Explaining the Negotiating Positions of Countries Within the Paris Agreement on Climate Change—An Interest-Based Approach

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ABSTRACT

Sprinz and Vaahtoranta (1994) developed a theory that state positions within international environmental agreements are driven by two factors: environmental vulnerability and abatement costs, and that the interaction of these factors positions states as either pushers, intermediates, bystanders, or draggers in international environmental negotiations. The following study tests whether or not this theory can accurately predict the negotiating positions of states with the Paris Agreement by assessing the correlation between quantified metrics of ecological vulnerability and abatement costs of participating states and their observed negotiating positions. The results of this analysis show that an interest-based theory can accurately predict negotiating positions approximately a third of the time, and *roughly* predict positions two thirds of the time. The data and relevant literature on the subject also suggests that additional factors such as international climate norms, epistemic communities, and domestic factors such as governance systems and public opinion play an important role in shaping negotiating positions within the Paris Agreement. These findings help us in understanding exactly how states develop their negotiating positions within complex international environmental agreements, and can provide policymakers with valuable tools to aid in designing future agreements in ways that motivate states to take stronger negotiating positions than they would have otherwise.

INTRODUCTION

Over the course of the last several decades, the number of international environmental agreements aimed at solving complex global environmental issues has skyrocketed (Mitchell 2017). This increase in agreements has subsequently been reflected in the literature, with political scientists from across the spectrum weighing in on how these agreements are negotiated, which types of agreements work best, and suggestions for how to make agreements as effective as possible. In discussing exactly how international environmental agreements are negotiated and how countries from around the world determine their individual negotiating positions, one of the most popular theories is an interest-based approach. According to Sprinz and Vaahtoranta (1994), a simple assessment of ecological vulnerability and abatement costs can explain why countries take the negotiating positions that they do within international environmental agreements. However, the literature reflects that while an interest-based approach may be able to explain a fair amount of negotiating positions, it cannot necessarily explain them all. In lieu of this debate, this thesis will test an interest-based approach to explaining negotiating positions by answering the following research question(s):

- Does the interaction of ecological vulnerability and abatement costs generally lead states to take climate change positions as expected by Sprinz and Vaahtoranta's (1994) theory?
- Are states that are more ecologically vulnerable more likely to have a strong negotiating position than states that are less vulnerable?

- Are states that face higher climate abatement costs more likely to have a weaker negotiating position than states that face lesser costs?
- Does ecological vulnerability exert a more significant influence over negotiating position than abatement costs?
- Do international climate norms exert a significant influence over the negotiating position of countries within the Paris Agreement?
- Are democratic regimes more likely to have stronger climate positions than authoritarian or hybrid regimes?

In the face of impending and potentially irreversible climate change, the pursuit of these research questions is critical in learning more about the negotiating process within international environmental agreements. Specifically, testing an interest based approach to international environmental negotiations within the context of the Paris Agreement—the first international environmental agreement in history to involve nearly every country in the world—will provide a better understanding of how negotiating positions are developed by individual countries with varied interests. With this sort of research at their disposal, policy makers can then design agreements in ways that will garner the maximum benefits for all parties and for the environment as a whole.

LITERATURE REVIEW

Understanding the International Politics of Climate Change

International negotiations within any political arena pose a unique set of challenges that are characteristic of any attempt at collective action. In the context of international climate change politics, however, the issues are particularly challenging and consensus is significantly more difficult to achieve. According to Hovi et. al (2009)

climate change can be considered a long-term policy problem in that it "lasts for at least a human generation, is plagued with deep uncertainty, and engenders substantial public good aspects" (20). In addition to these issues, varying cost-benefit distributions between countries make efforts to tackle climate change even more difficult. As discussed by Oye and Maxwell (1994), "environmental problems are easier to solve when problem solving generates large benefits for a small group of actors and the costs of problem solving can be dispersed over a very large group" (Bernauer 2013, 425). Overall, these characteristics and the inherent complexity of the climate change issue as a whole make international cooperation on the issue a challenging task.

Time Inconsistency

As defined by Kydland and Prescott, the problem of time inconsistency refers to a situation in which "optimal choices at one point in time may be at odds with optimal choices at future points in time" (Hovi et. al 2009, 21). In the case of climate change, this inconsistency is especially relevant since effectively addressing climate change will require significant investment in both mitigation and adaptation efforts. While some adaptation efforts will garner relatively immediately benefits, the majority of benefits associated with climate mitigation will not be experienced immediately. Preventing global warming from exceeding 2°C requires a *long-term strategy* developed with the interests of future generations in mind and the ability to overcome the temptation to remain inactive in service of short-term interests (Bernauer 2013, pg. 425). With a political system based upon short-term election cycles and instant gratification, prioritizing long-term interests over short-term interests is a challenging task in and of itself.

Tragedy of the Commons

Another challenging aspect of the climate issue is that like most transboundary environmental issues, climate change is a quintessential tragedy of the commons. As described by Hardin (1968), a tragedy of the commons exists when everyone has unbridled access to a common pool resource—resulting in overuse, degradation, and ultimately, ruin. In the climate context, the atmosphere is the common pool resource that is being exploited through the relentless burning of fossil fuels. Countries that may not be contributing as much to this process of exploitation are still harmed regardless of their role, and negotiating a solution requires cooperation between all parties with access to the commons. Thus, when countries pursue climate mitigation efforts, the result is the production of what Bernauer (2016) and Hovi et. al (2009) refer to as a "global public good" (pg. 424, 30). Since all countries are impacted by carbon emissions as a result of their access to the global atmosphere, all countries also benefit from the creation of this global public good. As a result, climate change politics are plagued with "free-rider" problems because countries can shirk their climate mitigation responsibilities and still benefit from the efforts of others (Hovi et. al 2009). Minimizing the occurrence of this phenomenon and bringing all parties to the table to negotiate an acceptable set of rules and regulations to preserve the commons is precisely what most international environmental agreements are designed to do.

The Paris Agreement—A Promising Step Forward

In April 2016, following weeks of intensive negotiations and years of research, planning, and preparation, the Paris Agreement on Climate Change was signed by 195 countries committed to reducing greenhouse gas emissions and mitigating harmful

climate risks. Since then, the agreement has been celebrated as a testament to the power of collective action and as a landmark achievement in the history of international environmental politics (Dimitrov 2016, Rowell and von Zeben 2016). As praised by national delegates who attended the negotiations, the outcome of Paris is "revolutionary" (Venezuela), "a tremendous collective achievement" (the EU), "a marvelous act" (China), "a resounding triumph of multilateralism" (St. Lucia) introducing a "new era of global climate governance" (Egypt), and "a tremendous victory for the planet… restoring the global community's faith that we can accomplish things multilaterally" (USA) (Dimitrov 2016, 2).

In the wake of the success of the Paris negotiations, however, an important question arose: Why did Paris succeed? It wasn't the first attempt at global climate governance—the international community had tried and failed to do so with Kyoto in 2004 (which lacked critical support from the United States) and again in Copenhagen in 2009, which ultimately failed to produce a set of global, long-term mitigation targets and goals (Christoff 2016). In contrast, the Paris Agreement was able to do exactly that, becoming the first global accord on climate change containing policy obligations for every signatory country (Dimitrov 2016). These policy obligations are developed through a rather unique bottom-up approach, with individual countries responsible for submitting their own intended nationally determined contributions (INDCs) outlining reduction targets and mitigation goals. In implementing this bottom-up approach, the Paris Agreement "leaves the content of domestic policy to governments but creates international legal obligations to develop, implement, and regularly strengthen actions,"

an aspect that Dimitrov (2016) argues played a large role in the widespread international support of the agreement (2).

Despite the obligations outlined by the agreement, many climate scientists are skeptical that the agreement will achieve its goal of preventing global surface temperatures from rising above the proposed target of 2°C (Rowell and von Zeben 2016). Regardless of these concerns, the Paris Agreement provides political scientists with a unique opportunity to study exactly how agreements of this magnitude and significance are reached and how individual countries adopt their respective negotiating positions (Young 2016, Dimitrov 2016). By shedding light on how countries develop their negotiating positions within international environmental agreements, policymakers can gain valuable insights that can help in designing more effective agreements and implementing more efficient negotiating strategies. As noted by Dimitrov (2016), the Paris Agreement is particularly remarkable in that "all major protagonists endorsed the deal, and countries with diametrically opposed interests supported it" (2). How exactly were those countries that had "diametrically opposed interests" persuaded to throw their support behind this agreement, and how can we replicate this achievement in future international environmental agreements? Won't countries usually support policies that are in their best interests, and based upon a simple analysis of costs and benefits? This study will attempt to address these questions by testing the effectiveness of an interest-based approach in explaining the negotiating positions of countries within the Paris Agreement.

Theories of Negotiating Positions

Several prominent theoretical frameworks exist that identify factors that influence why countries take the negotiating positions they do and what sorts of factors are influential in the process. Such frameworks include interest-based explanations, normative theories, knowledge-based approaches, and domestic factors. Of these frameworks, an interest-based approach provides a particularly parsimonious explanation of negotiating positions within international environmental agreements (Sprinz and Vaahtoranta 1994).

Interest-Based Explanation

Put simply, an interest-based explanation assumes that countries will act in their own best interest when determining their negotiating position within any international environmental agreement. In economic terms, negotiating positions reflect national cost-benefit analyses. Specifically, how much will it cost a country to commit to the proposed environmental regulations? How much will a country gain (financially, ecologically, politically) as a result?

Using this interest-based approach, Sprinz and Vaahtoranta (1994) argue that an assessment of a country's ecological vulnerability and abatement costs is a powerful predictor of a country's level of support for any given environmental regulation. To illustrate this, these theorists developed a matrix based upon estimations of abatement cost (high or low) and ecological vulnerability (high or low). The matrix divides support for environmental regulations into four distinct categories: pushers, intermediates, bystanders, and draggers.

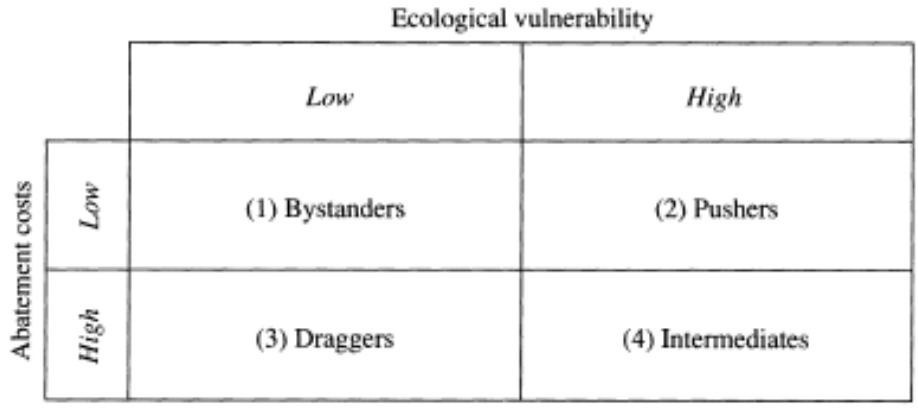

Figure 1. Sprinz and Vaahtoranta's matrix classifying negotiating positions of countries based upon ecological vulnerability and abatement costs (1994).

Pushers advocate for stringent environmental regulations as a result of their high vulnerability and ability to take action, while intermediates may be less willing because of their higher abatement costs. Bystanders are relatively indifferent to the implementation of environmental regulations since they experience low ecological vulnerability but also won't have to incur significant costs to take action. In contrast, draggers are strongly opposed to the implementation of environmental regulations because they face little ecological vulnerability and will have to shoulder excessive costs in order to take action. (Sprinz and Vaahtoranta 1994).

Using this theory, several hypotheses can be drawn about the behavior of countries within the Paris Agreement. First off, it is safe to assume that every signatory country has something like this matrix implicitly on hand as they decide what kind of negotiating position they will adopt. Each country presumably comes to the negotiating table focused on promoting their own interests. This assumption is rooted in the classic realist belief that interests drive state behavior (Waltz 1979). As articulated by Waltz (1979), "interest provides the spring of action; the necessities of policy arise from the unregulated competition states, and calculation based on these necessities can discover the policies that will best serve a state's interests" (117). In the context of an interest-

based theory as put forth by Sprinz and Vaahtoranta, the interests that Waltz references can be explicitly represented by the combination of vulnerability and abatement cost. How vulnerable is the country to the damaging effects of climate change—current and future? How capable is the country of dealing with these impacts, if there are any? How much money will it take for the country to divest from fossil fuels and transition to clean, renewable energy? These are, according to the theory, all questions that countries are considering as they enter into the negotiation process and begin to determine what kind of commitment they are willing to make.

