The Effects of US Participation on the Success of International Environmental Agreements

By

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Introduction

Are international environmental agreements (IEA) more likely to succeed when the US is a participant as opposed to when the US is not? What factors influence whether this is the case? One of the largest problems in international cooperation, especially when it comes to environmental issues because they involve public goods (clean water, clean air, fishing stocks, ozone layer, climate, etc.) is the collective action problem and the incentives that exist for states to free ride on their commitments. Essentially, states gain the most in the short term by not complying with the requirements placed upon them by agreements, allowing other states to bear the costs of solving the problem while they use the resources that would have been spent elsewhere. When these conditions are in place, it is very likely that states will not comply with an agreement. In order to prevent this, states must find ways to shift the costs and benefits in order to make compliance, as opposed to defection, the "rational" strategic option. One vector, I will argue, through which this is done is through the application of power (economic, diplomatic, coercive, etc.) available to a global, hegemonic superpower such as the US. However, even the vast resources of the US are finite, and using these powers is not always in the interests of the US. I hypothesize that there are likely domestic and international factors that determine how much power the US will expend in any single agreement, and how effective of a participant the US will be.

This question takes on added relevance with the current presidential administration's decision to pull out of the Paris Climate Agreement at COP21. Due to the nature of the problem climate change poses, immediate action is necessary to avoid irreparable damage to at risk areas all over the world, including here in the US (Ramanathan et al., 2015). Thus, if the most powerful country in the world is preparing to sit out or even to actively work against the efforts

to mitigate climate change, the question must be asked: Is there even a point in the rest of the world trying? Theoretically, in a vacuum the US, with its incomparable military power and substantial economic resources, would be the most important actor with regards to any agreement that addresses an issue of global scale, such as climate change. It should be able convince (through economic measures) or coerce (through forceful measures) other states to follow through on any individual agreement that would be reached. Additionally any agreement without this powerful ally would seem to be at a severe disadvantage in terms of actually fulfilled its goals. However, these methods of international politics are very costly and not repeatedly feasible due to the realities of international bargaining and trade. Because states have to work together on a great many issues, coercion and the resentment it creates is not a very productive bargaining technique in terms of inspiring cooperation on future issues. Additionally, the US expends only a small portion of its budget on international affairs, which limits the amount of financial support it is willing to muster. So the US, in order to maintain order and cooperation amongst other nations with which it must repeatedly interact with, uses softer forms of power, such as bargaining and incentivizing, which makes its true influence on agreements more difficult to discern due to the more subtle nature of this type of power. This paper will attempt to flesh out what exactly this influence is, and how it has been used, both in cases where the US greatly contributes to the success of an agreement as well as some where the US is less impactful and even, arguably, harmful.

Literature Review

With regards to existing literature, I have not been able to find much scholarship specifically addressing the US impact on success of IEA's as a subset of international cooperation. Although, there is an abundant amount of material on other factors that influence

compliance and many different theoretical perspectives as to why states sign agreements in the first place. Indeed, most existing literature addressing US impact on IEA's focuses on one specific agreement, and occasionally, on issue areas such as climate change, pollution, etc. One paper written by Matsuoka and Tanaka does address US participation in multiple agreements, albeit briefly, the International Regimes Database. Their study analyzes the impact of nine variables on the effectiveness of 14 international environmental agreements dealing with pollution, with the effectiveness of the agreements being measured by the degree to which their goals for reduction of a specific pollutant(s) were met. They find no significant relationship between US participation and agreement success (Tanaka and Matsuoka, 2010). They do find that a BRIC (Britain, Russia, India, China) nation being party to an agreement increases the likelihood that the agreement will succeed (10% confidence level), which they reason comes from benefits related to a treaty attracting "large scale, fast growing countries"(Matsuoka and Tanaka, 2010). However, it is difficult to extrapolate from these results due to the sample size. A larger scale analysis might be more illuminating, but data on environmental problems and agreement compliance is severely limited. See Seelarbokus (2014) for an explanation of the problem of data unavailability.

Collective Action as it Relates to Environmental Issues

To summarize Olson (1965), the theory of collective action addresses why, counter-intuitively, members of a group with one common goal or set of interests will *not* work collectively towards achieving that goal, due to the problems of public goods and free-riding. "Public good" refers to any good that is non-excludable, meaning that consumption of the good cannot be limited to a select group (if it is available to one person it is available to all), and non-rival, meaning that one person or actor consuming the good does not reduce the ability of others

to do the same. Groups, even those that share a common goal or interest, are made up of people (or, in the case of international politics, actors) who are inherently self interested, and thus will look to advance their own interests first, even if it comes at the expense of the group or the common cause itself.

Most of the time, this takes place in the form of “free-riding”, where individuals within the group will choose not pay the costs to achieve the common goal, instead allowing the other members to bear their burden, since they cannot be excluded from receiving the benefits even though they did not pay the costs. The larger the group, the more likely that there will be incentives to free ride, because it is harder to monitor participation and enforce accountability when the group is larger. Smaller groups, meanwhile, do not experience the same problems with collective action, simply because it is easier to specifically observe one member not bearing their portion of the costs when those costs are proportionally larger for each member. It is easy to follow these observations to its rational conclusion, where all members of a group elect not to pay any costs and the goal(s) remain unrealized.

These problems, according to Olson, can be overcome, as long as members are provided an additional “separate and selective incentive” beyond the benefits the group would receive if they achieve their objectives. “Privileged groups”, meaning that one or more members have incentives to provide the collective good even if it means bearing the costs of doing so entirely on their own, can also overcome this problem (Olson, 1965). This logic can easily be applied to global environmental politics, where issues such as emissions, pollution, natural resource regulation, etc. all can be defined as public goods, and thus subject to the collective action problem and its potential solutions, and the “groups” consisting of those states affected by a particular environmental issue, or the member states of an IEA.

