded economically industrializing countries like China, India, and Brazil, who have since become some of the globe's largest emitters (Patrick 2013). Without "quantified commitments" established for these crucial "developing countries," global emissions levels have been allowed to continue growing (Grubb 2016, 673). With the 2015 Paris Agreement better accounting for the rapidly industrialization of developing nations in its provisions, this concern may disappear in the coming years. For now, however, it remains.

Finally, Grubb explains that of the remaining 36 nations with quantified commitments under the Kyoto Protocol, the distribution of actual emission reduction is highly skewed. A large portion of post-Soviet era countries and members of the Organization for Economic Cooperation and Development (OECD) relied heavily on the JI and CDM mechanisms to receive carbon credits and meet their commitments (Grubb 2016, 2). While these nations technically remain within full compliance of the Protocol, their actual reduction of emissions was limited.

Because of the difficulty of attributing ecological change to the behaviors of regime actors, scholars often use compliance indicators as a sign of regime effectiveness. However, this case demonstrates that a regime may appear to be functioning well with high compliance levels but fail to properly address the issue at hand. The ecological effectiveness measure tried to remediate this downfall by accounting for both the scientific content of regime provisions and actor compliance with these provisions to substitute. However, after analyzing this case, this measure can be said to still rely too heavily on compliance.

Case 3: Global Oceanic Regime

Covering over 70% of the surface of the Earth, oceans are the foundation of all forms of natural life. Oceans host a multitude of valuable resources, from water to marine animals to a means for navigation and have served the interests of local, regional, and global peoples alike. Because of the widespread participation in maritime activities, however, the oceans and its resources are prone to overuse and exploitation. This dilemma, which has been accentuated by the past century of rapid globalization, prompted the creation of a regulatory global oceanic regime to manage the distribution of oceanic resources and territory for the purpose of international fairness and resource preservation.

As a mechanism for the environmental protection of the oceans and their resources, the global oceanic regime is a valid case to investigate within the parameters of this study. However, the regime's development was grounded in the regulation of territorial sovereignty, navigation, safety, and economic practices in the oceans. As scientific research continued to provide growing bodies of evidence that common oceanic practices, such as dumping, drilling, and mining, were unsustainable and having considerable ecological impacts, the regime involved environmental initiatives. While these environmental aspects of the global oceanic regime are the focus of this study, the regime's ecological protection is embedded within issues of more traditional political salience.

This case study will begin by discussing how the informal set of global oceanic norms progressed into an institutionalized regime throughout the mid- and late-twentieth century. The study will clarify how the development of various regime component parts within the United Nations framework has shaped the overall regime structure. Then, by

placing these norms, conventions, and regulations in direct conversation with global

oceanic industries, the next section evaluates the relationship of the regime to the

economic marketplace. Finally, the case study discusses the institutional and ecological

effectiveness of the regime and situating the case back into the context of an

interconnected web of global issues.

I. Background

While the existing institutionalized global oceanic regime has emerged since the

end of World War II, it has been strongly informed by the centuries-old debate over

national jurisdiction in the international seas. Historically, nations managed their

relationship between one another and the sea without a formal international structure of

governance. Rather, the widely held norms and ideas of oceans governance for much of

human history had focused on maintaining the "freedom of the seas," or the absence of

national jurisdiction in the ocean, for merchants, fishers, navies, and other international

actors (Craig 2012; Mendenhall 2019, 27). As maritime competition between states

mounted in the 18th century, however, so did the tension between these ideas of freedom

and territorialization of the seas. Some states claimed parts of the high seas and its

resources under their national jurisdiction, and, as a result, the norms regarding behavior

on the high seas faced significant shifts (Mendenhall 2019).

This shift in the global oceanic norms coupled with the dramatic expansion of the

types and frequency of human activities on and under the sea in the early 20th century, the

post-war years demanded the establishment of regulations on unfair ocean practices to

preserve free global markets. This regulatory need, combined with many unilateral and

conflictual territory claims following the war, led to the international community to form

a unified "law of the sea" (Mendenhall 2019). This "law" has grown into the contemporary global oceanic regime. This current system of ocean governance is comprised of a series of conventions and governing bodies that have solidified the norms around ocean-related issues.

A. Framework within the United Nations

Today, the global oceanic regime is grounded in the 1982 United Nations Convention on the Law of the Sea (UNCLOS). Described as a "regime of law and order in the world's oceans" that establishes "rules governing all uses of the oceans and their resources," UNCLOS has been deemed the "most comprehensive attempt to govern international waters" to date (International Maritime Organization 2019b; Patrick 2016, 2). It begins with the definition of four oceanic territorial realms: the *territorial seas* (twelve nautical miles from a nation's coast), the *contiguous zones* (twenty-four nautical miles), *exclusive economic zones* (two-hundred nautical miles), and the *high seas* (outside of jurisdiction) (DOALOS 1982; Mendenhall 2019, 35-6). These territorial borders each have coinciding regulations for a nation's proper resource management and navigational behavior.

While UNCLOS primarily focuses on oceanic jurisdiction, it does not shy away from addressing oceanic environmental concerns. Part XII of the UNCLOS document begins by outlining the signatories' "obligation to protect and preserve the marine environment" and their simultaneous "sovereign right to exploit their natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment" (DOALOS 1982, 100). The rest of the section

continues to suggest that signatories will cooperate in reducing all forms of marine pollution through state and international law enforcement mechanisms.

After having established a legal framework for oceanic practices, UNCLOS prompted the formation of three new institutions: The International Tribunal for the Law of the Sea, the International Seabed Authority, and the Commission on the Limits of the Continental Shelf. The Tribunal is an "independent judicial body" in place for settling international ocean-related disagreements (ITLOS 2021). The International Seabed Authority has set out to promote sustainable practices through "organiz[ing], regulat[ing] and control[ing] all mineral-related activities in the international seabed area" (ISA 2021). The Commission has been tasked with "establish[ing] the outer limits of the continental shelf beyond 200 nautical miles" (DOALOS 2012). These efforts, and others, have facilitated the implementation of the immense UNCLOS framework.

Today, UNCLOS operates under its secretariat, the Division for Ocean Affairs and the Law of the Sea (DOALOS). Despite 167 nations having become party to UNCLOS, the United States has refused to ratify the Convention (Patrick 2016). Rather, it has used its position as one of the globe's leading naval and technological powers to launch its own efforts into promoting safety and security standards in shipping through initiatives like the Proliferation Security Initiative and the Container Security Initiative (Patrick 2016). The disjointed involvement by a major global power is also illustrative of the larger fragmentation present in the oceanic regime as a whole. Because of the wide scope of global ocean-related issues, from piracy to pollution, no single agreement or organizational body, even one as comprehensive as UNCLOS, has been able to oversee all of the global effort for sustainable ocean governance (Patrick 2016). Rather, UNCLOS

is an "umbrella convention" that works in conjunction with many other organizations and agreements (Ehlers 2016).

B. Other Relevant Conventions and Bodies

Prior to UNCLOS entering force in 1994, the global oceanic regime was a series of scattered efforts in various areas of oceanic governance. One of these first instances of institutionalized ocean regulation came from the formation of the International Whaling Commission (IWC). In response to dwindling global whale populations, the Commission adopted the International Convention for the Regulation of Whaling in 1946 to establish a legally binding schedule of regulations on the whaling industry. Since 1986, the Commission has placed a moratorium on all instances of commercial whaling (Mendenhall 2019, 28).

Another early governance body within the regime was the International Maritime Organization (IMO). A specialized UN agency, the IMO was founded in 1948 to promote "safety and security of [global] shipping" practices (International Maritime Organization 2013, 2). Examples of their efforts include the 1966 International Convention on Load Lines, the 1972 International Convention on Safe Containers, and the 1974 Convention on the Safety of Life at Sea. These conventions deal predominately with protecting human life while at sea by creating safe shipping practices.