Following this, one could predict that countries that face minimal risks as a result of climate change and would incur low costs if they were to take action would be bystanders to the Paris Agreement—perhaps expressing interest but not making any sort of motivated effort to contribute. Countries that face minimal risks and high abatement costs could be expected to be draggers, opposed to regulations that will harm their economy and bring them little relative gain. Those that face significant risks in the face of climate change but will have to invest heavily in abatement are likely to be considered intermediates, motivated by the threat of climate change to take action but intimidated by the cost. Finally, countries that will be heavily impacted by the risks associated with climate change and will incur little to no costs if they are to take action will be vehement supporters of new regulations, and may, as per the theory, be considered pushers. In an attempt to test these assumptions and the strength of this theory in explaining the negotiating positions of countries within the Paris Agreement, this study will use indicators of ecological vulnerability and abatement costs for each signatory country and plug them into this interest-based theory matrix (Figure 1).

Hypothesis 1: The interaction of ecological vulnerability and abatement costs will generally lead states to take climate change positions as expected by Sprinz and Vaahtoranta's (1994) theory.

Vulnerability

In discussing the role of an interest-based explanation within international environmental politics, it is important to explicitly define the independent variables of the theory. Within the context of climate change, vulnerability refers to "the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change (Tubi et. al 2012, 473). These adverse effects include physical, economic, and political factors and vary from country to country. A country's vulnerability to climate change is also closely intertwined with a country's adaptive capacity, which refers to "the ability of a system to adjust to climate change, to moderate potential damages, to take advantages of opportunities, or to cope with the consequences" (Tubi et. al 2012 473).

Using these definitions and an interest-based explanation, one can expect countries experiencing a higher degree of vulnerability to be more likely to pursue climate mitigation. However, this is not necessarily the case. In a study aimed at examining the degree to which climate change vulnerability affected the development and implementation of mitigation policies of different countries, Tubi et. al (2012) found that vulnerability is not a reliable explanatory factor (480). Instead, they suggest that a close examination of governance and institutions are a more accurate way to predict political commitment to climate change mitigation. Other researchers echo this finding as well. Battig and Bernauer (2009) found that predicted climate impacts correlate with higher emission levels and have little impact on political commitment. With this

disconnect in mind, testing the applicability of an interest-based explanation in predicting the negotiating positions of countries within international environmental agreements becomes especially relevant. While an assessment of vulnerability alone may not have the ability to explain negotiating positions, this study will attempt to determine if a combination of vulnerability *and* abatement costs is capable of doing so. In the cases where a combination of vulnerability and abatement costs still doesn't seem to capture the negotiating positions of countries within the Paris Agreement, theories about negotiating positions as articulated by Tubi, Battig, and Bernauer provide particularly compelling arguments highlighting the danger in assuming that a higher vulnerability will dictate a particularly progressive negotiating position.

Hypothesis 2: States that are ecologically vulnerable will be more likely to have a strong climate negotiating position than those that are not.

Hypothesis 3: Ecological vulnerability exerts a more significant influence over negotiating positions than abatement costs.

Abatement Costs

The second independent variable operating within an interest-based explanation is abatement cost, or simply the amount of resources it will take for a country to participate in climate mitigation efforts. Following an interest-based explanation, higher abatement costs generally translate to less participation in mitigation efforts (Sprinz and Vaahtoranta 1994). As stated by Cass (2006):

> "States will seek to promote norms that minimize adjustment costs. International norms that do not entail substantial domestic redistributive consequences should face significantly less opposition than norms that will adversely affect the

> material interests of domestic actors. Actors facing adverse material consequences will attempt to block the domestic incorporation of international norms that will harm their interests" (11).

Put simply, countries with higher abatement costs are generally expected to take weaker negotiating positions within international environmental agreements than countries with lower costs. The economic barriers towards participation and compliance posed by high abatement costs are, in some cases, enough to deter countries from adopting an international environmental norm altogether (Cass 2006).

This claim is challenging to address in practice in part because abatement costs are particularly difficult to quantify. As stated by Battig and Bernauer (2009), "there is no agreement in the literature on how to estimate mitigation costs" (296). This is because accurately quantifying the costs a country will incur in addressing climate change is complicated by factors related to their economy, energy sectors, technology, politics, etc. In lieu of this, researchers use a variety of proxies for abatement costs. For example, Battig and Bernauer (2009) use carbon dioxide emissions per capita as a measure for mitigation costs in their study of whether democracy has a positive effect on mitigation efforts (296). A more complex way to quantify climate abatement costs is exemplified in abatement cost curves, which analytically quantify all the potential opportunities for mitigation a country has. For each opportunity analyzed, the abatement cost is then taken to be "the additional cost to society of implementing the opportunity compared to the cost of the activity that would otherwise occur in the business-as-usual case" (McKinsey&Company 2008, 9). For the purposes of this analysis, I adopt a version of

the simpler approach to quantifying abatement costs as exemplified by Battig and Bernauer.

Hypothesis 4: States that face high climate abatement costs will be less likely to have a strong climate change negotiating position than those that face lower costs.

Normative Theory

The role of international environmental norms is also an important variable to consider in conducting an analysis of negotiating positions within international environmental agreements. In the past, strict enforcement measures and stringent monitoring of regulated behavior characterized most environmental agreements (Cass 2006). In more recent years, however, policy makers have found that voluntary agreements based upon a collective system of social norms can be just as effective as binding, mandatory agreements (Hori 2015).

As defined by Finnemore et. al (1998), a norm is "a standard of appropriate behavior for actors within a given identity" (891). Norms represent moral claims about how individual actors should behave within a specific context, and emerge when what Finnemore et. al (1998) call "norm entrepreneurs" are able to convince at least a third of the parties involved of the moral validity of a particular position and trigger a tipping point. This persuasion may be achieved by either threatening political consequences or "shaming" a country into accepting the norm (Cass 2005). Upon reaching this tipping point, more and more states begin to imitate the particular behavior, influenced by "pressure for conformity, desire to enhance international legitimation, and desire of state leaders to enhance their self-esteem" (Finnemore et. al 1998, 901). During this adoption process, the behavior of critical states is particularly important. For example, in creating

a norm that establishes all countries should attempt to reduce their carbon dioxide emissions, large emitters such as the United States and China would be considered critical to the formation of the norm. Once the norm has "cascaded" and been adopted by critical states, it is then internalized and becomes a standard given (Finnemore et. al 1998).

According to Chan (2016), international norms have played a much bigger role within the Paris Agreement than in climate agreements of the past. Unlike other agreements, the Paris Agreement is structured by a uniquely bottom-up architecture that allows countries to determine their own commitments through intended nationally determined contributions (INDCs). Since INDCs are developed independently by each country and are characterized as "contributions" rather than "commitments," Chan argues that the Paris Agreement attempts to implement climate regulation through a relatively soft approach, or, in other words, a normative one (2016, 292). Following this, the role of international climate norms becomes an important independent variable to consider within the context of this particular study. If climate norms do influence state positions, then the presence of strong climate norms should lead to outcomes that differ from those predicted by Sprinz and Vaahtoranta's interest-based theory. Countries that are less willing to commit to ambitious mitigation efforts will experience pressure to do so, which may result in them shifting their positions to conform with existing norms. Depending on the strength of the norms, draggers and bystanders, for example, may take stronger positions than predicted by an interest-based theory. Similarly, intermediates may be motivated to throw their weight behind regulations and become pushers, and pushers may be galvanized into pursuing even more ambitious reductions.

Hypothesis 5: The presence of strong international climate norms will lead states to have stronger negotiating positions than they would have in the presence of weaker or absent international climate norms.

Additional Influences on Climate Negotiating Positions

Several other factors have been discussed within the literature as having the potential to explain differences in state negotiating positions within international environmental agreements. Such factors include the existence and strength of epistemic communities, variance in governance systems, and public opinion. Considering the fact that these factors have not been explored quite as thoroughly as some of the other areas that have been discussed thus far, research within this area may actually be what is missing in our current understanding of international environmental politics. As suggested by Bernauer (2016), "studies that take into account both domestic and international determinants of climate policy can help answer the puzzling question why, despite the systemic obstacles to climate policy (e.g., the global free-rider problem), some countries or subnational units become frontrunners" (436). In other words, this area of scholarship has the potential to explain why countries are pushers when all other theories indicate they should be draggers, or vice versa. Taking this into consideration, I will provide a brief overview of the literature regarding these additional factors in an effort to ensure that the theoretical analysis is comprehensive. While I do pose several hypotheses in response to the literature discussed, this study does not attempt to assess any of these claims in depth.

Epistemic Communities

The influence of epistemic communities over the negotiating positions of countries within international environmental agreements is a phenomenon that is widely discussed throughout the relevant literature. As described by Haas (2016), "epistemic communities are networks—often transnational—of knowledge-based experts with an authoritative claim to policy relevant knowledge within their domain of expertise" (168). In the realm of international climate policy, these experts come from a diverse range of scientific backgrounds and their collective expertise gives them the potential to wield significant influence over environmental policy at both the domestic and international level (Haas 2016). This is particularly true in the case of the Paris Agreement, much of which is based upon a complex set of findings, predictions, and recommendations developed by the Intergovernmental Panel on Climate Change (IPCC).

With thousands of scientists from around the world working together to produce periodic, comprehensive, climate assessments that help drive international climate policy, the IPCC is a critical hub of climate knowledge (Hulme et. al 2010). The result of these assessments is that the global scientific community is in agreement that human greenhouse gas emissions are causing global temperatures to warm and threatening irreversible climate change, and that action needs to be taken immediately (Oreskes 2004). With this level of scientific consensus and cooperation across countries, it seems dubious as to whether or not the role of epistemic communities can contribute much to an analysis of negotiating positions of countries within the Paris Agreement. Upon taking a closer look, however, it becomes apparent that some countries have greater representation within the IPCC, suggesting a variance in the strength of national epistemic communities

(Corbera et. al 2015). For example, a comprehensive analysis of the authorship of IPCC reports over a period of twenty years identified a clear bias within the epistemic community of the IPCC in that a large majority of IPCC contributors are either from northern countries or are educated at northern institutions

In addition to disparities in authorship and representation, we also see examples of strong epistemic communities failing to influence their host countries to take desirable action on climate. For example, climate change in the United States has become such a politicized issue that the scientific community has faced seemingly insurmountable barriers to convincing policymakers of the need to pursue ambitious mitigation policies (Cass 2006). Despite a strong community of climate scientists in the United States, domestic obstacles to action have effectively stalled the implementation of otherwise widely accepted international environmental norms (Cass 2006). These findings raise an important question—does the strength of the national epistemic community influence a country's negotiating position despite the presence of a strong international epistemic community? The influence of both national and international epistemic communities would likely pull countries towards stronger negotiating positions than an interest-based theory alone would predict. Following this, one could hypothesize that an interest-based theory would do a better job at predicting the negotiating positions of countries that lack their own epistemic climate communities and are perhaps more isolated from the international climate community. While there are a number of ways that this hypothesis could be tested, this study will not explore this line of research much. However, this line of questioning does represent a promising avenue for future research.

Hypothesis 6: Countries with stronger epistemic climate communities are more likely to have stronger negotiating positions than countries with weaker ones.

Governance Systems

With regards to governance systems, there is considerable support for the idea that democracies tend to contribute more to climate change mitigation efforts than non-democracies do. This presumption is based off of the inherent structure of democracy, in that it is in service of the people and strives to ensure reliable access to valuable public goods (Li and Reuveny 2006). Additionally, democracies allow for more freedom in research and communication, which plays an important role in the formation of epistemic communities that may very well be key advocates for climate change mitigation (Battig Battig and Bernauer 2009, Li and Reuveny 2006).