The environmental field also features an additional wrinkle, the distinction between developed and developing states. To developing states, it could seem relatively unfair and hypocritical for states that reaped the benefits of industrialization and overexploitation of natural resources to not only deny less developed or younger states the same privilege, but to additionally demand that they help mitigate the very damage the developed states caused. Due to this, these developed states have an even greater incentive to free ride and not cooperate since they played a negligible role in creating the problem compared the developed states (Najam et al., 2003; Posner and Sunstein, 2008). I hypothesize that the US can fill the role of both potential solutions. The US could act as a privileged group in cases where the costs that the problem, if unaddressed, threatens to impose are sufficiently disastrous so the US deems it worthwhile to disproportionately finance or facilitate a solution the issue. In other cases where the US interest may not suffer as much if the problem is unaddressed, the US could still assist in providing the additional incentives to group members beyond just the ones that come with the realization of the goal(s) of an agreement.

US Role in International Environmental Politics

The US, since the end of World War II, has been a political, military, and economic superpower, and since the end of the Cold War, has been the sole global hegemon. This, along with the rise of globalization and the increasing interdependence of nations, gives them an influence on international politics that, arguably, no other country has had historically. However, how they use this influence has varied, especially in regards to environmental policy. Falkner (2005) examines a change in US policy. A leader on the environmental front in the 1970's, in the 1980's the US later appeared to be "lukewarm about, and often hostile to, multilateral environmental policy making"(Falkner, 2005). He also discusses the vitality of US hegemony to

its forays into international environmental politics, finding that the US acts both as a catalyst for environmental policy through the expression of its vast economic and political influence, and as a road block, preventing multilateral policymaking when the goals being pursued were not in US interests (Falkner, 2005).

Characteristics of Environmental Agreements

When it comes to environmental agreements, the main issue is that very few of these agreements have any short-term tangible or economic benefits. They are cost-dominant, meaning that they require states to spend money or alter behaviors from their norm today in the hope that, essentially, things will not get as worse tomorrow as they would if no action was taken. States shifting to cleaner energy will not reverse climate change, it will only mitigate its negative effects on populations and ecosystems as the twenty-first century progresses. Reducing overfishing or overexploitation of natural resources will not immediately repopulate these stocks, it will only give nature a chance to do so over a prolonged period of time. Because there are few "benefits" economically to be derived, signing an environmental agreement essentially commits states to paying costs now to avoid worse costs in the future. These costs an make environmental agreements very unpopular or difficult to enforce domestically. "It is difficult to persuade a nation not to destroy its forests when the survival of families and people depends on that particular resource" (Samaan, 2011) When it comes to environmental agreements, most are merely "morally binding", meaning that they are dependent on states voluntarily enforcing the agreements within their borders (Samaan, 2011). Thus, if states do not want to or are unable to enforce an agreement, then, without international assistance or pressure, there are few consequences. However, states know this as well, which leads to the main potential confounder, "rational design". Rational design holds that states pursue international institutions and

agreements in order to advance their own interests, and design institutions accordingly, to help navigate and account for all of the potential issues that may derail cooperation on an agreement (Koremenos et al., 2001). Essentially, all agreements are designed as a best response to the issue specific and specific issues related to each specific attempt at international cooperation. When an agreement is finalized, it is composed of features that the negotiating states believe will give it the best chance of success.

Effects of US Participation in the IRD

Table 1

RC10: GOALS_ FULFILL	Average Score for Agreements (1=unsuccessful, 2=successful)	Percentage	Number of Observations	Average Score for Goals (1=unsuccessful, 2=successful)	Percentage	Number of Observations
US Ratified (US_YES)	1.72217	86.109%	23	1.83264	91.632%	239
US not Ratified (US_NO)	1.55625	77..813%	8	1.38235	69.118%	34

At the surface level of the data, we do see that agreements coded in the IRD with US participation in have had more success than the ones without. The RC10 variable (GOALS_FULFILL) identifies the goals of each agreement, and determines whether the states' behavorial changes led to the fulfillment of these goals or not, with a value of 1 meaning they did not and a value of 2 meaning they did. To aggregate the data and distinguish the agreements with US participation and without, I split the observations into two populations. Then, I calculated a general measure of success by adding up the values (either 1 or 2) of all of the goals identified for each agreement and then taking the averages. Then, I took the average of all of these values for the 8 cases without US ratification and the 23 cases with to find how successful the agreements in each category were, which I then converted into a percentage. By this measure, the

agreements the US ratified experienced a little less than 8% more success than those the US did not., with both still succeeding at more than a 75% rate. However, the sample at the agreement level is skewed by cases such as the Kyoto and Sulfur Protocols for US_NO, and by OILPOL and the NOX Protocol for US_YES, where only one goal is identified. This causes these agreements to be overrepresented in the results. To account for this, I conducted a similar operation, but eliminated the per-agreement averages and instead pooled all of the goals identified into either the US_YES or US_NO categories, and calculated the same average and percentage for each. In addition to granting a larger sample size, all of the goals of each agreement are now weighted equally. This measure produces an even larger gap between the US_NO and US_YES samples, with the YES population having experienced fulfillment on just over 22% more of its goals than the NO population.