However, as it has become increasingly evident that shipping practices are causing damage to marine life, the IMO has taken a larger role in "the prevention of marine and atmospheric pollution by ships" (International Maritime Organization 2013, 2). The 1972 London Convention and the 1978 International Convention for the Prevention of Pollution from Ships (MARPOL) have promoted global environmental

stewardship in shipping practices (Patrick 2016; International Maritime Organization 2019a; Mendenhall 2019). These conventions target pollution and dumping from ships, as well as unsustainable fishing practices.

Taking on similar issues, but at a regional level, is the United Nations Environment Programme (UNEP) Regional Seas Programme. Established in 1974, the Programme is a series of 18 conventions and plans of action that work to protect regional bodies of water, such as the Mediterranean Sea and the Caribbean Sea (UNEP 2017). While tackling a host of issues from oil spills to disaster reduction, these multilateral agreements have been able to function within a variety of cultural landscapes (UNEP 2017).

The wide range of focused multilateral institutions and agreements work in conjunction with the broader UNCLOS to create a global landscape for the protection of oceans. Though the regime's components cover a comprehensive scope of marine issues, from territorial borders to safety to marine species protection, the system is characterized by fragmentation.

II. Relationship to Market (Independent Variable)

As described in the previous section, UNCLOS has established territorial borders in the ocean and coinciding regulations on proper behaviors within each designated zone. These provisions have provided a legal framework for the operation of transboundary marine industries. When it is looked at in terms of its territorial focus, the global oceanic regime can be said to facilitate, or enable, many economic activities. When evaluating the global oceanic system of governance as an environmental regime, however, there is another story to be told.

A. Overview of the Ocean-Related Economy

The global oceans have long served as a means for economic activity and growth. This maritime industrial activity has predominately taken place within three sectors: maritime transportation, fisheries, and oil and gas extraction (Ehlers 2016, 189). These industries, as central drivers of the period of industrialization and globalization, have contributed to the establishment of the massive contemporary global economy.

As related economic practices and technologies have been implemented over the past centuries, these three industries have progressed. However, the maritime industry has never seen a shift quite to the scale of the contemporary movement for *blue growth.* Defined by the European Commission as the "sustainable growth in the marine and maritime sectors," *blue growth* encourages corporations to participate in the sustainable development of both existing and emerging ocean industries (Ehlers 2016, 195). These new industries, such as aquaculture, coastal and maritime tourism, marine biotechnology, ocean energy, and seabed mining are forming a so-called *blue economy* (Ehlers 2016). This *blue economy* is developing and operating within the realm of the oceanic regime.

Although sustainability is promoted as an important aspect of the global economic *blue growth*, many currently acceptable oceanic practices, when left unregulated, still have serious environmental implications on marine ecosystems and oceanic health. The ever-expanding tourism industry interferes with coastal habitats. Ocean energy industries still facilitate pollution from ships, overfishing, oil spilling, and dredging, which cause disturbances to the delicate balance of marine ecosystems. Even within the realm of so-called sustainable *blue growth*, it is these types of damaging corporate practices that have encouraged global oceanic institutions to introduce strict environmental regulation.

B. Industry Response to Ocean Regulation

In general, environmental regulation seeks to place limits on the acceptable practices of corporate actors. Facing higher production costs because of these barriers, these actors have historically tried to either prevent the creation of or avoid complying with these regulations. This general position has been the predominant response to the oceanic regime. During the regime institutionalization process, the negotiations of new regulations on corporate oceanic practices have historically demonstrated this clear tension between multinational corporations and oceanic protection.

One prominent example of global governance regulating environmentally harmful practices is the International Whaling Commission (IWC). Originally established in 1946 as a voluntary organization, the IWC aimed to promote sustainable commercial whaling practices (International Whaling Convention 1946). After initiating baseline regulations in its first decades of operation and reevaluating commercial whaling as a threat to global whale populations in the early 1980s, the Commission decided to "introduce a moratorium on commercial whaling starting in 1986" (Mendenhall 2019, 28). While this ban is still in effect today, many nations, including Japan, Norway, and Iceland who rely on commercial whaling, have resisted the regulations by whaling commercially in international waters (Japan Whaling 2019). As of July 2019, Japan withdrew from the IWC, and it has publicly resumed commercially whaling (Japan Whaling 2019). Though many nations have complied with the whaling regulations, there exists notable resistance.

Another example of this regulatory tension is the IMO's MARPOL Agreement. The first attempt in 1973 to enact regulations on marine pollution from ships was halted, as lobbying efforts from the shipping industry prevented enough states from ratifying the

agreement (Mendenhall 2019). Parties returned to the negotiation table to discuss granting concessions to the opponents, and the second attempt, MARPOL 73/78, eventually entered force a decade later (Mendenhall 2019, 31). The delayed negotiation of MARPOL is one example of how the attempts to regulate of unsustainable oceanic practices have been diluted by backlash from global corporations.

While historically industries that benefit from the exploitation of resources have opposed regime regulations, backlash has not been the only response, especially as of recent. In 2009, the World Ocean Council was formed as an alliance to bring together the interests of all ocean industries and promote "corporate ocean responsibility" (Holthus 2018; World Ocean Council 2021). Through hosting Sustainable Ocean Summits for industry actors, the group has discussed the "development and implementation of industry-driven solutions to ocean sustainability challenges" (World Ocean Council 2021). Though no major breakthroughs have occurred yet, the WOC regularly publishes reports on promoting collective action for ocean industries. Additionally, with a more condensed ocean industry position, the group is also collectively advocated for the inclusion of industries at future global ocean negotiations.

C. Analysis of Regime-Market Relationship

As a complicated regime system with numerous moving parts, the overall global oceanic regime is difficult to code as strictly market-enabling or regulatory. UNCLOS, by creating global territorial boundaries and conditions under which transboundary marine industries can operate equally, can be considered enabling of existing economic activity. Therefore, when the regime is looked at in terms of its territorial focus, the global oceanic regime can be said to facilitate, or enable, many economic activities. Although this is an

important piece of the overall regime structure, for the purpose of this study, the environmental parts of the global oceanic regime are more relevant to oceanic industries.

By enacting regulations, the global oceanic regime has presented challenges to MNCs' behaviors, and, as a result, has limited market activity in some capacities. These types of contentious relationships between industry and regulation can be seen across different marine industries, from whaling to shipping. Within the context of these regulations, there have been few breakthroughs for alternative technologies and minimal development of truly sustainable industries. Without clear oceanic industrial developments, the global oceanic regime is coded as *regulatory*.

III. Effectiveness (Dependent Variable)

With the context of the formation, development, and impacts of the global oceanic regime, the study moves to a discussion of the regime's effectiveness. Because this project is particularly concerned with environmental regimes, the below evaluations focus on the environmental implications of the global oceanic regime. These include Part XII of UNCLOS, the IWC, the UNEP Regional Seas Program, the IMO's MARPOL and London Convention, and other international bodies and agreements. Beginning with institutional effectiveness and then preceding to ecological effectiveness, the selected indicators from the literature inform the ranking of the oceanic regime.

A. Institutional Effectiveness

> i. *The agreement was completed on the prescribed timeline without major hold ups.*

While the negotiations for UNCLOS originally began in 1958, disagreements between states on the scope and terms caused delays. Following two more UN

Conferences, the comprehensive UNCLOS III was finally adopted in 1982 and entered

force in 1994 (Mendenhall 2019). Although the agreement is an impressively complex

treaty on a host of global issues, including navigation, fishing, scientific research, marine

pollution, and territorial and jurisdiction claims, the timeline of many decades of

negotiations was far longer than intended. (0 points).

> ii. *The institutional framework has been revisited and updated at least once since its original inception.*

UNCLOS impressively establishes a general oceanic law for an expanse of

relevant issues. Despite the years of work put into the development of the UNCLOS

document, it has not been updated since it entered force in 1994 (Mendenhall 2019). As a

result, the aging Convention "does not adequately address a number of emerging and

increasingly important international issues," particularly related to climate change

(Patrick 2016, 4; Mendenhall 2019).

That is not to say that there have been no advancements in the oceanic governance

in recent years. Initiatives within UNCLOS, such as the 1995 Fish Stocks Agreement,

have been implemented in the years since the Convention was put into force (DOALOS

1995). Other organizations, such as the IMO, ITLOS, and the ISA are working to support

the framework set forth by UNCLOS (Patrick 2016). Despite these smaller acts, the

stagnation of the international community to reform and advance UNCLOS demonstrates

its lack of institutional functionality. (0 points).