In contrast, non-democracies are more likely to be governed by elites free of accountability and acting in their own interests rather than in the interests of the people (Battig and Bernauer 2009, Li and Reuveny 2006). As a result, non-democracies are often accused of under-providing public goods. However, Li and Reuveny also highlight arguments within the literature of the ways in which democracy can actually enable environmental degradation—citing Hardin's classic tragedy of the commons example as a typical series of events within neoliberal democracies. In addition, they suggest that because most democracies are market economies, they are more easily influenced by powerful and often malevolent business interest groups than less democratic states are. Finally, the fact that democratic participation of citizens within democracies is limited in influence to national and domestic environmental issues can mean that the "democracy factor" is excluded from having any influence over international environmental issues (Li

and Reuveny 2006). As a result, some democracies have been observed to experience crippling public policy inaction with regards to international environmental negotiations.

Building on this debate, Battig and Bernauer (2009) hypothesize that democracies 1) exhibit stronger commitments to climate change mitigation efforts and 2) contribute more to climate change mitigation efforts in the form of emissions reductions. Despite these hypotheses, however, Battig and Bernauer (2009) caution the extent to which these claims can be made, and emphasize the need for distinguishing between policy output and policy outcome (policy output referring to the political commitment outlined within any given agreement, and policy outcome referring to the actual action that takes place as a result). In other words, their research suggests that democracies are more responsive to political commitments than to actual implementation of problem-solving techniques. Neumayer (2002) conducted a similar study examining whether democracies exhibit stronger international environmental commitment than non-democracies and found strong evidence that this is indeed the case. Ultimately, this combined research suggests that strong democracies make stronger INDC commitments than weak democracies or authoritarian governments do. Subsequently, however, it may also be the case that although these democracies have stronger commitments, they may not follow through on those commitments.

Hypothesis 7: Democratic regimes will have stronger climate positions than authoritarian regimes.

Public Opinion

Many studies regarding public opinion and climate change have focused on identifying the factors that spur concern over the issue and work to develop ways in

which to frame policies that will generate widespread support. For example, a study examining the ways in which policy framing had the potential to alter the opinions of climate skeptics concluded that "climate change skeptics become more supportive when climate policies are framed as fostering economic progress and/or creating a stronger sense of community, while framing in terms of the risks of climatic changes has no effect" (Bain et al. 2012, 169). Another study conducted by Finseraas et. al (2012) found that perception of the climate change issue is linked to high education levels, post-materialism, and identification with the left (18). Additionally, the study found that concern over climate change was equally distributed across countries of varied economic positions and emissions levels (Finseraas et. al 2012, 19). Other studies have examined whether extreme temperatures have the effect of increasing concern over climate change (Bernauer 2016). In sum, the literature on public opinion of climate change has focused on issues of risk perception and framing rather than examining "individual attitudes or behavior vis-'a-vis forms and ambition levels of climate policy" (Bernauer 2016, 439). While much of this existing literature on public opinion provides useful context within a discussion of international environmental politics, it not central to the research question at hand. As a result, the following hypothesis is presented but not analyzed within this study.

Hypothesis 8: States in which citizens exhibit strong support for climate policy will have stronger climate positions than states in which citizens exhibit limited levels of support for climate policy.

Moving Towards an Analysis of Negotiating Positions

Following this review of theories of negotiating positions within environmental politics, it seems apparent that there are multiple areas in which further research is needed to fully understand how negotiating positions within international environmental agreements are adopted. These theoretical frameworks will be treated as independent variables and will be employed in an effort to shed light on the formation of negotiating positions within international environmental agreements. In general, I hypothesize that an interest-based approach will be able to explain the majority of negotiating positions within the Paris Agreement—and that when it can't, one of the additional factors as discussed within the literature review will.

METHODS

When attempting to explain negotiating positions within international agreements, an interest-based approach similar to the one articulated by Sprinz and Vaahtoranta (1994) (or some modification of it) is widely cited—and logically, this makes sense. Countries will assess what costs and benefits they face before approaching any agreement and beginning negotiations. Within the context of international climate change policy, however, countries are beginning to come to terms with the fact that doing what is in their best interest may not necessarily be in the best interest of the planet, of future generations, or of people in other countries around the world. This shift is important, and understanding exactly how agreements are able to convince countries to make commitments that contradict the classic cost-benefit analysis is a critical step in learning how to design agreements that can continue to convince countries to do so and successfully address the crippling issue of global climate change.

With these shifting dynamics in mind, it becomes imperative to examine the ability of an interest-based theory to explain the positions of countries within climate negotiations. By assessing how effective the theory is at explaining negotiating positions and critically examining the cases in which it fails, critical insight into the development of negotiating positions within international environmental agreements can be garnered.

Research Question and Hypothesis

The primary research question of this analysis as derived from Sprinz and Vaahtoranta's matrix is the following: are vulnerability and abatement costs good predictors of negotiating positions on climate change? This study will conduct a straightforward test of a theory within international environmental politics. Waltz (1979) posits that a theory being tested must contain at minimum one theoretical assumption, be assessed based upon the terms it claims to explain, and understood as not having the ability to account for particularities that may arise (122). Furthermore, Waltz states, "if a theory depicts a domain, and displays its organization and the connections among its parts, then we can compare the features of the observed domain with the picture the theory has limned. We can ask whether expected behaviors and outcomes are repeatedly found where the conditions contemplated by the theory obtain" (123).

With this background in mind, this analysis will quantify ecological vulnerability and abatement costs for each country within the Paris Agreement and compare the prediction generated by these variables to the actual negotiating position of each country based on an assessment of their intended nationally determined contribution (INDC). Prior to conducting the research necessary to answer these research questions, we hypothesize that an interest-based explanation will explain the negotiating positions of

most countries within the Paris Agreement. However, we also presume that there will be exceptions that arise due to the influence of additional independent variables such as the influence of international climate norms and domestic factors. The additional research questions as outlined within the introduction will help in understanding the role of these additional variables, but will not be the primary focus of this study.

Case Selection

To test the degree to which an interest-based approach can explain negotiating positions within international environmental agreements, I selected the Paris Agreement for study. I chose the Paris Agreement because of climate change's importance on the international policy agenda. According to Falkner (2016), the Paris Agreement approaches the climate issue in a new way than its predecessors and represents a promising step forward in the realm of climate change policy. Falkner supports this claim by arguing that unlike past agreements, the Paris Agreement "acknowledges the primacy of domestic politics in climate change and allows countries to set their own level of ambition for climate change mitigation" (2016, 1107). Chan (2016) echoes this, highlighting the Paris Agreement as a unique bottom-up approach to climate negotiations in which "international coordination is eschewed in favor of increased national flexibility" (293). In addition to the unique nature of this climate agreement, the agreement also has an unprecedented amount of support within the international community—with a grand total of 195 signatory states (Falkner 2016). With nearly every country in the world being involved to some degree in the negotiation of this agreement, an analysis of this agreement is both relevant and critical to understanding the international dynamics of climate policy.

The Paris Agreement also presents a vast body of pre-existing, readily available, and unbiased data to be used within this analysis, which is a critical component in designing a reliable social experiment (King et. al 1994). Quantifications of ecological vulnerability already have been compiled for most member states by organizations like the Notre Dame Global Adaptation Initiative (ND-GAIN), indicators of abatement cost can be constructed using existing metrics that quantify carbon emission intensities, and the INDCs of each member country are available through the United Nations Framework Convention on Climate Change (UNFCCC). There are also a variety of web-based resources that provide comprehensive analyses of individual INDCs that can be utilized as a source of data for the purposes of this study.

In addition to providing access to high quality data, using the Paris Agreement as a case study also allows for analysis of a large set of cases all existing within the same policy space. With 195 signatory countries, this agreement effectively creates a complex, robust set of negotiating positions that serve as an ideal data set. In addition, this large number of data points provides variance in the independent variables that will be examined within this study, making for a more interesting and meaningful analysis. While a test of this sort could be performed with virtually any international environmental agreement, the Paris Agreement arguably provides the best opportunity to test the strength of an interest-based theory in explaining negotiating positions.

Study Design

As discussed previously, this study will use measures of ecological vulnerability and abatement costs to predict countries' negotiating positions in terms of Sprinz and Vaahtoranta's four defined negotiating positions of dragger, bystander, intermediate, or

pusher. Following this, the predicted negotiating positions will be compared to the actual negotiating positions of each country, which will be determined by an analysis of the intensity of each member country's commitment to reducing greenhouse gas emissions as outlined within their INDC. The result will be a comprehensive analysis detailing which countries fit within Sprinz and Vaahtoranta's interest-based matrix and which don't.

Variables

The dependent variable to be predicted and explained within this study is the individual negotiating positions of countries within the Paris Agreement. Subsequently, the primary independent variables comprising the theoretical framework of the study are ecological vulnerability and abatement costs, as these are the two variables cited as the main drivers behind an interest-based approach to negotiations (Sprinz and Vaahtoranta, 1994). To reiterate, in the context of climate negotiations, ecological vulnerability refers to the degree to which a country is at risk and their ability to adapt and abatement cost refers to the financial and technological costs a country will incur in order to address climate change. Other independent variables include the role of epistemic communities, international norms, and domestic factors such as governance systems and public opinion.

Variables that will be held constant within this study include the Paris Agreement itself, the number of countries involved, the time at which these negotiating positions are being determined, and existing international climate policy. Holding these variables constant better allows us to examine the effect of the independent variables upon negotiating positions. For example, if this study were to instead examine the negotiating positions of countries within a variety of different international environmental

agreements, varying factors such as vulnerability, cost of compliance, and number of countries involved would make drawing conclusions about the influence of abatement costs and ecological vulnerability on the dependent variable more difficult.

Detailed Methods

To begin to evaluate Sprinz and Vaahtoranta's interest based theory in the case of the Paris Agreement, data was compiled from a variety of sources comparing the predicted negotiating positions of countries with their actual positions based upon an analysis of ecological vulnerability and abatement costs. The result is a categorized table[1] coded by exact matches (gray), differences of one category (blue), differences of two categories (yellow), and differences of three categories (red). Each "category" corresponds to a different level of Sprinz and Vaahtoranta's theoretical model—dragger, bystander, intermediate, and pusher. The cases that fall within the red or "poorly predicted" category run contrary to what the theory would predict. These cases include China, Kazakhstan, Mauritius, South Africa, and Thailand, which were all predicted to be "dragger" states and turned out to be "pushers," and the Central African Republic, which was predicted to be a "pusher," and in reality is a "dragger."

In order to conduct this analysis, a list of all signatory states of the Paris Agreement[2] was assembled and correlated with the coded positions of countries based upon values of ecological vulnerability and abatement costs. For ecological vulnerability, values from ND-GAIN's assessment of vulnerability representing "a country's exposure, sensitivity and ability to adapt to the negative impact of climate change" (University of Notre Dame n.d.) were used. In order to develop these

[1] The table referred to here can be found within the index of this paper for further reference.

[2] https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&lang=en.

vulnerability values, ND-GAIN's assessment utilized a variety of indicators including both vulnerability indicators (food, water, health, ecosystem services, human habitat, and infrastructure) and readiness indicators (economic readiness, governance readiness, social readiness) (Chen et. al 2015). The combination of these two types of indicators creates an ecological vulnerability matrix similar to that of Sprinz and Vaahtoranta's interest-based matrix (Figure 2).

Figure 2. The ND-GAIN Matrix (Chen et. Al 2015).

The final vulnerability values derived from these indicators range from a minimum vulnerability of 0.274 to a maximum vulnerability of 0.68 (University of Notre Dame n.d.). For the purposes of this study, these resulting vulnerability values were split into two categories to fit within Sprinz and Vaahtoranta's outlined "high" and "low" ecological vulnerability—values lower than 0.399 were categorized as "low" and values above 0.399 were categorized as "high." This split of the values at 0.399 correlates with ND-GAIN's breakdown of the values, which is demonstrated through color-coding of the vulnerability results on a gradient with green and yellow shades representing the less

vulnerable countries, and orange and red shade representing the more vulnerable countries. 0.399 was chosen to be the split between high and low vulnerability because it falls right along the transition from yellow to orange and is an approximate median. Splitting the values into two categories unavoidably simplifies the data, but for the purpose of this analysis this split is sufficient.