When measured this way, it appears that US ratification is a significant factor in whether an agreement will succeed or not. However, as discussed earlier, the rational design of treaties holds that numerous other factors endemic to specific issues affect how agreements are designed, and these designs in turn substantially influence who ratifies and how successful the agreements ultimately are. Additionally, it is nearly impossible to rule out reverse causality in this case with statistical analysis. The US may simply be more likely to ratify agreements that are more likely to succeed, and that is why we see this correlation. Due to this, and the low number of agreements and goals in the IRD that the US has not ratified, a statistical analysis is not the best way to explore whether the US participating in an agreement makes it more likely to succeed.

Research Design

My research design will be a medium n cross section, looking at data from a sample of international agreements derived from the International Regimes Database (IRD). I will compare

the relative success of agreements that received the treatment (US participation) with agreements that did not receive the treatment. My dependent variable will be treaty success, defined by to what degree the goal of the treaty has been fulfilled, and my independent variable will be US participation in said agreement. Due to my smaller sample size, the main contribution of this thesis will come from comparing two pairs of agreements, with each pair including a treaty that the US ratified and one that it did not. Using these case studies, I argue that the US is uniquely positioned to use its resources to help shift the costs of joining and complying with environmental agreements in such a way that will have a tangible, statistically significant impact on whether these agreements succeed, but only when domestic conditions allow for it.

To test this hypothesis, I will be using the afore mentioned IRD, a database of 23 international environmental "regimes" (groups of agreements that target the same geographic region, such as the Antarctic or overall issue, such as hazardous waste) comprised of 58 total agreements that were ratified prior to 1998, the final year in the database. The IRD used a group of 46 coders, who were experts on the agreements chosen, to evaluate them on 136 total variables, broken down into four categories: 1) Regime Formation (RF: 57 variables), 2) Regime Attributes (RA: 51 variables), 3) Regime Consequences (RC: 23 variables), and 4) Regime Dynamics (RD: 5 variables). Out of these 58 agreements, I will only be considering those among them that are open for the US to join, and that address an issue that would be worthy of US attention. For instance, an agreement can be considered open and multilateral, but if it addresses pollution of a single river in Eastern Africa with only East African states participating, then it is not an agreement where US support would influence its success since US involvement is neither expected nor warranted. Neither will bilateral agreements involving the US be considered, since in an agreement between two countries, each state's importance in achieving the goal is obvious.

After narrowing down the agreements in the database, there are only 31 left that meet these requirements, with 23 of them being ratified by the US and 8 not. Since this sample size is rather small, I believe the case study approach will provide more insight than a statistical analysis.

The biggest challenge with this design is the issue of self-selection when it comes to international agreements. The international system exists in a state of anarchy. States are self interested, and will only act in ways they believe will increase their own well being and influence. As a result, participation in and ratification of international treaties is not random, as states specifically only choose to enter into agreements that they expect to derive some benefit from. The US is inherently less likely to join an agreement that it believes is doomed from the start, since any resources expended would be wasted, and more likely to join one where success seems obvious. However, just because the first agreement failed and the second succeeded, we cannot draw the conclusion that US participation in the second is what caused it to succeed. In order to compare agreements and isolate the desired variable of US participation, various other attributes of agreements that influence their likelihood of success or failure must first be accounted for.

In order to create an approximation of ideal experimental design, I will match the agreements into pairs that are as similar as possible, aside from the US ratifying one of the agreements and not ratifying the other. To accomplish this, I will correlate the factors identified by Koremenos with variables coded in the IRD, and select the two pairs of agreements that are the closely comparable in regards to those variables. After identifying these pairs, the bulk of my research involves looking into the agreements themselves. I will determine what role the US played in their negotiation, implementation, enforcement, etc. and what the counterfactual scenario(s) would have looked like (US participates where it did not, vice versa). This

information will determine how important US participation was to those specific agreements, while the comparisons of the case studies will show what conditions must be met for US participation to be beneficial, inconsequential, or even potentially harmful to an agreement.

As mentioned earlier, all international agreements are rationally designed, meaning they are best responses to the issues they address. In order to identify case studies, I need to account for this. To this end, the 11 different areas where agreements differ in design discussed by Koremenos will suffice. These 11 variables are: K1) Membership, K2) Scope , K3) Centralization, K4) Control, and K5) flexibility, K6) Distribution Problems, K7) Enforcement Problems, K8) Number of Important Actors, and uncertainty about K9) States' Behavior, K10) Ramifications of Decisions, and K11) States' Preferences (Koremenos et al., 2001). To quantify these factors, I selected 13 variables from the IRD to represent them. For each variable from the IRD, I excluded any observations marked "don't know" (usually the highest possible value), or "not applicable" (usually 0) to create a more fluid scale for each variable. Definitions for each of the variables are taken from Protocol Regime Database, which contains explanations for each variable and the different codes, provided by participants in the project (Breitmeier, 1996).

Appendix 1 (pg. 75) contains the values for the 13 variables selected for all 31 agreements. Additionally, each agreement's success on the 1-2 scale is included. All of the values are the average of all observations recorded for each agreement, with the exception of RA20, which is simply the number of ratifying states. The minimum and maximum scores are included in parenthesis below each variable, with the meaning of the scales explained in the definitions below.

Now, I will briefly summarize each of the 11 aspects of rational design identified by Koremenos, as well as which variable(s) from the IRD (shown in parenthesis) I use to represent them.

K1- Membership (RA20): "Who belongs to the institution?" Membership simply refers to who is allowed to ratify the agreement (Koremenos et al., 2001). Since I have already eliminated all agreements that are not open and multilateral, this is already controlled for. Additionally, I will include RA20, which measures how many states have ratified each agreement. All other things equal, the more members in an agreement, the more difficult it should be to ensure the compliance of all the members. To account for this, agreements with more members are generally wider in scope, to account for all the different interests at play. RA20 (MEMBERSHIP_NUMBER), which measures the number of states in each agreement, represents this second aspect perfectly. However, the data was missing for this variable, so used a UN database of treaties to determine how many states had ratified each agreement as of 1998 (the current number of members was used for Kyoto because it was not opened for ratification until 1998), in order to be consistent with the rest of the IRD.