> iii. *There are mechanisms in place for the enforcement of the agreement, such as inspections or reporting.*

UNCLOS establishes general oceanic regulations on state and industry behaviors.

In its provisions, the convention places the responsibility of enforcing these regulations

onto individual states. For example, Articles 213 through 222 of UNCLOS describe the responsibility of states to monitor and enforce international polluting behaviors (DOALOS 1982). Placing this responsibility onto the involved states imposes a high enforcement cost on individual states rather than spreading the cost across a group of states. Additionally, this enforcement strategy has caused regional conflict, particularly when dealing with areas of contested jurisdiction (Patrick 2016, 4). [11]

Because of the reliance of the UNCLOS framework on states for enforcement, other multilateral efforts have largely been unable to establish stronger surveillance, capacity-building mechanisms (Patrick 2016, 4). The lack of strong external enforcement mechanisms for holding states and industries accountable for their regulatory responsibilities shows weakness in the institutional ability to cause behavioral change (0 points).

iv.   *The regime features mechanisms for the generation and widespread distribution of information.*

Article 200 of UNCLOS demonstrates that international actors understand the importance of generating and sharing ecological information. It reads that "states shall cooperate, directly or through competent international organizations, for the purpose of promoting studies, undertaking programmes of scientific research and encouraging the exchange of information and data acquired about pollution of the marine environment" (DOALOS 1982, 102). While there is no explicit indication in UNCLOS of which organizations should take on this task, many have. For example, the IMO, the Intergovernmental Oceanographic Commission of UNESCO, the International

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[11] These instances of disagreement can be taken to the International Tribunal for the Law of the Sea (ITLOS), which hosts provides judicial proceedings related to UNCLOS (ITLOS 2021).

Hydrographic Organization, and others have organized the exchange of scientific and technical information (Mendenhall 2019). Though organization of scientific oceanic discourse are a bit disjointed, there are coordinated efforts being made. (1 point).

B. Ecological Effectiveness

      i. The regime's specific goals were created in response to scientific discourse.

The global oceanic regime, which is centered around the UNCLOS, was built to solidify international norms around the "freedom of the seas" and territorialization. While this is issue area is inherently linked to the preservation of oceanic resources, the bulk of the agreement was not a direct response to environmental concerns.

Looking at the specifically environmental aspects of the oceanic regime, however, there is more indication of a response to scientific discourse. Part XII and XIII of UNCLOS, recognizing the sources of marine destruction, uses the concerns raised by scientists to encourage states to conduct coordinated scientific research and collectively take responsibility for preserving their marine environments (DOALOS 1982). Still, the UNCLOS does not set specific goals to be achieved by global actors.

However, other international treaties, such as the IWC's International Convention for the Regulation of Whaling, the UN's Fish Stocks Agreement, and the IMO's MARPOL 73/78 are prime examples of how scientific discourse can be transformed into direct goals for global governance. Following growing concern of depleting whale populations, overfishing, and hydrological destruction from ship pollution, each organization has facilitated the creation of regulatory agreements (International Whaling Commission 1946; International Maritime Organization 2013; DOALOS 1995). Land-based marine pollution has prompted the creation of the UNEP's Global Programme of

Action for the Protection of the Marine Environment from Land-based Activities. The

2010 Nagoya Protocol has aimed to "halve marine extinction rate by 2020" (Patrick

2013, 14). While each of these agreements has a varying degree of success in solving

their ecological challenge, the goals of the environmental realm of the oceanic regime

have generally been created in response to specific scientific discourse. (1 point).

> ii. *Over 85% of the state signatories changed their behavior during the implementation phase of the regime.*

Because of the fragmented nature of the global oceanic regime, it is difficult to

gauge exactly what percentage of signatories are responding with behavioral change.

However, by analyzing a sample of important oceanic environmental regulations, I will

estimate the level of behavioral change and code this measure accordingly. UNCLOS, the

IWC, and the UNEP Regional Seas Programme are three valuable examples of the

behavior change of the global oceanic regime.

Although Part XII of the UNCLOS does not establish concrete environmental

goals, it does provide a general "framework for marine protection" from pollution

(Mossop 2018, 577). This framework, with the additional support of the MARPOL

agreement, has resulted in most global actors moving away from deliberately harmful

shipping practices. Displeased with the long-lasting global moratorium against

commercial whaling, some nations, such as Japan and Norway, have returned to their pre-

IWC whaling practices (Mendenhall 2019). Still, a strong majority of IWC signatories

have changed their nation's commercial whaling practices (International Whaling

Commission 2021). Finally, the Regional Seas Programme, although disjointed, has

garnered the support of 146 nations in a series of regionally conscious agreements and

plans of action. Between the participation in a host of conventions and agreements to

combat oceanic degradation, funding scientific research, and continued discussion, a very strong majority of countries have changed their behaviors. (1 point).

> iii. *Over 70% of actors meet the regime's regulations in their respective issue areas.*

Working within the regulations established by Part XII of UNCLOS, the IMO's MARPOL 73/78, the 1972 London Convention, and various UNEP Regional Seas Programs, global actors have moved toward more sustainable shipping practices, particularly related to polluting and oil spilling (International Maritime Organization 2019a; Mendenhall 2019). However, extensive land-based pollution, which makes up about 70 percent of total marine pollution, still remains, presenting a more serious problem (Mendenhall 2019). Despite attempts like the Nagoya Protocol and the UNEP Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, global policy and norms have not been able to successfully target widespread land-based pollution (Mendenhall 2019).

Regarding the protection of ocean species biodiversity, the IWC's International Convention for the Regulation of Whaling is generally regarded as successful with high levels of signatory compliance. Recent defection by signatories within the Arctic region, however, have signaled that the issue area may face some backsliding (Japan Whaling 2019). While the global effort to protect whale populations has been successful, the protection of marine life against overfishing has been disastrous. The implementation of the UN Fish Stocks Agreement and numerous regional fishery treaties has generally seen low levels of compliance due to the widespread use of illegal fishing vessels and its inability to effectively monitor fishing industries on a global scale (Patrick 2013).

There has surely been some progress toward compliance with oceanic regulation. However, there are many instances of defection in considerably important issue areas that suggest the regime's inability to promote widespread global compliance. (0 points).

iv. *Positive biophysical impacts are observable after regime implementation.*

In looking to biophysical indicators of a host of ocean-based issues, it becomes clear that the global oceanic regime has not caused a reversal of the negative trends that prompted the creation of the regime. In the past four decades, there have been significant reductions in the amount of ship-based pollution and oil spills (Mendenhall 2019). However, instances of land-based pollution continue to flourish, presenting significant problems for marine ecosystem health (Mendenhall 2019). Climate change trends have continued to swell, prompting new challenges for global ocean ecosystems, such as the acidification of wetlands and coral reefs and the melting of ice in the Arctic and Antarctic regions (Patrick 2016). Following years of exploitative whaling practices, whale populations are on a track to recovery. However, over 80% of the world's fish stocks are still depleted, despite widespread efforts to curb overfishing (Patrick 2016, 2; Mossop 2018, 574). While there have been some visible positive changes following the institutionalization of the global oceanic regime, the overall trend of biophysical impacts has continued to be negative. (0 points).

IV. Conclusion

Global Oceanic Regime
Market Relationship: Regulatory
Institutional Effectiveness: 1/4 (institutionally ineffective)
Ecological Effectiveness: 2/4 (somewhat ecologically effective)

The global oceanic regime, when evaluated in its capacity as an environmental regime, has been limited in its success. In an institutional sense, the regime scored only met one (1/4) criterion for effectiveness. The regime, which operates within the framework of UNCLOS and other smaller conventions and agreements, has been characterized by fragmentation. This disjointedness, when considered alongside the lack of effective enforcement mechanisms and inability to restructure in the face of new challenges, has rendered the global oceans regime largely institutionally unsuccessful.