For abatement costs, the process was not as straightforward. Quantifying the climate abatement cost of a country accurately is an extremely complicated task dependent upon a variety of constantly shifting factors such as economy, energy sectors, technology, politics, etc. (Batting and Bernauer 2009). With these complexities in mind, this analysis used total carbon dioxide emissions (measured in annual megatons of carbon dioxide emitted)[3] per billion dollars of GDP[4] as a representative for each country's individual abatement costs. Put simply, this measure captures the carbon dioxide emissions intensity of each country in relation to total GDP. The resulting abatement cost values were then split into two categories, with anything less than the median of the data set categorized as low abatement costs and anything above as high. Specifically, values less than 0.325 were labeled as "low" and values above 0.325 as "high." It is important to note that while this measure does a sufficient job of capturing the abatement costs that a country will face in *mitigating* climate change, it does not capture the cost a country will incur in *adapting* to climate change. According to the IPCC (2001), mitigation and adaptation costs are often separated despite adaptation efforts having the ability to influence mitigation cost curves. While this separation may result in somewhat

[3] Carbon emissions data was sourced from the Global Carbon Atlas. http://www.globalcarbonatlas.org/en/CO2-emissions.

[4] GDP data was sourced from the 2017 International Monetary Fund assessment. http://www.imf.org/external/datamapper/NGDPD@WEO/OEMDC/ADVEC/WEOWORLD.

misconstrued calculations, it is characterized by the organization as "a necessary simplification to gain traction on an immense and complex issue" (IPCC 2001). With this in mind, a measure of abatement cost focused solely upon capturing mitigation costs is suitable for the purposes of this analysis.

With each country assigned either a "low" or "high" rating for both ecological vulnerability and abatement cost to form predicted negotiating positions, each country was then placed within their respective categories based upon Sprinz and Vaahtoranta's matrix (Figure 1). For example, if a country was coded as having low ecological vulnerability and low abatement costs, it was labeled as a bystander. If it was coded as having high ecological vulnerability and high abatement costs, it was labeled as a pusher, etc.[5]. The resulting predicted negotiating positions were then compared to the actual negotiating positions of each country in an attempt to test the predictive power of Sprinz and Vaahtoranta's interest-based theory and matrix.

To determine the actual negotiating positions of each country as outlined within the Paris Agreement, the stringency of each individual country's emission reduction commitment as outlined within their Intended Nationally Determined Contribution was quantified using data from the Stockholm Environment Institute Climate Equity Calculator[6]. This calculator performs a thorough assessment of each country's INDC mapped alongside different "mitigation pathways" (1.5°C or 2°C) and different time frames for historical responsibility of cumulative emissions (anywhere from 1850-2010). For the purposes of this analysis, the "2°C standard" and "historical responsibility since 1850" were selected. Upon making these selections for a particular country, the

[5] See Figure 1 for additional breakdown of matrix.
[6] https://calculator.climateequityreference.org/.

calculator produces a comprehensive report detailing the amount by which the country's INDC commitment either exceeds or falls short of what is determined to be "mitigation fair share" in tons of carbon dioxide emissions per capita. These numerical values were quantified as positive values if they exceeded "mitigation fair share," and as negative if they fell short. In the case that a country submitted both "unconditional" and "conditional" pledges within their INDC, the target reductions of the two pledges were averaged[7]. A five number summary was then calculated for the following data set, which had a minimum value of -33.1 and a maximum value of 35.9. Values within Quartile 1 (-33.1 to -3.2125) were labeled as draggers, values within Quartile 2 (-3.215 to -0.575) as bystanders, values Quartile 3 (-0.575 to 0.7875) as intermediates, and values in Quartile 4 (0.7875 to 35.9) as pushers.

To clarify, "mitigation fair share" refers to the amount a country would need to reduce their current emissions to take full responsibility for their equitable share of historical emissions. In other words, it provides a way to measure the stringency of a country's commitment to reducing their emissions through an equity framework. While equity and fair share are not central themes to this study in particular, the values that this calculator produces are extremely useful in capturing a rough estimate of negotiating positions as delineated within the individual INDCs of each country. With both the predicted and actual negotiating position of each country coded according to Sprinz and Vaahtoranta's matrix on hand, an examination of the accuracy of an interest-based theory can easily be conducted.

[7] "Unconditional" pledges are commitments made by countries that will be fulfilled regardless of the actions of other countries. "Conditional" pledges are commitments made by countries that have stipulations to their fulfillment based upon the actions and emission reductions of other countries.

ANALYSIS AND DISCUSSION

Testing the Accuracy of an Interest-Based Approach

The result of the analysis as described above is the following graph comparing predicted and actual negotiating positions of signatory countries of the Paris Agreement vis-á-vis Sprinz and Vaahtoranta's framework (Figure 3). The values on the x-axis represent the ecological vulnerability score of each country as assessed by ND-GAIN, and the values on the y-axis represent abatement costs measured as megatons of carbon dioxide emitted per billion dollars of GDP. The resulting data points represent the predicted negotiating position of each individual country within the agreement as articulated by an interest-based theory. The color of each data point depicts whether or not the predicted negotiating position matched the actual negotiating position, with white squares representing cases in which the theory was correct and black squares representing cases in which the theory was wrong. The horizontal line represents where the distinction was made between high and low abatement costs (0.325), and the vertical line represents the distinction made between high and low ecological vulnerability (0.399). Finally, the shaded regions of the graph highlight what Sprinz and Vaahtoranta's theory and matrix would predict about negotiating positions—that the area in red should be composed of primarily draggers (low ecological vulnerability, high abatement costs) the area in blue should be composed of bystanders (low ecological vulnerability, low abatement costs), the area in orange should be composed of intermediates (high ecological vulnerability, high abatement costs), and the area in green should be composed of pushers (high ecological vulnerability, low abatement costs).

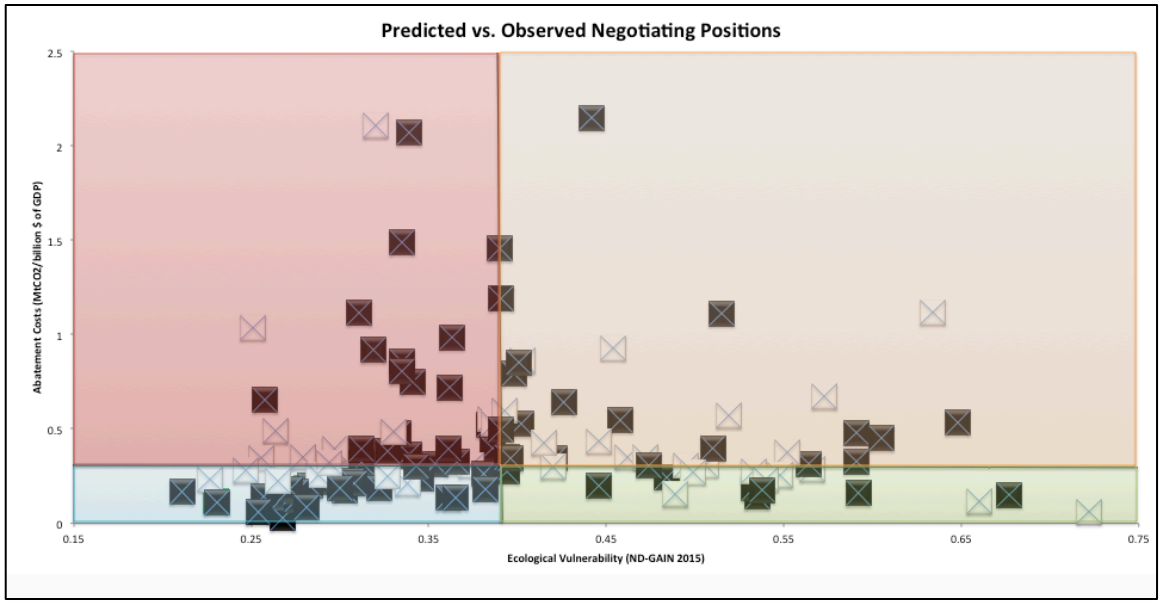

Figure 3. Predicted vs. observed negotiating positions of countries within the Paris Agreement coded by matches (white squares) and mismatches (black squares).

This graph reveals several facts. First off, there are some obvious outliers[8]—a few countries with remarkably high abatement costs (Ukraine, Hungary, Turkmenistan), and one country in particular with extremely high ecological vulnerability (Chad). The graph also shows that an interest-based theory did a better job at predicting some negotiating positions in comparison to others. For example, the largest concentrations of white squares, or matches, are found within the dragger and intermediate portions of the graph. In contrast, black squares dominate the areas representing bystanders and pushers. This distribution suggests that an interest-based approach may be more adept at predicting the positions of countries with high abatement costs (draggers and intermediates) rather than countries with low abatement costs (bystanders and pushers).

So exactly how well did the theory do in predicting the negotiating positions of countries within the Paris Agreement? The following graph attempts to answer this

[8] China and Mongolia were excluded from this figure completely due to the fact that they were extreme outliers with regards to abatement cost (values of 8.77 and 4.38, respectively).

question more directly by comparing the predicted and observed negotiating positions for each position category based upon the total number of cases measured (Figure 3). Perhaps the most interesting takeaway from this presentation of the data is that the theory *underestimated* the number of countries that would adopt stronger negotiating positions (intermediates/pushers) and *overestimated* the number of countries that would adopt weaker ones (draggers/bystanders). Specifically, the theory underestimated the number of pushers by 6 and the number of intermediates by 8, and overestimated the number of bystanders by 9 and the number of draggers by 5. It's also interesting to note that the observed negotiating positions were represented equally across the board, with each category containing twenty-nine countries. While this seems unlikely to occur as a result of pure chance, there is no evidence to suggest that the methodology of the study would be capable of producing this result. Overall, however, this graph presents the theory as having the ability to *roughly* predict the negotiating positions of countries within this agreement.

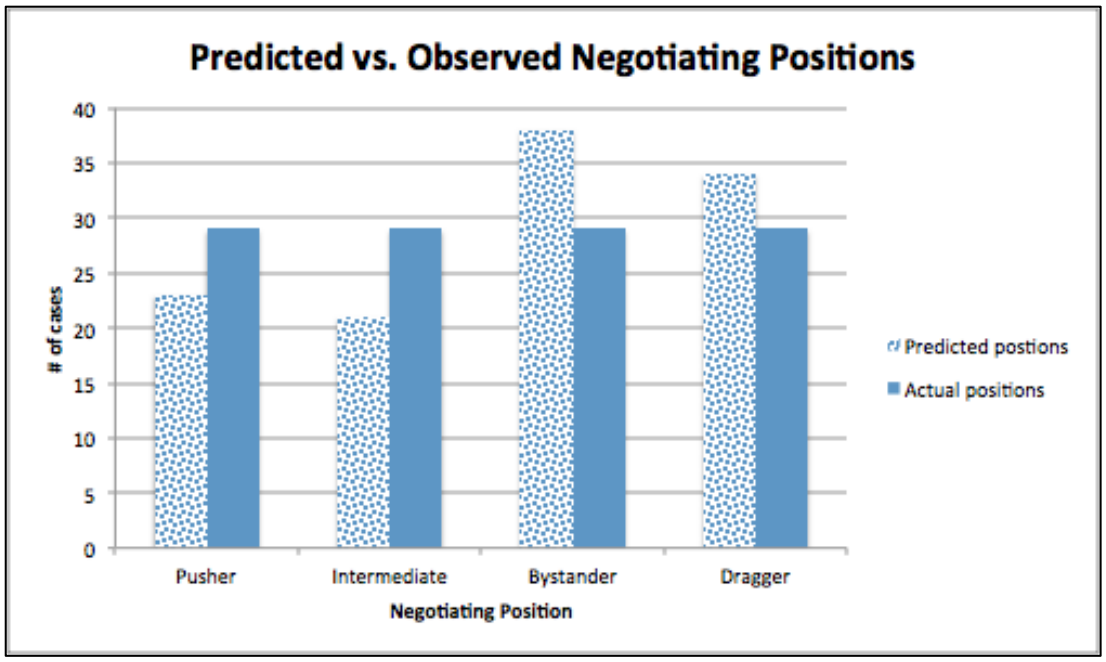

Figure 4. Predicted vs. observed negotiating positions of pushers, intermediates, bystanders, and draggers.

The following graph (Figure 5) presents the same set of data, but through the specific lens of Sprinz and Vaahtoranta's interest-based matrix (Figure 1). Again, the trend of underestimating the stronger negotiating positions and overestimating the weaker positions is striking in these graphs, and prompts further research into why this may be. In an attempt to understand these results further, the next section will analyze the specific results of this study on a case-by-case basis.