K2- Scope (RF8): "What issues are covered?" Scope refers to what issues are addressed by an agreement (Koremenos et al., 2001). For environmental agreements specifically, agreements can link numerous different scientific, economic, and political issues, or they can be limited to well defined issues (Koremenos et al., 2001). To represent scope, I chose the variable RF8 (INTEREST_COMPLEXITY), which measures the complexity of the issue area, with a score of 1 meaning high complexity and a score of 6 meaning low complexity. A more complex issue area would necessitate more regulation from an international agreement, which would lead to it being more expansive in scope.

K3- Centralization (RA30): "Are some important institutional tasks performed by a single focal entity or not?" How centralized a regime is refers to the degree to which one single entity involved in an agreement can perform important institutional tasks, such as distributing information, reducing bargaining and transaction costs, and enhancing enforcement (Koremenos et al., 2001). Most agreements are relatively decentralized, particularly in regards to enforcement, due to states' concerns about protecting their sovereignty (Koremenos et al., 2001). To estimate how centralized each agreement is, I will use the RA30 (SECRETARIAT_INDEPENDENCE) variable, which measures how independent the secretariat (officials or a group that performs administrative duties) of each agreement is from its members, with a score of 1 meaning highly independent and a score of 5 meaning no independence. A score closer to 1 features secretariats that can take more important actions without approval from member states, while 5 means that the secretariat has no latitude to take independent action. N/A refers to agreements without a secretariat. While this is not a perfect measure, since other bodies can be more or less centralized as well, because the secretariat is usually the main administrative body of a regime, how much centralized power is possesses would provide a good estimate for other groups involved as well.

K4- Control (RF51): "How are collective decisions to be made?" Who "controls" an agreement can manifest itself through disproportionate power exercise by states, by different measures for how individuals are selected for positions within the regime, whether all members of the agreement have equal votes, or whether minorities possess a veto power (Koremenos et al., 2001). To assess this, I use RF51 (STATE_DOMINATION), which measures the degree to which negotiations for an agreement were dominated by a single state or group of states. A score of 1 means corresponds to the agreement being very strongly dominated by a state or group of

states, while 5 means that domination by a state or group of states did not play a role in negotiations. Again, while not a perfect measure, agreements dominated by one or a few states are likely to consolidate control with those main actors (such as granting themselves veto powers), while those negotiated amongst a more equal playing field are likely to feature broader compromises among all parties and more authority for each individual nation or group of nations (such as majority rules voting mechanisms).

K5- Flexibility (RA11 and RA12): "How will institutional rules and procedures accommodate new circumstances?" Agreements sometimes face shocks in the form of changes to the issue itself or the preferences of the states with regards to the rules and procedures (Koremenos et al., 2001). To represent how well they respond to these shocks, I have chosen the RA11 (RULE_BINDING) and RA12 (RULE_PRECISE) variables, which represent whether the rules are legally binding and how specific and easy to interpret the rules are, respectively. The scale for RA11 is only 1-2, with 1 meaning the rule is legally binding and 2 meaning it is not. For RA12, the scale is 1-5, with 1 meaning the rules are precise and thus easily interpretable and a 5 meaning the rules are ambiguous. Rules that are legally binding would be harder to change or adapt in response to a shift in preferences of a state or group of states or another shock than those that are not binding, since these rules are inherently more flexible. Additionally, it would also be more difficult to do so for rules that are more ambiguous. Rules that are difficult to understand are likely subject to multiple interpretations from different parties, which would lead to bigger debates over how to adjust these rules to address the shock. Meanwhile, easy to interpret rules would see almost universally similar interpretations, and thus would not have this extra barrier to adjustment.

K6- Distribution Problems (RC15 and RC16): "When there is more than one agreement possible, actors may face a distribution problem" (Koremenos et al., 2001). This refers to the potential conflicts that may arise from the differing preferences of states in "selecting one outcome from a range of known possible outcomes", with the splitting of costs and benefits as the main potential conflict area (Koremenos et al., 2001). RC15 (BENEFITS_DISTRIBUTE) and RC16 (COSTS_DISTRIBUTE), measure whether the benefits and costs, respectively, are evenly or unevenly distributed. Both variables operate on a 1-2 scape, with 1 meaning the benefits or costs are more or less evenly distributed and 2 meaning they are unevenly distributed. Unevenly distributed costs and benefits would suggest a small number of causers that are disproportionately responsible for the problem, as well as a smaller number of victims who would suffer disproportionately. Conversely, relatively even cost-benefit distribution suggests a problem where responsibility for causation and the share of suffering are more widely dispersed among the actors involved.

K7- Enforcement Problems (RF7): "Enforcement problems refers to the strength of individual actors' incentives to cheat on a given agreement or set of rules. Even if an arrangement makes everyone better off, some or all actors may prefer not to adhere to it because they can do better individually by cheating-the heart of Prisoners' Dilemma and public goods problems" (Koremenos et al., 2001). Luckily, RF7 (INTEREST_DISOBEY), measures exactly this, on a 1-5 scale. A score of 1 corresponds to strong incentives to disobey the rules after the agreement was in place, while a 5 corresponds to no incentives to disobey the agreement.