As for its ecological impact, the regime met two (2/4) criteria for effectiveness. While scientifically minded regulations have been enacted to counter the negative consequences of destructive oceanic practices, the high cost of compliance has restricted states and their industries' willingness to make long-term changes. The regime's inability to garner consistent and full compliance from important state and corporate actors has caused it to stagnate as a mode of environmental governance.

As a predominately regulatory regime, global ocean governance has historically dealt with a combative position by market actors. With vested interests in the pollution of marine landscapes and the exploitation of oceanic resources, many market actors have resisted environmental policy creation, and if that had failed, have resorted to non-compliance. This failure to abide by regime provisions, then, has created the larger inability of the regime to address the destruction of marine ecosystems.

Based on the narrative of the global oceanic regime, one explanation for these low levels of effectiveness has been the failure of regime compliant technological advancements to keep up with regulation. When a regulation is put into place, market

actors have the choice to comply or defect. In complying, the firm must incur the cost of adjustment to new practices, which often involves the adoption of new technologies. However, there have not yet been sufficient, widespread technologies developed as alternatives to harmful ocean industry practices, such as energy substitutes and waste management strategies. Because the global oceanic regime has not allowed for the establishment of a clear path for economic progression, many powerfully damaging firms have made the decision incur the less costly penalties of defecting.

This lack of clear technological options for substituting industry practices in the global oceans regime is also inherently linked to the pervasive nature of the global oceans problem. Because of the extensive range of ocean-related issues, both territorial and ecological, ocean governance has called for a complex system. With sources of marine degradation coming from a variety of state and corporate actors, the policy solutions have to target an extensive list of industries and actions. These targeted efforts, while sometimes impactful on oceanic issues, often become lost within the larger framework of the regime. Based on evidence of the fragmented character of the regime, the scattered efforts to manage oceanic systems seem to stem from the scattered nature of the problem.

Another important consideration for this regime has been the ineffective mechanisms for enforcement of regime provisions. In many of the ocean governance agreements, coastal states are placed in charge of enforcing regulations. While there are bodies, such as the ITLOS, that can be utilized in situations of international dispute, the high costs of both adjusting to and enforcing regulations causes states and their industries to have ample incentive to defect.

Recent movements, such as the creation of the World Ocean Council and the movement towards a *blue economy* might indicate that the market is at a turning point. However, presently, the lack of support from these powerful corporate actors is weakening the potential strength of the global oceanic regime.

Case 4: Biodiversity Regime

Biodiversity is defined as the biological variety of living organisms and their ecological surroundings on the Earth (Millennium Ecosystem Assessment 2005). As living beings and their complexes are constantly evolving, this multiplicity of lifeforms within and across global ecosystems is constantly changing and progressing. Though elements of biodiversity are variable, it has long been of value to human beings. From aesthetic beauty to basic ecosystem services to economic opportunity, humans have an interest in preserving biodiversity (Jóhannsdóttir et al. 2010, 140).

Despite biological diversity having both inherent and instrumental value for humans, current trends demonstrate an increasingly large threat to global ecosystems and their species. At the core of this threat is humanity, whose rapid development has created the ecological conditions for mass species loss. Recognizing that human-caused biodiversity loss will create conditions that are unsuitable for sustaining any life on Earth, it has become increasingly imperative for global governance efforts to address biodiversity.

The study of the biodiversity regime, as this case study will demonstrate, provides a rich narrative on how a system of global governance can emerge from an immensely complicated environmental issue. Despite the complexity, the institutional structure of the regime has made significant progress since its inception in the mid 1970s, with provisions that apply regulations on many global state and economic actors. While negotiating a widely accepted regime framework is an impressive feat in itself, the agreements within the regime have been prone to non-compliance. As a result, the positive ecological

outcomes have been limited. Throughout this section, these evaluations of effectiveness are placed in direct discussion with the regime-economic market relationship.

I. Background

A. Scientific Discovery and Progress

Throughout its history, the Earth has seen five mass extinctions of species, in which biological diversity was seriously compromised. Based on a variety of biodiversity indicators, scientists have shown that current trends of species loss are outpacing the rate of loss even for these previous periods of mass extinction (Raven et al 2011; Cafaro 2015). Without any indication of this rate, an expansive body of scientists has concluded that the Earth has entered a new sixth period of mass extinction (Millennium Ecosystem Assessment 2005, 42).

While the causes of these previous mass extinctions are heatedly debated, the body of scientists has generally agreed that this contemporary period of mass extinction is caused by five "direct drivers" (Millennium Ecosystem Assessment 2005, 8). These causes of biodiversity loss include habitat destruction, invasive species, overexploitation, pollution, and climate change (Cafaro 2015). Each of these direct drivers can be traced back to the demographic, economic, sociopolitical, cultural, and technological implications of humanity's rapid development (Millennium Ecosystem Assessment 2005, 8). Uncontrolled population growth and expansion of harmful business practices, in particular, put increasing amounts of stress on the Earth. This realization that one of the most serious threats to life on Earth is humanity's destruction of global species has sounded alarm bells and prompted the international community to address biodiversity in global governance.

B. Growing Pressure from the IUCN

The International Union for Conservation of Nature (IUCN) was created as an international organization in 1948 with the commitment to the protection of nature. As a collection of government and civil society actors, the IUCN has served as "the global authority on the status of the natural world and the measures needed to safeguard it" (IUCN 2017). Its first decades in operation were dedicated to creating accessible environmental assessments for understanding how humanity was impacting the functioning of Earth's ecosystem. Starting in the 1970s, however, the IUCN became a driving central force behind the creation of biodiversity-related international agreements (IUCN 2017).

Today, the IUCN has continued to represent the interests of a host of non-human species. It has garnered the support of over 1,400 member organizations and has been granted permanent status as a United Nations observer (IUCN 2017). The Union hosts the IUCN World Conservation Congress every four years, where members and experts discuss how human society can implement policy and measures in order to properly transition to sustainable development.

C. Early Conventions for the Protection of Biodiversity

The collection of multilateral and international agreements that have constituted the contemporary biodiversity regime can be traced to the 1971 Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat, also known as the Ramsar Convention on Wetlands. In the 1960s, a host of ornithologists, with the support of the IUCN, the International Council for Bird Preservation, and the International Waterfowl and Wetlands Research Bureau, voiced their concern about the "global loss of

migratory waterfowl habitat" (Griffin 2012, 7). This effort culminated in the Ramsar Convention. By designating the "Ramsar List" of Wetlands of International Importance, the Convention has committed signatories to cooperating for the preservation of wetlands habitats and the waterfowl (UNESCO 1971). Its Conference of Contracting Parties (COP) still meets in three-year increments to discuss the findings and resulting implications of their Scientific and Technical Review Panel (UNESCO 1971; Griffin 2012).

In 1972, the UN Educational, Scientific and Cultural Organization (UNESCO) hosted the signing of the World Heritage Convention, which creates a global plan for the preservation of both cultural heritage and natural heritage. Backed by the IUCN once again, the Convention simultaneously acknowledges national sovereignty and dons onto State Parties the responsibility of designating and protecting World Heritage Sites within their national territory (UNESCO 1972). To financially assist developing nations with these new duties, the Convention also established the World Heritage Fund (UNESCO World Heritage Center 2021). This explicit marriage of the cultural and ecological importance of the Earth in the World Heritage Convention furthered the institutionalization of the biodiversity regime.

Following the founding of UNEP in 1972, most of the subsequent biodiversity-related conventions were established within the UNEP realm. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which entered force in 1975, is a legally binding international agreement regarding wildlife trade. Article VIII explains that signatories must both "penalize trade in, or possession" of illegal foreign species and "provide for the confiscation or return to the State of export of such specimens" (CITES Secretariat 1973, 6). Today, the treaty maintains the integrity

of global biodiversity by regulating the trade of 37,000 species of animals and plants (CITES Secretariat 2019).

While CITES addresses the human transportation of species across borders, the 1979 Convention on Migratory Species of Wild Animals (CMS) tackles the protection of migrating animals. Through observational research, CMS has designated the range of a host of migratory species. This work by the framework Convention has allowed for "internationally coordinated conservation measures" in the form of smaller regional agreements or informal arrangements (CMS Secretariat 2020). Examples of these efforts include the Agreement on the Conservation of African-Eurasian-Migratory Waterbirds (AEWA) and the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS) (Jóhansdóttir et al. 2010, 147).