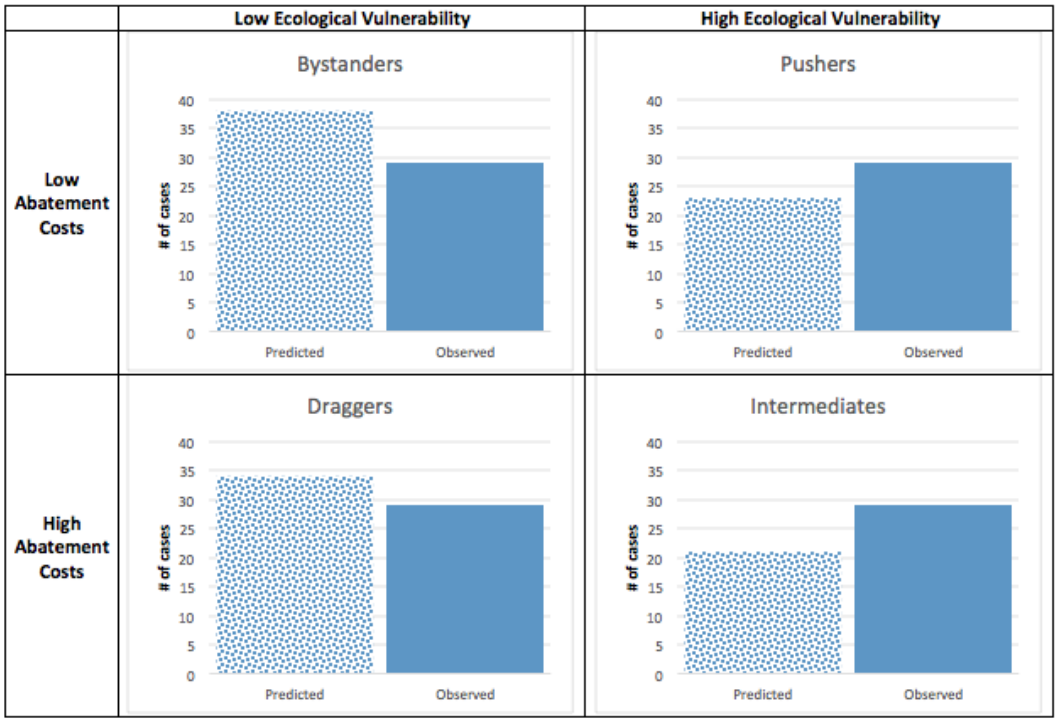

Figure 5. Predicted vs. observed negotiating positions of bystanders, pushers, draggers, and intermediates within an interest-based framework as articulated by Sprinz and Vaahtoranta (1994).

"Exact Match" Cases

By examining the results of this analysis as displayed in the master table,[9] we find that 37 out of the 116 countries (32%) assessed turned out to be exact matches based upon the theory. In other words, the predicted negotiating position based upon an analysis of ecological vulnerability and abatement costs was the same negotiating position as one based upon an assessment of a country's INDC in the case of 37 member states. To put these results into perspective, someone randomly assigning countries to each of the four categories would get an exact match approximately 25% of the time. At 32% accuracy, the data shows that an interest-based theory has a predictive accuracy 7% better than chance. This acknowledgment is important to consider as we attempt to evaluate the predictive power of the theory in the case of the Paris Agreement.

[9] The table referred to here can be found within the index of this paper for further reference.

Within the cases that match the theory perfectly, an even further breakdown of the categorizations within these cases proves to be of particular interest. For example, 12 of the 37 countries with an exact match of predicted and actual negotiating positions were intermediates, or roughly 32.4%. 11 of the cases (29.7%) matched as draggers, 7 of the cases matched as bystanders (18.9%), and the last seven cases matched as pushers (18.9%) (Figure 6). This data shows that the majority of the cases that proved to be exact matches were intermediates and draggers, again suggesting that the theory is perhaps best at predicting the negotiating positions of states with high abatement costs. To reiterate, an intermediate position is predicted to be taken by countries that face both high ecological vulnerability and high abatement costs and a dragger position is predicted to be taken by countries that face low ecological vulnerability and high abatement costs (Sprinz and Vaahtoranta 1994).

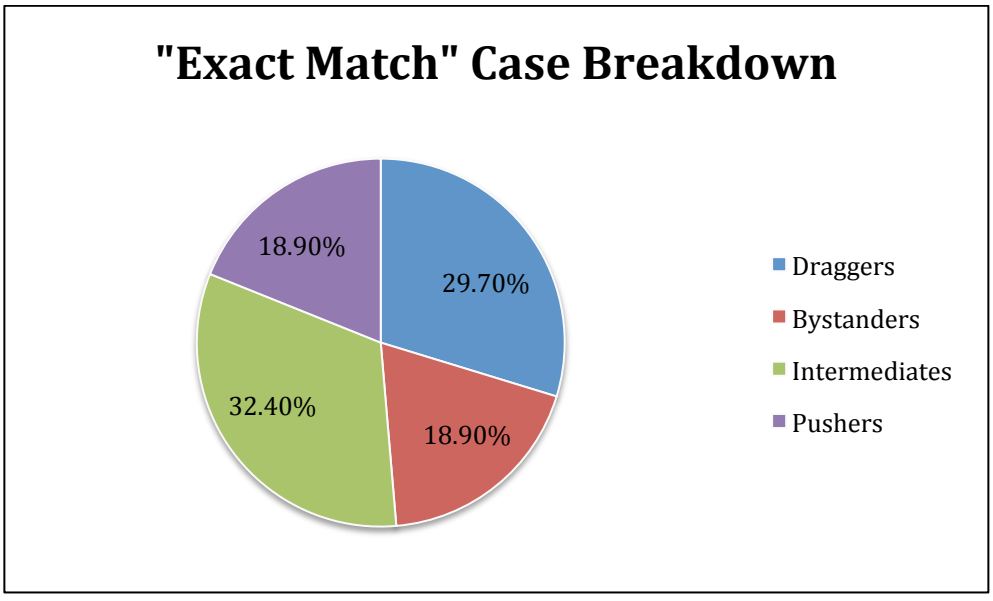

Figure 6. "Exact match" case breakdown of individual negotiating positions by percentage.

"Close Match" Cases

Although there were just 37 cases that resulted in an exact match of the theory, there were another 42 cases that fell into the "close match" category. In other words, these cases represent instances in which the predicted negotiating position based upon an interest-based theory was just one category away from the actual negotiating position. This would be the case, for example, if a country was predicted to be a dragger but was actually a bystander. Considering the method in which this research was conducted, these "close match" cases may be considered to be within a reasonable margin of error and treated as a secondary set of cases that *roughly* match the theory as articulated by Sprinz and Vaahtoranta (1994). By treating these additional cases as rough matches of the theory, the total number of cases in which an interest-based approach does a "good or reasonably good" job of capturing negotiating positions of countries within the Paris Agreement rises to 79, or approximately 68.1%. Considering the multitude of different factors at work within the realm of international environmental politics, a theory that can accurately explain a phenomenon over two thirds of the time undoubtedly represents a valuable piece of the puzzle.

Within these close matches, several notable patterns emerge that are worth mentioning (exhibited in Table 1, Figure 7). Ten of the cases (23.8%) were predicted to be draggers and had actual negotiating positions of bystanders, and 16 of the cases (38.1%) that were predicted to be bystanders were actually draggers. Nine cases (21.4%) were predicted to be pushers and were intermediates, four cases (9.5%) were predicted to be intermediates and were actually bystanders, two cases (4.8%) were predicted to be

intermediates and were pushers, and, finally, just one case (2.4%) was predicted to be a bystander and had the actual negotiating position of an intermediate.

"Poorly Predicted" Cases

The next set of cases represents cases that *don't* fit predictions of an interest-based theory. Specifically, the predicted negotiating positions of these thirty-one "poorly predicted" countries differ from their actual negotiating position by two categories. This disconnect is significant and suggests that these individual countries merit closer examination, as they may reveal valuable insight into what other factors countries take into consideration when developing their negotiating positions within international environmental agreements.

As presented by both Table 1 and Figure 7, 14 of the 31 cases within the "poorly predicted" category (45.2%) were predicted to be bystanders and were actually pushers. Seven (22.6%) were predicted to be draggers and were actually intermediates, and six (19.4%) were predicted to be pushers and were actually bystanders. Just two countries (6.5%) were predicted to be intermediates and had actual negotiating positions of bystanders, one country (3.2%) was predicted to be a dragger and was actually a pusher, and one other country was predicted to be an intermediate and ended up being identified as a dragger.

	"Close Match"	"Poorly Predicted"	"Antithetical"
Dragger/Bystander	10	0	0
Dragger/Intermediate	0	7	0
Dragger/Pusher	0	1	1
Bystander/Dragger	16	0	0
Bystander/Intermediate	1	0	0
Bystander/Pusher	0	14	0
Intermediate/Dragger	0	1	0
Intermediate/Bystander	4	2	0
Intermediate/Pusher	2	0	0
Pusher/Dragger	0	0	5
Pusher/Bystander	0	6	0
Pusher/Intermediate	9	0	0

Table 1. Breakdown of predicted (first listed position) vs. actual (second listed position) results by case type.

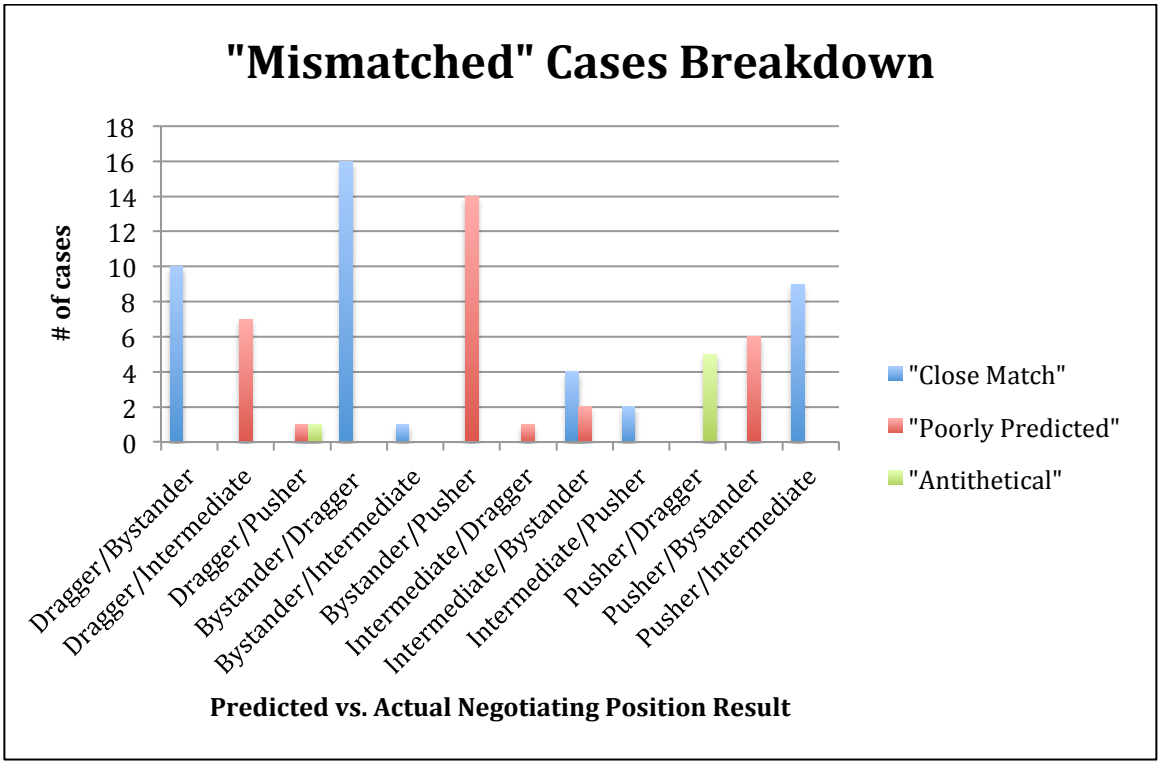

Figure 7. Breakdown of predicted (first listed position) vs. actual (second listed position) results by case type.