K8- Number of Actors (RF1 and RF2): "Number of actors refers to the actors that are potentially relevant to joint welfare because their actions affect others or others' actions affect them" (Koremenos et al., 2001). Essentially, states that are more responsible for causing the

problem disproportionately affect states which do not, because they have no influence over what the causer state does. Conversely, states that are disproportionately impacted by the problem may not be responsible for causing it in the first place. This can lead to all kinds of conflicts over distribution and enforcement that must be addressed for an IEA to have a chance at success. To measure this, I use RF1 (NUMBER_CAUSERS) and RF2 (NUMBER AFFECTED), which measure how many nations were important due to their role in causing or being affected by the problem. Both variables use a 1-6 scale, with 1 meaning 1-5 important actors, 2 meaning, 6-15, 3 meaning 16-30, 4 meaning 31-60, 5 meaning 60-120, and 6 meaning more than 120.

K9- Uncertainty About State's Behavior (RF7): "States may be unsure about the actions taken by others. If states agree not to pursue technologies associated with the development of biological or chemical weapons, for example, some states may have no way of knowing whether others are abiding by the agreement. Similarly, if countries agree to restrict sulfur emissions to reduce acid rain, how can they be sure others are complying with the agreement?" (Koremenos et al., 2001). To measure this, I will again use RF7, which measures how strong the incentives to defect from each agreement are. If there are identifiable benefits to noncompliance, then even the states who do not want to forgo cooperation for these benefits will be unsure if other actors will do so.

K10- Uncertainty About the State of the World (RF22): "Uncertainty about the state of the world refers to states' knowledge about the consequences of their own actions, the actions of other states, or the actions of international institutions. This could be scientific and technical knowledge or political and economic knowledge. Consider the dispute over the Spratly Islands, which lie off the southern coast of China and have been claimed by a number of states. Any agreement governing the dispute would have to take into account that no one knows how much

oil is actually there or its future value" (Koremenos et al., 2001). To represent this, I use RF22 (PROBLEM_UNDERSTAND). RF22 rates how well the nature of the problem addressed was understood. The scale is 1-5, with a 1 meaning the understanding of the problem was very strongly established with a general consensus, and 5 meaning general understanding of the problem was not established at all. If the nature of the problem is not understood, then uncertainty over the consequences of the actions of all parties involved in the agreement would be greater than when the nature of the problem is well understood, in which case there should be little uncertainty over the consequences of actions.

K11: Uncertainty over Preferences (RF9): "Governments are often unsure what their counterparts really want. We assume states know their own preferences, but they are often uncertain about the preferences or motivations of other states… Of course, a major problem in determining others' preferences is that states may have incentives to misrepresent their preferences, either verbally or through their actions" (Koremenos et al., 2001). RF9 (INTEREST_INCOMPATIBILITY) will represent this final determinant of rational design. The scale is from 1-6, with 1 meaning very strong incompatibility of interests and 6 meaning very strong compatibility of interests. If there are more conflicts over interests over an issue, then the states involved may be more incentivized to misrepresent their own interest, or more suspicious that others are doing so. Conversely, there would be little uncertainty over the preferences of other states when the interests of the actors are closely aligned.

Table 2

Aspects of Rational Design	**K8**	**K8**	**K7 and K9**	**K2**	**K11**	**K10**	**K4**	**K5**	**K5**	**K1**	**K3**	**K6**	**K6**	**Success**
R (Correlation with Success)	0.077	-0.299	0.262	0.196	0.365**	-0.072	0.358**	0.18	-0.711***	-0.491***	-0.344	-0.16	-0.338*	X

*** p<0.01, ** p<0.05, * p<0.1

The pairs of agreements that I that will look at for this paper are the Kyoto Protocol and the Montreal Protocol, and secondly, CITES and the CBD. While both cases are not perfectly identical, they are similar enough to compare. Table 2 shows the correlations between each variable and the agreement success. Prior to the section on each case study, I will address the IRD variables where the two agreements score more than 2 SD's apart from one another. However, differences in variables that are not statistically significantly correlated with success will not be considered significant. Additionally, any instances where the two may be greater than 2 SD's apart, but are not substantially far apart in interpretation (ex: "very strong relevance" vs. "strong relevance") will also not be considered substantial differences.

Case Study #1: Kyoto and Montreal

Table 3

Aspects of Rational Design	**K8**	**K8**	**K7 and K9**	**K2**	**K11**	**K10**	**K4**	**K5**	**K5**	**K1**	**K3**	**K6**	**K6**	**Success**
IRD Variable / **Agreement**	**RF1 (1-6)**	**RF2 (1-6)**	**RF7 (1-5)**	**RF8 (1-5)**	**RF9 (1-6)**	**RF22 (1-5)**	**RF51 (1-5)**	**RA11 (1-2)**	**RA12 (1-5)**	**RA20 (# of members as of 1998)**	**RA30 (1-5)**	**RC15 (1-2)**	**RC16 (1-2)**	**RC10 (1-2)**
Kyoto Protocol (X)	2	5	1	1	1.5	2	2.5	1	2.5	192 (current)	4	2	2	1
Montreal Protocol	2.5	5.33	3	3	2.5	2.33	3	1	1.25	167	2.5	2	2	1.87
Mean (SD)	2.87 (1.3)	3.55 (1.63)	2.83 (0.89)	2.53 (0.93)	2.69 (1.19)	2.33 (0.76)	3.36 (0.75)	1.09 (0.18)	1.9 (0.66)	82.41 (59.2)	3.29 (0.67)	1.72 (0.41)	1.78 (0.41)	1.68 (0.38)
R (Correlation with Success)	0.077	-0.299	0.262	0.196	0.365**	-0.072	0.358**	0.18	-0.711***	-0.491***	-0.344	-0.16	-0.338*	X