These three framework conventions served as the original structure of the global biodiversity regime for over a decade. While each is still in operation today, the growing significance of biodiversity issues and pressure from international organizations, such as the IUCN, led to the United Nations to begin working toward implementing a comprehensive biodiversity convention. The UN Convention on Biological Diversity (CBD) has served since 1992 as the centerpiece of the biodiversity governance system.

D. Development of the UN Biodiversity Framework

At the 1992 UN Conference on Environment and Development (the Rio "Earth Summit"), the Convention on Biological Diversity (CBD) was opened for signature (CBD 2021). It entered force in 1993 and, with the support of its Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), began addressing its three main goals: "the conservation of biological diversity," "the sustainable use of the

components of biological diversity," and "the fair and equitable sharing of the benefits arising out of the utilization of genetic resources" (CBD 2021). It spans across the globe, working on biodiversity issues in all types of contexts, from marine and coastal areas to agricultural regions to mountains (CBD 2021).

To achieve these three goals on wide scale, the CBD sponsored supplementary agreements: the Cartagena Protocol and the Nagoya Protocol. Dating back to 2000, the Cartagena Protocol on Biosafety "seeks to protect biological diversity from the potential risks posed by living modified organisms resulting from modern biotechnology" (CBD 2012, 1). By transparently sharing relevant information about the ecological damaging effects of living technologies, the Protocol has promoted global biosafety. In 2010, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization became the second supplemental agreement to the CBD. This protocol directly addresses the third goal of the CBD, to promote global access to genetic resources for the sustainable development of human society (CBD 2015; CBD 2021). Taken together with these protocols, the Convention on Biological Diversity has served as the biodiversity regime's home for nearly three decades.

E. Contemporary Regime Mechanisms

The biodiversity regime, seeing industrial practices as the foundation of biodiversity loss, has targeted a wide variety of business practices from an even wider body of international firms. The regime institutions have employed many mechanisms for furthering its biodiversity goals. These include the creation of international targets for biodiversity improvement, the introduction of frameworks that encourage national and corporate regulation, and the facilitation of biological technology distribution.

i. Scientific Collaboration and Goal Setting

A multitude of scientific bodies have been working to synthesized information regarding the current biodiversity trends. These organizations include the CBD's Subsidiary Body on Scientific, Technical, and Technological Advice (SBSTTA), the UNEP World Conservation Monitoring Centre (WCMC) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (Jóhansdóttir et al. 2010). Using compiled scientific findings, policymakers from the CBD and other multilateral conventions have crafted targets in various areas of biodiversity, from habitat conservation to marine species protection. The Aichi Biodiversity Targets are one example of these global targets. Established within the 2011-2020 CBD Strategic Plan, the Aichi Biodiversity Targets have set six strategic goals and twenty specific targets for implementation by the signatory Parties (CBD 2020a). By encouraging collaboration, the biodiversity regime has grounded its regulatory policy in scientific discourse.

ii. Encouraging National & Corporate Regulation

While there are very few legally binding international agreements within the realm of the biodiversity regime, the regime has encouraged states and corporations to set their own biodiversity-related regulations. As is part of many international regimes, "states are obliged to monitor the national implementation" of the biodiversity regime" (Jóhansdóttir et al. 2010, 144). Using the international biodiversity targets and policy suggestions set forth by the regime, states are instructed to enact national biodiversity regulations. When regulations come from this national level, states have the capacity to enforce them within their territorial borders (Tsioumani and Tsioumanis 2020).

Beyond encouraging the state to establish legally binding regulations on certain harmful practices, the biodiversity regime has also targeted corporations directly. Since COP-8 in March 2006, "the business community has been officially asked to contribute to the objectives of the Convention on Biological Diversity" (Houdet et al. 2011, 37). Decision VIII/17, in particular, establishes the importance of having corporations consider biodiversity when making their company strategies and policies. [12]

iii.   Facilitating Biological Technological Distribution

The two biodiversity regime mechanisms mentioned above focus predominately on the establishment of regulations, there has also been a considerable amount of stress placed creating a collaborative global community that is committed to furthering human development in a biologically sustainable way. The regime is bringing about this reality through the creation of benefit-sharing partnerships. This strategy "builds scientific and technological capacity within high-biodiversity countries, can promote legal and policy regimes that protect the rights of countries, individuals, communities and corporations, and can encourage sustainable development and the conservation of biological diversity" (Kate and Laird 2000, 264). The Cartagena and Nagoya Protocols exemplify this goal, as they seek to create widespread access to biological information and technologies.

Because of the difficulty in passing legally binding international agreements, the bulk of international efforts on biodiversity protection is focused on compiling scientific information and providing potential policy options, encouraging states and business

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[12] In order to achieve the Convention's objectives, Decision VIII/17 at the COP-8 for the CBD acknowledges the "the need to enhance voluntary commitments of the private sector" (Conference of Parties to the CBD 2006, 1). It implores Parties to the Convention to encourage and support the transition of corporate actors to biologically safer practices by raising awareness, providing guidance, and setting benchmarks, and facilitating public-private partnerships.

actors to enact regulation, and facilitating the fair distribution of biological technology. These initiatives originate in numerous frameworks, conventions, and agreements.[13] In an attempt to bring together the many efforts for global biological diversity governance, "a web of memoranda of cooperation and understanding have been created between the secretariats of the CBD, the Ramsar Convention, the CMS, CITES, the World Heritage Convention and the International Seed Treaty" (Jóhansdóttir et al. 2010, 143). This collaboration aims to both "strengthen international governance and reduce duplication" in these efforts (Jóhansdóttir et al. 2010, 143). Despite these attempts, the sheer scale of the biodiversity problem and the number of relevant conventions, organizations, and agreements has rendered the biodiversity regime fragmented.

II. Relationship to Market (Independent Variable)

A. Business and Biological Destruction

The biodiversity regime, as a collection of institutions, norms, and behavioral procedures, is inseparably linked to a host of global industries. Historically, very few global businesses have operated independently of their surrounding environment. Their reliance on biological resources had characterized their operations for generations and have led to the exploitative business practices that have caused biological destruction. However, seeing that many corporate practices rely on natural resources, it is these very businesses that have a stake in the reversal of negative biodiversity trends. This section

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[13] Here is an incomplete list of multilateral agreements that constitute the international biodiversity regime: Convention on Biological Diversity (CBD); International Convention for the Regulation of Whaling; Ramsar Convention; World Heritage Convention; Convention on International Trade in Endangered Species (CITES); Convention on Migratory Species (CMS); United Nations Convention on the Law of the Sea (UNCLOS); UN Convention to Combat Desertification (UNCCD); Straddling Fish Stocks Agreement; the Cartagena Protocol; the Nagoya Protocol; and International Treaty on Plant Genetic Resources for Food and Agriculture (the International Seed Treaty) (Jóhansdóttir et al. 2010).

will further explore this two-fold relationship between global industries and the international biodiversity regime.

The rapid collapse of non-human species populations can be traced to the enduring behaviors of many dominant global industries. Many industries, such as logging, pharmaceuticals, and technology firms, rely on directly extracting natural resources as raw materials in the production of products or services (Smith et al. 2019). When placed in the context of a competitive marketplace, these practices are often overused and can cause the depletion of valuable resources.

Damaging extractive practices have also been coupled with the highly pollutant energy industry. The mining and burning of coal, oil, and natural gas both depletes global natural resources and contributes to high levels of greenhouse gas emissions (Smith et al. 2019). Shipping industries, which facilitate the international trade of these extracted goods, also actively contribute to high levels of species destruction through atmospheric pollution and oceanic dumping (Ehlers 2016). This combination of resource extraction and pollution makes for some dually destructive industries.