"Antithetical" Cases

The last set of cases to be discussed represent instances in which the predicted negotiating position of a country based upon Sprinz and Vaahtoranta's matrix was off by

three categories. For example, a country would fall into this grouping if it were predicted to be a dragger but was actually a pusher. Interestingly enough, the majority of cases considered to be "antithetical" follow that exact pattern. Out of six countries designated as "antithetical," five (83.3%) were predicted to be draggers and had actual negotiating positions based upon their INDCs of pushers (Table 1, Figure 7). These countries include China, Kazakhstan, Mauritius, South Africa, and Thailand. Just one case (16.7%) differed from this pattern, with the Central African Republic predicted to be a pusher but having the actual negotiating position of a dragger.

These six countries that directly contradict what an interest-based theory would predict about negotiating positions within an agreement of this type provide the basis for a more in-depth analysis examining the factors that might be responsible for the lapse in explanatory power of an interest-based approach. As discussed within the literature review of this analysis, a variety of additional factors may be exerting a more significant role within these exceptional cases such as international norms and domestic factors. Examining the ways in which these factors have influenced the specific negotiating positions of these individual countries within the Paris Agreement represents an exciting area for future research, and one that is not included within the confines of this particular study.

Yea or Nay to an Interest-Based Theory of Negotiating Positions?

Upon reviewing the results of the tests as described above, we can draw some conclusions about the influence of ecological vulnerability and abatement costs on negotiating positions. Prior to doing so, however, it is important to highlight that a theory is at best a *generalization* of a phenomena that is happening in the world. Testing a

theory will not necessarily result in a cut and dry answer as to whether or not the theory is true or false. As eloquently stated by Waltz (1979):

> "Testing theories is a difficult and subtle task, made so by the interdependence of fact and theory, by the elusive relation between reality and theory as an instrument for its apprehension. Questions of truth and falsity are somehow involved, but so are questions of usefulness and uselessness. In the end, one sticks with the theory that reveals most, even if its validity is suspect" (124).

With this disclaimer of theory testing in mind, I conclude that Hypothesis 1 is correct, and that an interest-based theory rooted in Sprinz and Vaahotaranta's (1994) ecological vulnerability and abatement costs matrix does rather well at capturing the negotiating positions of countries within the Paris Agreement. This conclusion is based upon the concession that although the theory only predicts negotiating positions *exactly* a third of the time (32%), it gets close approximately two thirds of the time (68%) if we consider "close matches" to capture negotiating positions. Without this concession, the predictive power of the theory is still better than chance by 7%. While this doesn't present the strongest argument in support of the accuracy of the theory, it does prove that the theory is not *inaccurate*. Ultimately, I would argue that in light of the generalizations within the study design and potential data errors, we should give considerable credence to a theory that can roughly predict what kind of negotiating position a country will take within a complex, international environmental agreement.

Several other compelling trends that were observed within the results of this study are worth mentioning. As mentioned prior, the theory was able to accurately predict when a country would be a dragger more often than when it would be a pusher (Figure 4).

This observation was also reiterated within the analysis of the case matches, with pushers making up the lowest percentage of exact matches within the theory. This trend was also reflected within the other case categories (close match, poorly predicted, and antithetical), with the theory consistently overestimating the amount of weak negotiating positions present and underestimating the amount of strong negotiating positions. For example, of the poorly predicted cases, 45% of the cases that were predicted to be bystanders were actually pushers, and 22% of the cases that were predicted to be draggers were actually intermediates. Also, 83% of the antithetical cases were predicted to be draggers but in reality were pushers! Most countries are acting *more* ambitiously with regards to climate negotiations than an interest-based theory predicts. In addition, this suggests that whatever an interest-based theory is missing within these strong negotiating position cases may be contained within the influence of the other extraneous independent variables as examined within this study.

Ecological Vulnerability and Negotiating Positions

While Sprinz and Vaahtoranta's interest-based theory relies upon the combined influence of both ecological vulnerability and abatement costs, there is also a debate within the literature of whether or not ecological vulnerability on its own can be used as an explanatory factor for negotiating positions (Tubi et. al 2012). At face value, one would assume that countries that are more vulnerable to climate change will exhibit a stronger commitment to addressing climate change than countries facing minimal risks. However, as discussed prior, Tubi et. al (2012) found that this is not necessarily the case, and that vulnerability is an unreliable indicator of negotiating positions within international environmental agreements. Despite this, I hypothesized that states that are

more vulnerable to climate change will likely take stronger negotiating positions within the Paris Agreement than states that are less vulnerable. If this hypothesis were true, we would expect the countries within this analysis coded as having high ecological vulnerability to have observed negotiating positions of intermediates and pushers, and countries coded as having low ecological vulnerability to have observed negotiating positions of bystanders and draggers.

In order to test this hypothesis, countries were split into two categories of low and high ecological vulnerability and then sorted according to their observed negotiating position (Table 2). When graphed, the results present an interesting set of patterns (Figure 8). For example, the line representing countries with high ecological vulnerability shows that, as an interest-based theory would predict, there are very few countries with high vulnerability that are characterized as draggers. The number of countries continues to grow with each increasingly ambitious negotiating position—twelve countries as bystanders, twenty-one as intermediates—until it drops off with just 9 countries as pushers. In comparison, the line representing low ecological vulnerability shows that the highest concentration of countries is of those that have adopted the negotiating position of draggers, a total of twenty-seven. From there, the numbers continue to diminish with each negotiating position—seventeen countries as bystanders, eight as intermediates—until again, the number for pushers changes drastically, skyrocketing up to twenty.

	Low Ecological Vulnerability	High Ecological Vulnerability
Dragger	27	2
Bystander	17	12
Intermediate	8	21
Pusher	20	9

Table 2. Breakdown of total number of cases within low and high ecological vulnerability by negotiating position.

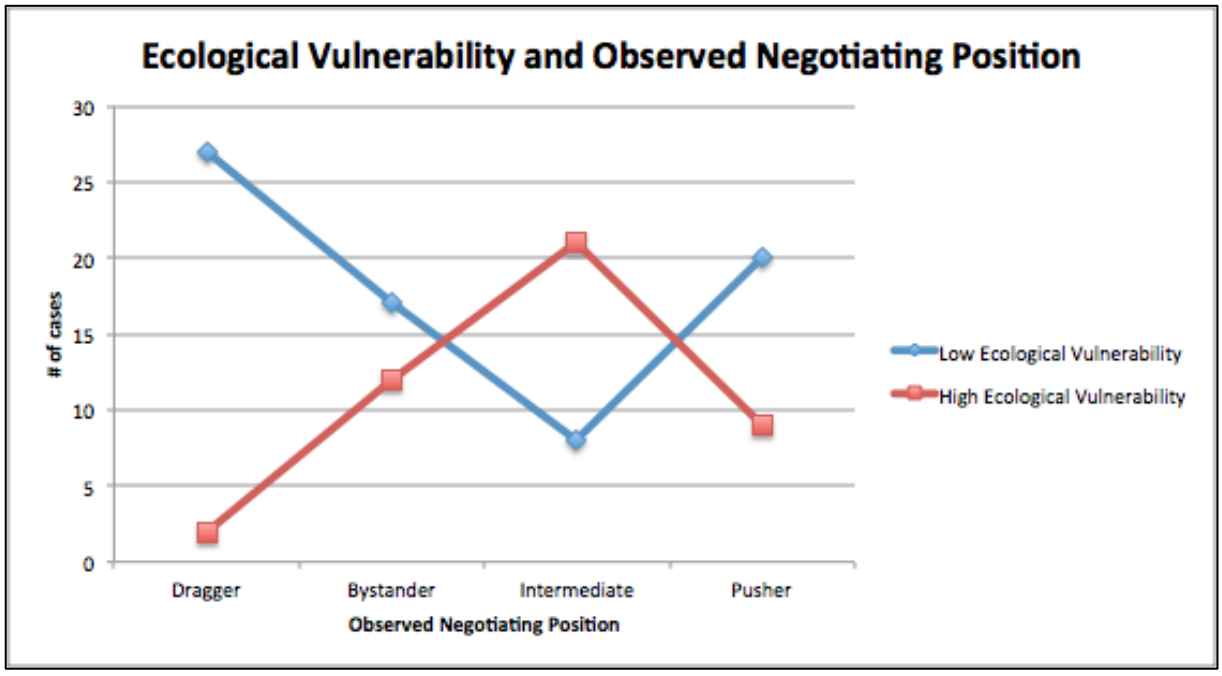

Figure 8. Low vs. high ecological vulnerability and observed negotiation positions by negotiating category.

In determining whether or not this data proves or disproves the hypothesis that countries that are more vulnerable to climate change will adopt more ambitious negotiating positions than those that are not, there are a few factors to consider. If we test the hypothesis based on pushers alone, it's clearly false. Of countries with high vulnerability, just 9 were pushers in comparison to twenty countries that were categorized as pushers with low vulnerability. However, when we assess the hypothesis based upon

the intermediate category, it proves to be correct in that there are significantly more countries that are categorized as intermediate and with high vulnerability than those categorized as intermediate with low vulnerability. This disconnect between what we would predict to be true about countries that are pushers and the observed reality is a compelling one, and one that muddies the water in affirming the hypothesis. It also appears to be consistent with a trend of difficulty in predicting and understanding the behavior of countries observed to be pushers within the Paris Agreement[10].

In examining the behavior of bystanders and draggers within both categories, however, the hypothesis appears to be more plausible. The amount of draggers with high ecological vulnerability was the lowest of any category at just two countries, and in stark contrast to a whopping 27 countries coded as having low vulnerability. This same trend is true for the bystanders in that the number of countries having high vulnerability is notably less than the number of countries with low vulnerability. Ultimately, these observations and the contradicting example of the pushers are at odds in either proving or disproving the hypothesis. More research is needed in order to confidently make a claim in either direction.

Abatement Costs and Negotiating Positions

According to an interest-based theory of international negotiations, countries with higher abatement costs will be less likely to have a strong climate change negotiating position than those that face lesser costs. If this were true, we would see countries within this study coded as having high abatement costs with observed negotiating positions of draggers and bystanders, and countries coded as having low abatement costs with

[10] An observation to be flagged for future analysis and exploration.

observed negotiating positions of intermediates and pushers. In an attempt to test this hypothesis, countries were split into the two categories of low and high abatement costs and then tallied according to their negotiating positions (Table 3). The results are displayed in Figure 9, and provide an interesting look into exactly what kind of influence abatement costs hold over the negotiating positions of countries within this agreement.

	Low Abatement Costs	High Abatement Costs
Dragger	17	12
Bystander	13	16
Intermediate	10	19
Pusher	21	8

Table 3. Breakdown of total number of cases within low and high abatement costs by negotiating position.

In taking a look at the line representing low abatement costs in Figure 9, we find that there are actually a significant number of countries (17) with low abatement costs categorized as draggers. This trend continues, with 13 countries categorized as bystanders and ten as intermediate. Since these countries face low abatement costs and therefore smaller economic obstacles to implementing climate mitigation policies, an interest-based theory would predict this pattern to be switched, and the number of countries in each category to start low within the draggers and grow with each subsequent negotiating position. However, the results do match the theory with regards to pushers in that there is a high concentration of pushers (21) with low abatement costs. In comparing the low and high abatement cost lines, we find that there are actually fewer draggers with high abatement costs than draggers with low abatement costs. This counterintuitive trend

continues in that there are more bystanders (sixteen) and intermediates (nineteen) with high abatement costs than low abatement costs. However, in the case of the pushers, the opposite is true. There are far fewer countries with the negotiating position of a pusher that have high abatement costs than those with low abatement costs.