*** p<0.01, ** p<0.05, * p<0.1

Table 3 reproduces the results from Appendix 1 with all observations aside from the Montreal and Kyoto Protocols excluded, and also includes the correlations from Table 2. The agreements differ moderately in RF7, RF8, and RA30, and slightly in RF9 and RA12. First, with regards to RF7, RF8, and RA30, these variables are not significantly correlated with the success of the agreements in the database, so the fact that the two Protocols differ in them would not have substantially affected their likelihoods of success. For RF9, meanwhile, the difference between the two agreements is less than 1 SD, which suggests they are not substantially different. Additionally, the interpretation of the scores, with Kyoto having between "very strong" and "strong" incompatibility of interests and Montreal having between "strong" and "minor" incompatibility, are not divergent enough to have significantly affected the design of either agreement. Finally, for RA12, the results are similar to RF9. The two Protocols differ by slightly less than 2 SD's, which while a more significant difference, does not result in a problematic dissimilarity in the interpretations. Even though the rules for Montreal were more precise and

less ambiguous than Kyoto, both feature rules rated closer to “precise and easy to interpret” than the opposite end of the spectrum.

Kyoto

The 1997 Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) is an attempt to address climate change, specifically greenhouse gas emissions, by creating mandatory reductions in relation to 1990 emission levels for all of its developed members. The general consensus on Kyoto is that it has generally failed to fulfill its goals, modest as they were. While there is little debate over the failure of Kyoto, the reasons behind this failure are not universally agreed upon. First, I will assess what role the US played in negotiations. Then, I will discuss how the US refusing to ratify may have affected the success of the agreement. To conclude, I will assess the counterfactual scenarios where the US participates fully in the agreement and does not participate at all to determine how instrumental the US was in creating the observed agreement. The main takeaway from Kyoto is that the US participation was not very influential on the agreement’s success because the US did not possess incentives to behave in a manner which would have done so.

In regards to Kyoto, the US was not a privileged group, as the costs for compliance greatly outweighed the benefits for doing so, at least in the short term. One estimate put the costs of compliance at $325 billion, while the benefits to the US would have been $12 billion with the compliance of other states, and as low as $0 with US compliance only (Sunstein, 2007). Even though the estimated damages may be exaggerated due to uncertainty over the true effects of climate change, and the benefits understated due to uncertainty over the development and proliferation of new technologies, there is still a great discrepancy between the two (Sunstein,

2007). Due to this, the US is not incentivized, at least economically, to comply with the agreement.

I will briefly summarize why most scholars consider Kyoto a failed agreement, despite the fact that the membership met their commitments on average. While the reduction targets for each individual nation were different, on average, Kyoto stipulated a 5.2% emissions reduction compared to each state's 1990 emission levels. With regards to actually addressing climate change, full compliance by all members would mitigate global warming only by an estimated 0.03° C by 2100 (Nordhaus and Boyer, 2000). This makes the average 5.2% reductions a far cry from the estimated 40-95% reductions necessary to keep warming below 2° C (Rosen, 2015). The Kyoto states actually experienced a 12.5% reduction of CO_2 emissions by 2012, the end of the first compliance period; however, most of these reductions (11.2%) occurred between 1990 and 1994, before the Protocol was even ratified (Jones, 2015). These reductions are not the result of any state action, but were caused by the fall of the Soviet Union. From 1990-2012, CO_2 emissions from Russia and Ukraine (the two largest energy consumers of the USSR) fell by 32.4% (almost entirely before 1997), and only by 2.7% for all other member states (Jones, 2015). When looking at the total carbon footprint of each state (including imports and excluding exports), as opposed to the 2.7% CO_2 reduction, we actually see a 7% increase, which rises to 12% if you exclude Russia and Ukraine (Clark, 2012).

One reason for this failure is the decision by the US to remain in the negotiations for Kyoto, despite strong domestic signals that the Senate would not ratify. The US Senate issued the Byrd-Hagel Resolution in July 1997, five months before the negotiations for Kyoto began. The resolution, passed by a 95-0 vote, declared that the Senate would not ratify any climate change agreement that did not include the participation of developing countries in the form of

mandatory emission reduction targets. An agreement such as this was never going to come to fruition, as the G77 (coalition of developing nations within the UN) made it very clear during negotiations that they would not accept an agreement featuring mandatory reductions for themselves. A spokesperson for the Chinese Foreign Ministry stated that they would refuse any treaty that "hampered developing countries' hopes of prosperity" and that Kyoto should only be applied to developed nations (Cooper, 1999). Despite it being obvious that the agreement would not mandate developing countries to reduce emissions, and the overwhelming uphill battle that would be required to convince the Senate to accept the agreement without including developing nations, the US still played a large role in the negotiations. A widely accepted norm in international relations is that states design agreements to be ratifiable at the domestic level, especially for nations that are important for the agreement's success (Putnam, 1988). So, why did the US remain in the negotiations even though it was obvious no agreement ratifiable from its perspective would be reached? Three explanations that received support from a study in which government officials and Kyoto negotiators from Germany, the US, and Norway were interviewed about why the US did not ratify the agreement are:

1) The other negotiating parties believed that Byrd-Hagel was a bluff by the US in an attempt to gain leverage and further push the deal in their favor and thus did not take the threat of the US backing out seriously. The US, while aware of the reality of the Senate resolution, also believed that they could eventually convince other states to accept an agreement acceptable to the Senate (Hovi et al., 2010).

2) Because they considered the climate change issue a long term one, other negotiating states, and specifically the Europeans (due to domestic pressures),

preferred a stronger agreement without the US as opposed to a weaker one with US participation, assuming that the US would eventually come on board due to international pressure (Hovi et al., 2010).