Other biologically damaging industrial practices include the demolition of previously wild lands and native species. The construction of residential, commercial, and government facilities have flattened natural habitats for the progression of human society (Smith et al. 2019). Additionally, the operation of industrial agricultural practices, such as monoculture cropping and concentrated animal feeding operations (CAFOs), relies on the introduction of particularly economically efficient species (Kate and Laird 2000). By destroying habitats, introducing nonnative species, overexploiting, polluting,

and contributing to climate change, these types of industrial business practices, among many others, have triggered rapid biodiversity loss (Cafaro 2015).

It is clear that the interconnectedness of many industry operations with the Earth's natural resources has caused the degradation of global biodiversity. However, the Earth's vast biodiversity is also a keystone for many global industries, including agriculture, forestry, fisheries, and tourism (Tsioumani and Tsioumanis 2020, 3). It is, then, in the economic interest of some industries to support the regulation of harmful biological practices. This distinction between corporations that benefit from having a violently harmful impact on biodiversity and those that would prefer to operate on a biologically diverse Earth has resulted in a level of duality in the regime structure, with some strategies focused on regulation and others on facilitating sustainable economic development.

B. Analysis of Regime-Market Relationship

While some aspects of the biodiversity regime have encouraged corporations to develop and share new biotechnologies for more sustainable development, this type of market opportunity is not sufficient to code the regime as market-enabling. Rather, the principal provisions that have been enacted under the regime have placed restrictions on land use or emissions levels. This restriction of free market action leads me to code the biodiversity regime as *regulatory*.

III. Effectiveness (Dependent Variable)

Overall, the global biodiversity regime is a complex system dealing with biological diversity issues through a variety of norms, institutions, and agreements. Although the system is fragmented by nature, it has been somewhat effective, particularly

in areas of institutional effectiveness. The regime still has serious steps to take in order to achieve higher levels of ecological effectiveness. In this following section, the characteristics of institutional and ecological effectiveness are used to evaluate the regime structure and performance.

A. Institutional Effectiveness

i. The agreement was completed on the prescribed timeline without major hold ups.

Following years of scattered efforts to address different areas of biological diversity, the international biodiversity regime was institutionalized with the creation of the UN CBD. With pressure mounting from the IUCN and other civil society actors at the end of 1988, the UNEP organized the Ad Hoc Working Group of Experts on Biological Diversity "to explore the need for an international convention on biological diversity" (CBD 2021). When this group decided that a convention would be necessary, it convened another ad hoc group of technical and legal experts to begin the drafting and negotiation process in May of 1989. This group, the Intergovernmental Negotiating Committee for a Convention on Biological Diversity, worked until the Nairobi Conference of 1992, where the Convention was officially opened for signatures (CBD 2021). Although it took decades for the international community to respond to the calls for action by biodiversity activists, a comprehensive agreement was put into force in 1993, only five years after collective international action commenced. (1 point).

ii. The institutional framework has been revisited and updated at least once since its original inception.

While there are numerous parts of the overall biodiversity regime, a closer look at the CBD provides a valuable demonstration of the ongoing efforts to keep the regime

framework relevant. The Convention, which entered force in December 1993, has gathered fourteen COP meetings and two extraordinary meetings of the Parties to the Convention (CBD 2020b). While this group is primarily concerned with the implementation of the Convention, the meetings have addressed emerging issues of biological diversity. The increasing significance of biosafety brought about the adoption of the 2000 Cartagena Protocol. Similarly, discussions about technology cooperation and benefit-sharing prompted 2010 Nagoya Protocol (CBD 2020b). The CBD, as well as other biodiversity-related conventions and institutions, are adjusting the framework of the biodiversity convention to meet the needs of a changing world. (1 point).

> iii. *There are mechanisms in place for the enforcement of the agreement, such as inspections or reporting.*

The responsibility of complying with the provisions of the biodiversity regime falls onto individual state and corporate actors. Historically, the regime has lacked an international body with the responsibility and capability of enforcing this compliance. Rather, states and corporations have been in charge of self-monitoring and reporting their progress within biodiversity realms (Jóhansdóttir et al. 2010, 144).

Recognizing the challenges of self-reporting and no legal enforcement mechanism, the CBD has initiated specific programs to encourage compliance from state and corporate actors. For example, COP-12 and COP-13 brought about the Business and Biodiversity Pledge, "which requires [its 140] signatories to report on their activities related to biodiversity" (CBD 2018). With efforts like these, in CBD, in its 5th Global Biodiversity Outlook report, explains that participation by states and corporations in this self-reporting system has been increasing since the introduction of the regime (Secretariat of the CBD 2020, 12). However, the lack of a governing enforcement body to monitor the

progress of various actors within the biodiversity regime has rendered the mechanisms less useful (0 points).

> iv. *The regime features mechanisms for the generation and widespread distribution of information.*

One of the major initiatives of the biodiversity regime has been to promote collective scientific advancement in the field of biological diversity. International organizations that serve this purpose include the CBD's SBSTTA, the UNEP's WCMC and the IPBES, among others (Jóhansdóttir et al. 2010). These organizations, as well as other agreements, such as the Cartagena and Nagoya protocols, have facilitated the distribution of scientific and technical information to state and corporate actors.

The regime has also highlighted the importance of sharing this information about biodiversity loss with the general public. Article 13 of the CBD dons on states the responsibility to "promote and encourage understanding of the importance of, and the measures required for, the conservation of biological diversity" with the public (United Nations Convention on Biological Diversity 1992, 8). These efforts culminated at the COP-8 with the introduction of the Global Initiative for Communication, Education and Public Awareness (CBD 2018). The biodiversity regime has included mechanisms for both the generation and dissemination of information throughout the international community. (1 point).

B. Ecological Effectiveness

> i. *The regime's specific goals were created in response to scientific discourse.*

There is a wealth of international scientific bodies that are researching issues of biodiversity. Some groups have contributed specifically to the creation of policy choices

for international agreements, like the International Waterfowl and Wetlands Research Bureau at the Ramsar Convention and the Ad Hoc Working Group of Experts on Biological Diversity at the CBD (UNESCO 1971; Secretariat of the CBD 2020). Other initiatives, such as the U.S.-led Millennium Ecosystem Assessment and the UNEP WCMC, are monitoring the overall health of the biosphere and evaluating the efforts of the regime (Millennium Ecosystem Assessment 2005; UNEP World Conservation Monitoring Centre 2021). The input of the scientific community has played a central role in the creation and analysis of the biodiversity regime. (1 point).

> ii. *Over 85% of the state signatories changed their behavior during the implementation phase of the regime.*

The 5th Global Biodiversity Outlook report, published in 2020, provides an excellent overview of the implementation of the Aichi Biodiversity Targets from the CBD's Strategic Plan for Biodiversity 2011-2020. The Aichi Biodiversity Targets represent concrete ways for global actors to curb the rate of biodiversity loss. While these targets do not capture the biodiversity regime in its entirety, the CBD's relatively wide base of support and centrality to the regime makes it a reasonable substitute to assess regime effectiveness.

Based on information reported by the CBD signatories, 5th Global Biodiversity Outlook suggests that each of the Aichi Biodiversity Targets has seen more than 80 percent of actors changing their behaviors toward their national targets for the protection of biodiversity (Secretariat of the CBD 2020, 138). [14] Five of the Aichi Targets have seen less than 85% of actors change their behaviors, with the other fifteen Targets seeing

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[14] Over 80% of actors are designated as *on track to exceed*, *on track to reach*, or *have made some progress but at an insufficient rate* in each Aichi Biodiversity Target (Secretariat of the CBD 2020, 138).

above 85% behavioral change (Secretariat of the CBD 2020, 138). [15] When taken all together, the average percentage of signatories who change their behaviors exceeds 85%, making the regime an effective promoter of behavior change. (1 point).

> iii. *Over 70% of actors meet the regime's regulations in their respective issue areas.*

In looking at the same data from the 5th Global Biodiversity Outlook's report on Aichi Biodiversity Target achievement, it becomes clear that the high levels of behavioral change have not necessitated complete compliance from actors. Although an average of 85-90% of actors reported changing their behavior for the achievement of the Targets, between 35 and 65% of these actors were not on track to meet their targets (Secretariat of the CBD 2020, 138). None of the Targets are expected to see 70% of actors in full compliance. (0 points).