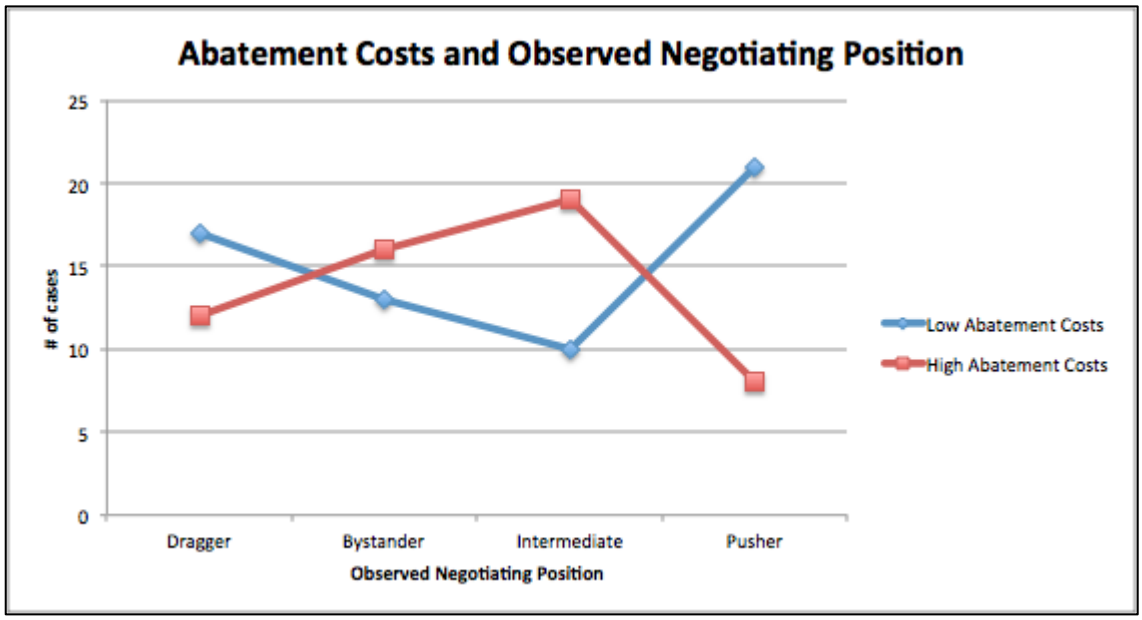

Figure 9. Low vs. high abatement costs and observed negotiating position by negotiating category.

In determining whether or not this data supports the hypothesis that states with high abatement costs will be less likely to have a strong climate change negotiating position than those that face lesser costs, there a few considerations that need to be made. As was the case with ecological vulnerability, each negotiating position presents a slightly different contribution to the hypothesis. In the case of pushers, for example, the hypothesis is clearly true. There are far more pushers with low abatement costs than pushers with high abatement costs. However, with regards to the other negotiation categories, the opposite is true. In light of these contradictions in the data, there is not enough evidence to support the hypothesis that countries with lower abatement costs will necessarily adopt stronger negotiating positions than countries with higher abatement

costs. Rather, this failed hypothesis suggests what is discussed in the next section—that ecological vulnerability is a more reliable explanatory factor than abatement costs.

Comparing the Influence of Ecological Vulnerability and Abatement Costs

After examining the influence of both ecological vulnerability and abatement costs separately, a comparative look at these two variables can also provide important insight into how they influence negotiating positions within the Paris Agreement. Comparing the two variables also enables us to test another one of our hypotheses—that ecological vulnerability exerts a more significant influence over negotiating positions than abatement costs do. This hypothesis is rooted in the idea that abatement costs could be staggering, but if the threat posed by climate change is also staggering, that vulnerability will motivate a country to take action regardless of the cost (Mitchell 2017). If this hypothesis were true in the context of this study, we would see ecological vulnerability as having a higher predictive accuracy of negotiating positions than abatement cost after effectively separating out the two variables. In an effort to determine if this is the case, the following table was compiled comparing the predictive accuracy of both ecological vulnerability and abatement costs (Table 4).

	Total # of Cases	Cases that match prediction (%)	Cases that don't match prediction (%)
High abatement costs	55	51	49
Low abatement costs	61	51	49
High ecological vulnerability	44	68	32
Low ecological vulnerability	72	61	39

Table 4. Predictive capacity of ecological vulnerability in comparison to abatement costs.

By isolating ecological vulnerability and abatement costs and examining the degree to which they are able to accurately predict negotiating, we can get an idea of which variable is a stronger explanatory factor. For example, an interest-based theory would predict that countries with high abatement costs would be either draggers or bystanders, and countries with low abatement costs would be more likely to be either intermediates or pushers. In testing whether or not this is true, the data shows that these predictions were only true approximately 50% of the time for both high and low abatement costs (Table 4). In comparison, predictions of negotiating positions based on ecological vulnerability—assuming that countries with high ecological vulnerability will be either intermediates or pushers, and countries with low ecological vulnerability will be either draggers or bystanders—was a lot more effective, with the theory being correct 68% of the time for high ecological vulnerability and 61% of the time for low ecological vulnerability.

In light of the data as discussed above, it appears that the hypothesis is correct that ecological vulnerability does exert more influence over negotiating positions than abatement costs. By comparing the percentages within Table 4, one can easily infer that ecological vulnerability was a better predictor of negotiating position than abatement costs. It is also worth noting that the *best* predictor of negotiating positions was that of high ecological vulnerability. However, this analysis is rather simplistic in that it just looks at the percentage of all cases, and doesn't necessarily isolate each independent variable in a way that would allow this finding to be more decisive. A more exhaustive study would attempt to resolve this issue and deliver a more compelling argument.

International Climate Norms and the Paris Agreement

As discussed within the literature review of this study, the role of global climate norms within international environmental agreements is theorized to have an increasingly influential role in shaping negotiating positions. While this particular study does not develop a specific test for this claim, I hypothesized that the presence of strong international climate norms would in fact lead states to have more ambitious negotiating positions within the Paris Agreement than they would have in the presence of weaker or absent climate norms. To test this claim would require somehow quantifying the strength of global climate norms and evaluating their influence upon the positions of countries within this agreement, a task that is simply beyond the bounds of this study. However, there are a few areas within the data in which the influence of international norms could potentially have some explanatory power.

For example, one of the key takeaways from the results of this study is the tendency of an interest-based theory to consistently underestimate the ability of states to adopt more ambitious negotiating positions. As addressed in previous sections, the theory consistently underestimates strong negotiating positions—intermediates and pushers—and overestimates weak negotiating positions—draggers and bystanders (Figure 4). Of the 37 cases within the poorly predicted and antithetical categories, 27 (73%) have more ambitious positions than the theory predicts. If we break it down even further, 22 of 31 cases (87%) within the poorly predicted category and five of six cases (83%) within the antithetical category are underestimated by the theory. In other words, when the theory is wrong, it's wrong in a specific direction. Rather than doing less than

expected, the cases that contradict the theory are going above and beyond what an analysis of ecological vulnerability and abatement costs would predict.

This phenomenon as observed within the data highlights the fact that an interest-based theory isn't taking at least one key factor into consideration in its analysis of negotiating positions. With the relevant literature in mind, one could conclude that there is a high possibility that that missing factor is the influence of international climate norms. As articulated within the literature review, international environmental norms have become an integral part of multilateral environmental agreements over the last several decades—and especially so in the case of the Paris Agreement. According to Rowell and von Zeben (2016), the mere fact that the Paris Agreement experienced the degree of global support that it did sets powerful psychological norms into place, those of which are critical in improving the probability of norm salience. While the data to examine the validity of this claim is not addressed within this study in particular, this area undoubtedly represents a promising avenue for future research.

Governance Systems and Negotiating Positions

Within the literature, there is also a significant amount of debate as to whether or not governance systems have an influence over negotiating positions within international environmental agreements. In particular, political scientists debate whether or not democracies are more ambitious in their environmental commitments than autocracies, and whether democracies can generally be considered to take better care of their environments than less democratic regimes (Li and Reuveny 2005). Within the context of this study, I hypothesized that democracies would in fact adopt stronger negotiating positions within the Paris Agreement than authoritarian states. If this hypothesis were to

be true, we would see countries that are identified as more democratic to be adopting more ambitious positions than those identified as being less democratic. To test this hypothesis, I categorized the countries within the Paris Agreement by regime type (authoritarian, hybrid regime, flawed democracy, or full democracy) and observed negotiating positions. The Economist Intelligence Unit developed these particular democracy categorizations through a comprehensive analysis of electoral process and pluralism, functioning of government, political participation, political culture, and civil liberties (2017).

The result of this analysis is exhibited in Figure 10, which displays the total percentage of cases of each regime type within each negotiating position. Percentage was chosen as a measurement unit rather than the total number of cases because there is an unequal distribution of each regime type within the data set, and using the case total rather than percentage would have skewed the appearance of the results. Right away, one can see that the regime type with the highest percentage of draggers is that of the full democracy, but that full democracies also constitute the highest percentage of pushers. Interestingly enough, there are no full democracies observed to be intermediates to the agreement. Flawed democracies take second for highest percentage of draggers, and have a relatively poor showing on the pusher front as well. In contrast, authoritarian and hybrid regimes both have fairly low percentages of draggers (14-15%) and the highest percentage of intermediate positions (35% and 48%, respectively). Hybrid regimes do have the lowest percentage of pusher states at 9.5%, but authoritarian states beat out flawed democracies as pushers at nearly 31%.

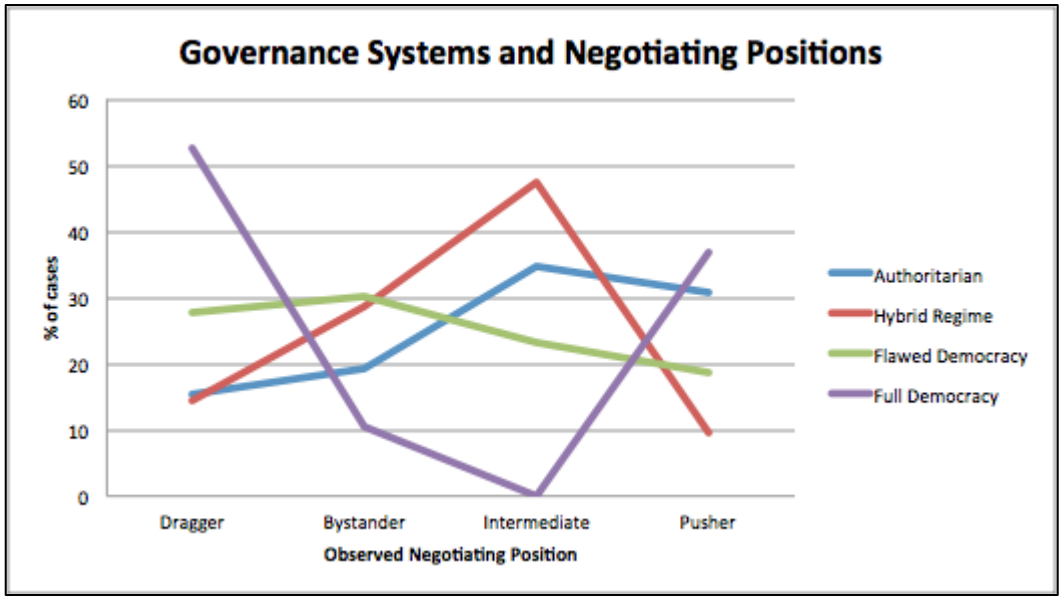

Figure 10. Types of governance systems observed within each negotiating position as a percentage total across all cases.

Ultimately, this data provides conflicting evidence both in support of and against the hypothesis that democratic regimes will have stronger climate positions than authoritarian or hybrid regimes. As reflected in Figure 10, full democracies *do* in fact have the largest percentage of "strong" negotiating positions, but flawed democracies have a lesser percentage than authoritarian states do. Additionally, full democracies and flawed democracies make up the majority of draggers, with hybrid regimes and authoritarian states being spread out amongst the more neutral negotiating positions of bystanders and intermediates. These contradictory findings echo some of what has been found within the literature on this topic in that the results are, at best, mixed (Li and Reuveny 2006).

SUMMARY OF FINDINGS

In order to provide an overview and summary of the findings reached throughout the course of this study, the following section provides a brief review of the research questions, hypotheses, and the subsequent conclusions made. To reiterate, the primary

focus of this research was to determine if the interaction of ecological vulnerability and abatement costs lead states to take climate positions within the Paris Agreement as expected by Sprinz and Vaahtoranta's interest-based theory. I hypothesized that this would in fact be the case, and that by quantifying vulnerability and abatement costs I would be able to accurately predict what kind of negotiating position a country would adopt within the context of this agreement. Upon conducting this analysis, I was able to confirm this hypothesis—though with an important caveat. In total, the theory was able to accurately predict negotiating positions roughly a third (32%) of the time. However, if we take into consideration the cases in which the theory was close to a completely accurate prediction—the "close match" cases, this predictive accuracy percentage rises to approximately two thirds (68%) of the time. While including these "close match" cases may be viewed as a concession to the theory, the theory itself is inarguably valid in that it explains negotiating positions more accurately than chance would allow. Additionally, the analysis of this research question also revealed the tendency of the theory to *overestimate* the number of states that have weak negotiating positions and *underestimate* the number of states that have stronger negotiating positions.