3) The Clinton-Gore administration, knowing that the Senate would reject any deal without developing nations, continued to negotiate (and eventually sign) for a more ambitious agreement in order to give their administration a more climate friendly appearance, instead to craft an agreement that would have higher chances of succeeding (Hovi et al., 2010).

All of these explanations, either separately or in conjunction with one or more of the others, offer evidence for the US impact on the negotiations and the resulting ineffectiveness of the agreement. According to Hovi et al. the first and third explanations received the most support from their twenty-six participants, although it must be noted that all three explanations also received criticism from some of the interviewees. With regards to #1, if the negotiating states mistakenly believed that the US administration could find a way to get an agreement through the Senate, then the resulting agreement would reflect the fact that they believed the US would be involved to assist in enforcement. Even if the European states and other leaders were prepared to manage without US participation initially, as explanation #2 suggests, they still believed that the Americans would eventually come on board, and the fact that they did not results in the same issues that arise under the first explanation. Finally, under the third explanation, the US would have not negotiated in good faith since they knew the agreement would not apply to them due to the Senate's stand against it. For example, by agreeing to a higher reduction target for themselves, the US would have both encouraged other states to do the same and inspired confidence that the US was committed to the ratifying the treaty. If the administration knew the

Senate had no chance of ratifying and was simply out to improve their political standing, then they could have negotiated free from the constraints of Senatorial approval, and simply blamed Congress for not ratifying the treaty. One German interviewee, supporting this explanation, also blamed the US for insisting that the agreement include loopholes (Hovi et al., 2010). All three explanations lead to essentially the same conclusion, that US abandonment of the agreement left the remaining states to attempt to comply with and enforce an agreement that was designed to be heavily dependent on US participation.

Indeed, the final agreement ended up greatly reflecting the US proposal and demands made during negotiations. The general parameters of the agreement were likely a compromise of the US initial proposal (stabilize emissions at 1990 levels between 2008-2012), the Japanese proposal (5% reduction from 1990 levels by 2008-2012), and the EU proposal (15% reduction below 1990 levels by 2015) (Lopez, 2003). Additionally, the US pushed heavily for the inclusion of flexibility measures in the form of carbon sinks, emissions trading, and joint implementation, all of which were included in the final version of the deal (Lopez, 2003). These measures very likely represent the “loopholes” that the German interviewee mentioned in the Hovi et al study. These alternative methods of “reducing” emissions took attention and money away from technological investments that could have resulted in new technologies or improvements on existing technologies in the fields of clean energy, carbon sequestration, etc., since the targets could be easily and cheaply met through these alternative measures (Dagamas et al., 2006; Manne and Richels, 2001).

In addition to these provisions, the US also played a large role in the implementation of the emissions trading system, where states who have reduced their emissions by more than was required of them can sell these surpluses to other states who are not on track to meet their goals.

These surpluses were mostly available from Eastern Europe, where states had already seen emissions reductions of over 30% due to the collapse of the Soviet Union and the surrounding economies (Dagamas et al., 2006; Manne and Richels, 2001). The US, who were required to reduce emissions by 7% below 1990 levels by the end of the first compliance period (2008-2012), had the largest reductions required, due to their rising carbon output as a result of continued industrial expansion (Dagamas et al., 2006). Additionally, most of the other states, even aside from the Eastern European states, who appeared to have high targets had already experienced reductions either close to, meeting, or exceeding their Kyoto targets (Sunstein, 2007). Thus, the US would have been the main buyer for Eastern European emission permits. In models with US participation, the price of these permits increases by approximately 50-70% (Buchner et al., 2002; Eyckmans, 2002). Without US participation, the extreme price drops in permits allows states who need to meet their requirements to meet them very cheaply through the permits as opposed to through actual emissions reductions measures. Additionally, the lack of US participation is projected to have reduced the profits of the Eastern European states, particularly Russia, by over 60% (Dagamas et al., 2006). This both reduces the incentives for Russia to effectively participate in the agreement. Not only did US participation in negotiations harm the outcome of Kyoto through the implementations of alternative, less productive means to meet emission targets, but their rejection of the agreement also carried economic consequences that reduced the incentive of states to innovate and encouraged the reliance on these economic emissions reductions, at the expense of actual reductions.

Finally, with regards to other possible alternative explanations for Kyoto's failure, they mostly have to do with the design of the agreement itself. Specifically, 1) that the compliance periods (5 years) were too short, 2) the small, binding, non-progressive emission targets, and 3)

the choice to measure with net emissions instead of gross emissions (Rosen, 2015). Rosen explains how the first two flaws incentivized states to search for quick fixes, such as emissions permits and sinks, to meet their requirements as opposed to searching for more meaningful measures of cutting emissions, while the third flaw allowed states to minimize domestic cuts by crediting them for emissions reduction projects in other parts of the world as well as for simply moving production abroad. Additionally, during the Marrakesh Accords in 2001, when the final mechanisms for Kyoto were actually agreed upon, most of the US demands made their way into the final treaty. Seemingly, the US should have had no leverage to influence the outcome since it was obvious at that point that the US would not ratify. With this in mind, the more logical explanation is that, since Kyoto needed 55 states representing at least 55% of global emissions, the participation of Japan and Russia was necessary for the agreement to go into effect, and these states happened to share most of the same positions as the US with regards to compliance and facilitation mechanisms (Lopez, 2003).