> iv. *Positive biophysical impacts are observable after regime implementation.*

Some initiatives within the biodiversity regime have found success at reversing negative biodiversity trends. With its *List of Wetlands of International Importance*, the Ramsar Convention has created "the world's largest network of protected areas with 1,915 sites, covering 187 million hectares" (International Institute for Sustainable Development 2011, 2). Another success is the International Whaling Commission, which placed a moratorium on commercial whaling that has allowed many populations of species and stocks of whales to recover (International Whaling Commission 2021).

While there have been some biological recoveries seen after the implementation of the biodiversity regime, overall levels of global biodiversity have not seen the same

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[15] Targets 6, 8, 9, 13, 20 have between an 80% and 85% rate of behavioral change.

reversal of trends. Using a diversity-weighted Living Planet Index (LPI)[16], McRae et al. estimate that there has been "a global population decline in vertebrate species between 1970 and 2012 of 58%" (2017, 1). Their work does not rule out the possibility that the rate of biodiversity loss is currently slowing. However, evidence is not clear enough to suggest a reversal of the negative trends in biological diversity. (0 points).

IV.   Conclusion

Global Biodiversity Regime
Market Relationship: Regulatory
Institutional Effectiveness: 3/4 (largely institutionally effective)
Ecological Effectiveness: 2/4 (somewhat ecologically effective)

As an institution, the global biodiversity regime has created the conditions for swift, coordinated action for the reduction of damaging biodiversity practices, as demonstrated by its score of three (3/4). It does have limitations, particularly dealing with the strength of enforcement strategies built into the regime structure. However, it has created functional mechanisms for information generation and distribution and allowed for continued regime development. Although it has achieved considerable institutional success, its ecological impact has been more limited, with a score of two (2/4). International actors, although making strides toward the protection of biodiversity, have not been able to meet the regime targets and have been unable to create sustained improvements to global biodiversity levels.

Having a regulatory relationship to industry, the biodiversity regime has generally dealt with a combative position by market actors. While many industries have economic

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[16] The LPI is a measure that analyses the state of global biodiversity considering the diversity of vertebrate species populations from around the world (McRae et al. 2017).

interest in biodiversity protection, a significant portion of powerful global firms further

themselves economically by exploiting natural resources and land. As a result of this

vested interest, many market actors have resisted environmental policy creation.

Nonetheless, biodiversity regulation, through agreements from the IWC and the CBD,

has been enacted, causing these deviant market actors to resort to non-compliance. As

demonstrated by the regime narrative, the failure of state and corporate actors to abide by

regime provisions has resulted in the larger regime failure to protect species and

ecosystem biodiversity.

As demonstrated by the discussion of the biodiversity regime's institutional

effectiveness, there have been insufficient mechanisms in place for the enforcement of

regime provisions. While some agreements, like the ICRW, have imposed legally binding

regulations on actors, the majority of biodiversity targets are adopted voluntarily, without

enforceable consequences for defection. As a result, the cost of defection is rather low.

In addition to the low cost of defection, the scattered nature of the biodiversity

problem has contributed to the ecological failure of the regime. A host of market

industries, including fisheries to energy to land development, are contributing to

biological degradation. Although the regime is centralized around the CBD, there is a

complex of related conventions, agreements, provisions, and norms to deal with the host

of specific biodiversity issues. While sometimes these efforts have successfully

contributed to the mitigation of biodiversity loss, the regime fragmentation has caused

these efforts to become lost within the larger framework of the regime.

Additionally, because of the scattered nature of the biodiversity issue, there are no

technically feasible, economically viable solutions to the problem. Without a clear and

unified path for the economic progression of market actors, many powerfully damaging

firms have made the decision accept the minimal penalties of defecting, rather than

incurring the high costs of adjusting to regulations.

In the theoretical argument, I hypothesized that the regulatory nature of an

international environmental regime would complicate the regime negotiation process and

negatively impact its institutional effectiveness. While this may have been observable in

this case, it seems more notable that the regulatory nature of the regime caused low levels

of actor compliance. This has translated to a wider regime failure to bring about the

biological regrowth it had hoped to.

Chapter 5: Conclusions

After having carried out four in-depth analyses of international environmental regimes, this chapter serves as a conclusion to this project. The first section brings together each separate case study discussion to understand how an environmental regime's relationship to the marketplace has influenced its outcome and wider impact. The hypotheses, in their original forms, do not fully account for this relationship. Rather, the case studies point to a more nuanced version of the argument that better assesses the relationship of industry actors and environmental regimes. The chapter concludes with an assessment of the strengths and weaknesses of the methodological approach employed in this research project and suggestions for future avenues of research.

I.   Results Overview

Each regime discussed in the previous chapter represents a unique set of international rules, norms, and decision-making procedures focused around a particularly pressing ecological issue. While each varies in their chosen strategies, there are general lessons observable across the cases.

A. Analysis of Hypotheses

This study aimed to bring clarity to whether an international environmental regime's status as market-enabling or regulatory would be correlated to its effectiveness. Based on literature about regime effectiveness and non-state actors in global governance, I hypothesized that regulatory regimes would see (1) lower levels of institutional effectiveness and (2) higher levels of ecological effectiveness than their market-enabling counterparts. This expectation was based on the argument that regulatory regimes, as

opposed to market-enabling regimes, would face pushback from powerful corporate actors but include provisions that more suitably addressed the environmental concerns. In looking to Table 5.1 where the case study information has been synthesized, it becomes clear that this relationship does not exist exactly in this way.

Table 5.1 Overview of Environmental Regime Institutional & Ecological Effectiveness.

Regime	Relationship to Market	Institutional Effectiveness	Ecological Effectiveness
Strat. Ozone	Enabling	4	4
Oceanic	Regulatory	1	2
Climate	Enabling	3	2
Biodiversity	Regulatory	3	2

i.   Evaluating Hypothesis One

The first hypothesis states that when international environmental regimes are market-enabling, they will be more effectively implemented at an institutional level than regulatory regimes. The case study data does not indicate a clear connection between the regime's relationship to market actors and institutional effectiveness. The two market-enabling regimes had high scores of 3 and 4 in institutional effectiveness, and the regulatory regimes earned scores of 1 and 3. While the regulatory oceanic regime had lower institutional effectiveness than both market-enabling cases, the regulatory biodiversity regime matched the score of the market-enabling climate change regime. This similarity suggests that there is no discernable distinction in the institutional functionality of regulatory versus market-enabling regimes. While the hypothesis cannot be confirmed, it also cannot be discounted. Section iii offers an alternative explanation.

ii.   Evaluating Hypothesis Two

The second hypothesis expects that a market-enabling international environmental regime will be less effective ecologically than one that is regulatory. The case data on

ecological effectiveness does not offer support for this explanation. The market-enabling regimes scored 2 and 4, while both regulatory regimes scored 2 points. Contrary to what was expected in the hypothesis, the strictly regulatory regimes saw low scores of ecological effectiveness, while the market-enabling stratospheric ozone regime was the only case to demonstrate very positive ecological achievement.

This data shows that the presence of market-enabling regime provisions did not cause a decoupling of the institutional and ecological effectiveness measures as the theoretical argument had expected. Rather, the two measures of effectiveness seemed to move, more or less, together, with the stratospheric ozone regime seeing the highest levels of each, the climate change and biodiversity regimes in the mid-range, and the global oceanic regime having the lowest scores of each.

Table 5.2 Broken-Down Environmental Regime Institutional & Ecological Effectiveness

	Institutional Effectiveness					Ecological Effectiveness				
Indicator	i.	ii.	iii.	iv.	**Total**	i.	ii.	iii.	iv.	**Total**
Strat. Ozone	1	1	1	1	4	1	1	1	1	4
Oceanic	0	0	0	1	1	1	1	0	0	2
Climate	1	1	0	1	3	0	1	1	0	2
Biodiversity	1	1	0	1	3	1	1	0	0	2

    iii.   Alternative Theoretical Explanation

While the theoretical argument had expected that the mere presence of market-enabling mechanisms would change firms' strategies and increase the regime's functionality, it seems more likely that the cost of these new opportunities and technologies is of more concern for industry actors. When faced with new regulations on existing industries and presented with new market opportunities, these actors seem to complete a cost analysis of the situation. If the cost of complying (reducing harmful

practices and incurring the cost of adjustment) is more expensive than the cost of defection (continuing with harmful practices and incurring the cost of punishment), like in the case of the climate change regime, the firms will choose to defect. When the cost of complying is less than the cost of defection, like in the case of the stratospheric ozone regime, the firm will be more likely to comply with environmental regulation.