The next set of research questions within this study attempted to flush out the independent influences of ecological vulnerability and abatement costs upon negotiating positions and the relationship between the two. The first question was as follows: are states that are more ecologically vulnerable more likely to have a strong negotiating position than states that are less vulnerable? I hypothesized that yes, countries experiencing higher levels of ecological vulnerability would be more likely to have more ambitious climate positions, and specifically that 1) countries coded as having high

ecological vulnerability would have observed negotiating positions of intermediates and pushers and 2) countries coded as having low ecological vulnerability would have observed negotiating positions of draggers and bystanders. Upon reviewing the data, I was unable to clearly confirm or reject this hypothesis. The hypothesis was true in some aspects—for example, the majority of countries with intermediate climate positions did in fact have high levels of ecological vulnerability. Conversely, however, the majority of countries within the pusher category had low ecological vulnerability. This dichotomy suggests that relying upon ecological vulnerability as a primary indicator of negotiating positions is an unreliable practice, and that more research needs to be done to clarify the relationship between the two.

Regarding the independent influence of abatement costs upon negotiating positions, the research questions was as follows: are states that face higher climate abatement costs more likely to have a weaker negotiating position than states that face lesser costs? My hypothesis supported this claim and suggested that states with higher abatement costs would primarily be observed as bystanders and draggers, and states with lower costs would be observed as intermediates and pushers. The data addressing this hypothesis also proved to be both contradictory and ultimately inconclusive, and suggested that abatement costs alone are not a sufficient explanatory factor of negotiating positions within the Paris Agreement.

Another research question addressed within this study attempted to take a closer look at the interaction between ecological vulnerability and abatement costs and their relative influence over negotiating positions by asking: does ecological vulnerability exert a more significant influence over negotiating positions than abatement costs? I

hypothesized that yes, ecological vulnerability does exert a more significant influence in part because countries faced with severe climate impacts will be motivated to take action regardless of the costs associated. The data confirmed this hypothesis, and showed that ecological vulnerability was more often an accurate predictor of negotiating position than abatement costs.

There is also evidence within the literature that both international climate norms and variance in governance systems have the potential to exert a significant influence over the negotiating positions of countries within international environmental agreements. In response to these claims, the following research questions were asked and addressed briefly within the context of this study: do international climate norms exert a significant influence over the negotiating position of countries within the Paris Agreement? Are democratic regimes more likely to have stronger climate positions than authoritarian or hybrid regimes? I hypothesized that international climate norms do in fact exert a significant influence over negotiating positions, and that democratic regimes are more likely to be identified as intermediates or pushers than authoritarian or hybrid regimes. Although I didn't get the chance to test the influence of international norms to any substantial degree, my data did exhibit areas in which the results were unexplained by ecological vulnerability and abatement costs. Further research would clarify whether this disconnect could be explained by an examination of the influence of international norms. Regarding governance systems, the data showed mixed results as to whether or not democratic regimes have stronger climate positions than authoritarian or hybrid regimes. Again, more exhaustive research would need to be conducted to answer this research question in a more thorough and definitive manner.

CONCLUSION

Upon completing this analysis of negotiating positions within the Paris Agreement, it is clear that there is still a lot to learn within the realm of international environmental negotiations. Potential areas for future research include delving into the specific "antithetical" case studies, quantifying or qualitatively assessing the influence of international climate norms on negotiating positions, learning more about the role of democracy in negotiating positions, distinguishing between adaption and mitigation costs within the Paris Agreement to present a more complete picture of abatement, and conducting a similar test using other international environmental agreements in an effort to compare the predictive power of an interest-based theory across policy issues.

In conclusion, this study provides a comprehensive analysis of whether or not an interest-based theory as articulated by Sprinz and Vaahtoranta (1994) utilizing quantified values of ecological vulnerability and abatement cost can accurately predict the negotiating positions of countries within the Paris Agreement. The results of this study are important because climate change is an issue that has global, long-lasting, and likely irreversible effects that need to be addressed sooner rather than later. International environmental agreements like the Paris Agreement are an attempt to do exactly that, and learning more about the dynamics at work within these agreements and how countries formulate their negotiating positions can provide policymakers with valuable insights and strategies to design more effective agreements that are able to convince countries to adopt as ambitious of positions as possible. By examining the interaction of independent variables exerting an influence over the negotiating positions of countries within the Paris

Agreement, this study contributes to a vital body of research that will be absolutely critical in combating the harmful effects of climate change in the years to come.

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The following table displays the primary results of this analysis sorted by result category (exact match, close match, poorly predicted, or antithetical).

	ABATEMENT COST	ECOLOGICAL VULNERABILITY	PREDICTED POSITION	OBSERVED POSITION	RESULT
Germany	Low	Low	Bystander	Bystander	Exact match
Grenada	Low	Low	Bystander	Bystander	Exact match
Israel	Low	Low	Bystander	Bystander	Exact match
Latvia	Low	Low	Bystander	Bystander	Exact match
Lithuania	Low	Low	Bystander	Bystander	Exact match
New Zealand	Low	Low	Bystander	Bystander	Exact match
Portugal	Low	Low	Bystander	Bystander	Exact match
Canada	High	Low	Dragger	Dragger	Exact match
Armenia	High	Low	Dragger	Dragger	Exact match
Belarus	High	Low	Dragger	Dragger	Exact match
Cyprus	High	Low	Dragger	Dragger	Exact match
Czech Republic	High	Low	Dragger	Dragger	Exact match
Georgia	High	Low	Dragger	Dragger	Exact match
Greece	High	Low	Dragger	Dragger	Exact match
Russian Federation	High	Low	Dragger	Dragger	Exact match
Trinidad and Tobago	High	Low	Dragger	Dragger	Exact match
Turkey	High	Low	Dragger	Dragger	Exact match
Ukraine	High	Low	Dragger	Dragger	Exact match
Afghanistan	High	High	Intermediate	Intermediate	Exact match
Algeria	High	High	Intermediate	Intermediate	Exact match
Benin	High	High	Intermediate	Intermediate	Exact match
Gabon	High	High	Intermediate	Intermediate	Exact match

Ghana	High	High	Intermediate	Intermediate	Exact match
Honduras	High	High	Intermediate	Intermediate	Exact match
India	High	High	Intermediate	Intermediate	Exact match
Lebanon	High	High	Intermediate	Intermediate	Exact match
Mauritania	High	High	Intermediate	Intermediate	Exact match
Mongolia	High	High	Intermediate	Intermediate	Exact match
Mozambique	High	High	Intermediate	Intermediate	Exact match
Senegal	High	High	Intermediate	Intermediate	Exact match
Antigua and Barbuda	Low	High	Pusher	Pusher	Exact match
Chad	Low	High	Pusher	Pusher	Exact match
Eritrea	Low	High	Pusher	Pusher	Exact match
Laos	Low	High	Pusher	Pusher	Exact match
Madagascar	Low	High	Pusher	Pusher	Exact match
Namibia	Low	High	Pusher	Pusher	Exact match
Sao Tome and Principe	Low	High	Pusher	Pusher	Exact match
Argentina	Low	Low	Bystander	Dragger	Close match
Australia	Low	Low	Bystander	Dragger	Close match
Austria	Low	Low	Bystander	Dragger	Close match
Belgium	Low	Low	Bystander	Dragger	Close match
Brazil	Low	Low	Bystander	Dragger	Close match
Denmark	Low	Low	Bystander	Dragger	Close match
Iceland	Low	Low	Bystander	Dragger	Close match
Japan	Low	Low	Bystander	Dragger	Close match
Luxembourg	Low	Low	Bystander	Dragger	Close match
Singapore	Low	Low	Bystander	Dragger	Close match
Slovenia	Low	Low	Bystander	Dragger	Close match

Spain	Low	Low	Bystander	Dragger	Close match
Sweden	Low	Low	Bystander	Dragger	Close match
Switzerland	Low	Low	Bystander	Dragger	Close match
United Kingdom	Low	Low	Bystander	Dragger	Close match
United States	Low	Low	Bystander	Dragger	Close match
Chile	Low	Low	Bystander	Intermediate	Close match
Albania	High	Low	Dragger	Bystander	Close match
Bulgaria	High	Low	Dragger	Bystander	Close match
Croatia	High	Low	Dragger	Bystander	Close match
Estonia	High	Low	Dragger	Bystander	Close match
Hungary	High	Low	Dragger	Bystander	Close match
Macedonia	High	Low	Dragger	Bystander	Close match
Romania	High	Low	Dragger	Bystander	Close match
Serbia	High	Low	Dragger	Bystander	Close match
Slovakia	High	Low	Dragger	Bystander	Close match
Tunisia	High	Low	Dragger	Bystander	Close match
Botswana	High	High	Intermediate	Bystander	Close match
Liberia	High	High	Intermediate	Bystander	Close match
Vietnam	High	High	Intermediate	Bystander	Close match
Zimbabwe	High	High	Intermediate	Bystander	Close match
Equatorial Guinea	High	High	Intermediate	Pusher	Close match
Gambia	High	High	Intermediate	Pusher	Close match
Bangladesh	Low	High	Pusher	Intermediate	Close match
Comoros	Low	High	Pusher	Intermediate	Close match
Côte d'Ivoire	Low	High	Pusher	Intermediate	Close match
Djibouti	Low	High	Pusher	Intermediate	Close match

Dominican Republic	Low	High	Pusher	Intermediate	Close match
Ethiopia	Low	High	Pusher	Intermediate	Close match
Kenya	Low	High	Pusher	Intermediate	Close match
Tanzania	Low	High	Pusher	Intermediate	Close match
Zambia	Low	High	Pusher	Intermediate	Close match
Barbados	Low	Low	Bystander	Pusher	Poorly predicted
Colombia	Low	Low	Bystander	Pusher	Poorly predicted
Costa Rica	Low	Low	Bystander	Pusher	Poorly predicted
Dominica	Low	Low	Bystander	Pusher	Poorly predicted
Finland	Low	Low	Bystander	Pusher	Poorly predicted
France	Low	Low	Bystander	Pusher	Poorly predicted
Ireland	Low	Low	Bystander	Pusher	Poorly predicted
Italy	Low	Low	Bystander	Pusher	Poorly predicted
Malta	Low	Low	Bystander	Pusher	Poorly predicted
Netherlands	Low	Low	Bystander	Pusher	Poorly predicted
Norway	Low	Low	Bystander	Pusher	Poorly predicted
Paraguay	Low	Low	Bystander	Pusher	Poorly predicted
Phillipines	Low	Low	Bystander	Pusher	Poorly predicted
Uruguay	Low	Low	Bystander	Pusher	Poorly predicted
Malaysia	High	Low	Dragger	Intermediate	Poorly predicted
Mexico	High	Low	Dragger	Intermediate	Poorly predicted
Montenegro	High	Low	Dragger	Intermediate	Poorly predicted
Morocco	High	Low	Dragger	Intermediate	Poorly predicted
Poland	High	Low	Dragger	Intermediate	Poorly predicted
Republic of Korea	High	Low	Dragger	Intermediate	Poorly predicted
Tajikstan	High	Low	Dragger	Intermediate	Poorly predicted

Azerbaijan	High	Low	Dragger	Pusher	Poorly predicted
Jordan	High	High	Intermediate	Bystander	Poorly predicted
Turkmenistan	High	High	Intermediate	Bystander	Poorly predicted
Indonesia	High	High	Intermediate	Dragger	Poorly predicted
Cambodia	Low	High	Pusher	Bystander	Poorly predicted
Cameroon	Low	High	Pusher	Bystander	Poorly predicted
Guatemala	Low	High	Pusher	Bystander	Poorly predicted
Haiti	Low	High	Pusher	Bystander	Poorly predicted
Maldives	Low	High	Pusher	Bystander	Poorly predicted
Solomon Islands	Low	High	Pusher	Bystander	Poorly predicted
China	High	Low	Dragger	Pusher	Antithetical
Kazakhstan	High	Low	Dragger	Pusher	Antithetical
Mauritius	High	Low	Dragger	Pusher	Antithetical
South Africa	High	Low	Dragger	Pusher	Antithetical
Thailand	High	Low	Dragger	Pusher	Antithetical
Central African Rep.	Low	High	Pusher	Dragger	Antithetical

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