B. Other Lessons

While the connection of a regime to the marketplace and its actors seems to be an important consideration for regime functionality, this relationship does not singlehandedly determine regime effectiveness. Rather, it operates alongside a host of other mechanisms that create the conditions for regime success.

The first of these is technological substitutability. Market-enabling regimes can exist only when there are less ecologically harmful substitutes to existing producing and consuming practices. The CFC alternatives created under the stratospheric ozone regime and the growth of renewable energy sources in the climate change regime demonstrate this. However, the lack of these industry substitutes has limited the success in the global oceanic regime and the biodiversity regime. Technically feasible and, as we saw above, cost-effective alternatives provide the conditions under which an environmental regime may find ecological success.

Another important consideration embedded within the cases is enforcement mechanisms. As shown in *Table 5.2,* the stratospheric ozone regime was the only case to both feature legally binding enforcement strategies for encouraging regulation compliance (institutional effectiveness indicator iii) and to have visible positive ecological changes (ecological effectiveness indicator iv). This suggests that the

attainment of higher levels of ecological effectiveness is aided by strong legal enforcement mechanisms.

Lastly, there is indication that the nature of the ecological issue and the resulting structure of the regime institutions played into its effectiveness. The climate change, oceanic, and biological issues are complex and multifaceted in cause and difficult to understand scientifically. As a result, the three subsequent regimes are characterized by fragmentation and have struggled to effectively address their respective problems. Meanwhile, the issue of ozone depletion can be traced to a relatively small group of industry behaviors and can be targeted much more directly. Thus, the global stratospheric ozone regime is able to be concentrated within the UN Ozone Secretariat, under the Vienna Convention and the Montreal Protocol. This distinction between centralized and fragmented regimes, therefore, may have significant implications for the regime's resulting impact.

II.   Implications of Findings

Given the overview of results in the previous sections, this study can be placed within the literature on non-state actors as drivers in global environmental governance. Although the impact that the regime-market relationship had on regime effectiveness did not match the original hypotheses, the study still indicates that corporations must be considered significant actors in environmental governance. As many scholars have suggested previously, the participation of multinational corporations can influence the regime outputs, outcomes, and impacts.

The case of the climate change regime demonstrates that powerful firms may lobby international organizations and governments to weaken regulations. While the goal

of the regime is to reduce greenhouse gas emissions levels, corporations (and the consumers they respond to) have provided pressure that has lessened the strength of regime provisions. Even after years of full compliance by signatory actors, the regime has not been able to reduce emission growth levels. With this case in mind, policymakers must be cognizant of the balance between appeasing powerful corporate actors and creating institutions with strong ecological regulations.

This study has also shown that the rate of technological advancements is a large determinant of a regime's ability to inspire positive biophysical progress. Again, the case of the climate change regime demonstrates that even when a regime's provisions account for market activity and progression, it still may be unable to inspire ecological change. If global governance is to properly address environmental issues without drastic shifts in society's consumption patterns, there must be continued deliberate public and private research efforts to invent new technologies and markets.

Finally, this study demonstrates the importance of distinguishing between compliance and ecological outcome. As Jackson and Bührs suggested in their 2015 piece, scholars have too heavily relied on institutional indicators of effectiveness in assessing the success of environmental governance. This study, particularly the climate change regime,[17] further demonstrates that compliance with regime provisions and positive ecological change are not always coupled. Scholars, even within the field of political science, should be deliberate about including assessments of the ecological impacts of environmental regimes in their studies.

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[17] A more prolonged discussion of this can be found in conclusion of the climate change regime case study.

III.   Methodological Considerations

Having drawn conclusions from the case study analyses, it is necessary to reconsider the methodological approach taken for this study. The first consideration is determining whether the dichotomous distinction between market-enabling and regulatory regimes has been valuable for this research. For the purpose of this study, market-enabling regimes were defined as regimes that use restrictions to deliberately encourage new technologies and market opportunities to be created by private sector actors. As noted in the methodology section, regimes often include provisions that exhibit characteristics of both classifications. However, in acknowledging this, the prominent market-enabling tendencies of some regimes still renders the distinction worthy of scholarly consideration.

On the topic of analytical categories, the methods for assessing effectiveness were not without flaw. Although the literature informed the creation of distinct indicators of institutional and ecological effectiveness, each of these indicators was coded using a dichotomous system, with a score of 0 signifying indicator absence and a score of 1 signifying indicator presence. While this scoring system accounted for a variety of effectiveness indicators, it failed to consider the relative level of achievement within each indicator. For example, the climate change regime and the biodiversity ozone regime have both earned a 1 for the first indicator of institutional effectiveness (which states that *the agreement was completed on the prescribed timeline without major hold ups*). However, the timeline from the negotiation to the enactment of international agreements took about 12 years for the climate change case and only 4 years for the biodiversity case. In comparison to the decades of negotiations for the global oceanic regime, neither of

these timelines are sizable. However, this erasure of case difference is certainly a drawback of the chosen methodology.

In drawing conclusions from the analysis, it is also notable that only one regime has achieved its goal of creating positive biophysical changes. Without multiple successful regimes, identifying any causal mechanisms within the variables of interest is unlikely. Despite the drawbacks of the small-n case study, this project provides a valuable first attempt to understand the connection between the regime-market relationship and regime effectiveness. This project can surely be expanded upon in future research efforts.

IV.   Future Research

Seeing that corporate interest can have a significant impact on the resulting effectiveness of international environmental regimes, this study indicates that scholars should continue pursuing research within this topic further. While this particular study drew four cases from the host of global environmental regimes, there are many additional cases, such as the desertification and the hazardous waste regimes, whose analysis could lend additional evidence to the acceptance or rejection of this study's conclusions.

While the dynamics of global governance are of particular salience in an industrialized and globalized world, regional governance on environmental issues, such as the UN Regional Seas Programme, is also of concern. By moving beyond the global scale and implementing a similar type of study with cases of regional environmental governance, scholars may be able to understand how business responses to environmental issues may change in response to geo-political and geo-economic factors.

Finally, the interconnectedness of environmental issues has created interlinkages between distinctive international environmental regimes. For example, as issues of atmospheric disruption, ozone depletion and global warming are inherently linked. The resulting stratospheric ozone and climate change regimes, thus, have built off of one another in terms of establishing legitimacy, their institutionalization, and gaining support. While it is beyond the scope of this study to address explicit regime linkages, this growing area of scholarship may have interesting and important implications for future studies of market-regime relationship.

V.   Conclusion

In conclusion, this study represents an early attempt within the context of international environmental regimes to bring together discussions of institutional and ecological effectiveness with corporate interest. While this project has some methodological flaws, the four case studies demonstrate that corporations, as major contributors to environmental degradation with immense force from global capital, do have significant influence over the unraveling of global environmental governance. When market-enabling regime provisions provide major corporate actors with cost-saving opportunities, they are more likely to contribute to the regime efforts to bring about positive ecological change. However, when the cost of compliance with regime provisions, whether market-enabling or regulatory, is higher than the cost of defection, corporations elect to continue contributing to ecological destruction.

As the threat of environmental disaster looms around the globe, it is becoming increasingly imperative for governance efforts to create both institutionally and ecologically effective institutions. Previous research has shown that many considerations,

such as the availability of technological advancements, regime enforcement mechanisms, and issue fragmentation, may impact how successful a regime may be. However, this study indicates that corporate actors, as drivers of large-scale environmental change, are a largely untapped key to solving contemporary environmental crises. This model can be continually used to analyze the correlation between the market-regime relationship and subsequent regime success in the context of global environmental governance.

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