With regards to the first explanation of agreement design, while Rosen's claims are certainly valid, due to the substantial role the US played in negotiations, I would contend that many of the design flaws still support the position that the US played a large role in the agreement's failure. However, it is also likely that Kyoto's flaws would have still been present if the US had ratified Kyoto. On the other hand, the US administration might have negotiated for more compliance-friendly parameters had they believed the agreement stood a chance of being ratified in the Senate. However, the agreement would have looked relatively similar without US participation, due to the veto powers then granted to Russia and Japan. While the US was the most important actor, it appears that, because enough of the other major actors held preferences

similar to the US to, the US participation may not have made the agreement much different than a scenario where the US did not participate.

To determine this, let us examine the hypothetical counterfactual scenarios where the US, 1) participates in the negotiations and then fully participates in the agreement, and 2) does not participate in the negotiations at all. While there can be no certainty of how these scenarios would have played out, with the evidence above, a picture of what likely would have occurred can be painted.

First, if the US had ratified the agreement, and thus had negotiated with the idea that they would have to follow through on their commitments, its delegation likely would have pushed harder for a less ambitious agreement. As established by Lopez (2003), the US initial proposal was for the stabilization of emission levels at 1990 levels, while the final agreement called for 5% reductions relative to 1990 levels. Had the Senate issued a resolution announcing it would ratify instead of that it would not, then the US likely would have pushed harder for a lower reduction requirement, which would have been easier to meet and thus would have likely seen higher compliance. Even if the 5% requirement was kept in place, the agreement would have been more successful simply with the US, assuming full compliance, meeting their requirements and pushing the total reductions closer to the goal. Other states would have also come closer to achieving their reduction goals with US participation. Without the largest emitter present, other states likely did not feel strongly that the agreement would make an impact on the global climate change issue, which could have led to them failing to meet their requirements. Conversely, full US participation likely would have had the opposite effect. Perhaps the agreement, while similar textually, would function differently had the US ratified. Perhaps the more expensive emissions permits resulting from the addition of US demand to the market would have encouraged states to

invest more into reducing their own emissions. Perhaps US participation could have convinced states to more fully comply with their commitments, with the idea that Kyoto would be a building block to more aggressive reduction protocols later. However, this is all purely conjecture, and greater US involvement would only be possible if somehow the costs and benefits of the agreement shifted to where the benefits outweighed the costs. This would create more incentives for the US to participate and ensure other states would as well.

Interestingly, under the other scenario, where the US does not participate in the negotiations, it is unclear whether compliance would have been higher. Since the reduction requirement was a compromise between the US, Japanese, and European proposals, it likely would have more closely reflected the European proposal (15% compared to 1990 levels) without US participation. This would have reduced compliance due to the difficulty in meeting the higher requirements over the short time frame. Additionally, the agreement likely would have looked mostly the same in terms of the loopholes, sinks, and financial mechanisms, since the participation of Japan and Russia was necessary to meet the requirement of 55% of global emission and these states had preferences similar to the US.

Both counterfactual scenarios would likely result in an agreement similar to the one that took place, with the most observable difference being the levels of carbon reductions mandated. In the scenario where the US ratifies, its presence, resources, and influence could have resulted in more across the board compliance, albeit possibly with a less ambitious agreement. This raises the question of whether a less ambitious agreement without US participation would have seen similar results. As discussed, the states collectively reduced their emissions by 2.7% when omitting the collapsed economies of Eastern Europe. While US participation would have increased that simply through their reductions (7% of their emissions relative to 1990 levels), the

magnitude of their impact on other states would be dependent on how much assistance the US would offer other states and how much more incentivized other states would be to comply. The closer US behavior approximated that of a privileged group, the greater the reductions from other members its participation would result in. However, due to the massive costs and minimal benefits of Kyoto, even assuming full US participation, it is extremely unlikely that the Americans would have behaved in any manner resembling that of a privileged group, absent some sort of alternate universe environmental epiphany and massive redistribution of funding by the Bush and Obama administrations. Thus, while the US was the most influential actor during negotiations, it appears that whether the US ratifies Kyoto only makes a minimal impact on the emissions reductions of the parties. With US participation, Kyoto may have seen higher compliance rates and thus more "success", but with lower reduction requirements, the parties may not have managed to reduce emissions by more than the 2.7% that they did in the observed agreement. Meanwhile, completely without US participation, the agreement may have been more ambitious, but likely would have still suffered from the same flaws as the observed one, and have been just as ineffective as a result.

To recall, the average target of 5.2% below 1990 levels of Kyoto was not particularly ambitious by any means, but despite this, states managed to reduce emissions by only 2.7%, when removing the Eastern European states whose emission reductions took place years before negotiations for Kyoto even started and were caused by the collapse of the USSR. I argue this is due to the US administration participating and playing a leading role in negotiations despite clear signs from the Senate that ratification was impossible, and also to the direct absence of US contributions. The US was not a privileged group in this case, and, as evidenced by the fact that its emissions continued to rise in the aftermath of Kyoto, would not have complied with the

agreement in the absence of its existence. Despite this, even if US merely complied with its requirements without assisting any other states, the agreement likely would have been more successful. However, when taking into account the counterfactual scenarios of full US participation and no US participation, we see that, regardless of US actions, the agreement seemed destined to fail, or at the very least to be extremely underwhelming. Due to this, US ratification seems to be relatively inconsequential for Kyoto, because the US did not have the same incentives to substantially contribute that they did in regards to Montreal.

Montreal

In comparison to Kyoto, the case of the Montreal Protocol (1987) to the Vienna Convention for the Protection of the Ozone Layer is very simple. Briefly, the agreement addresses the use of ozone depleting chemicals used in aerosol sprays, fire extinguishers, solvents, in packing materials, and as refrigerants, known as Chlorofluorocarbons (CFC's) (Elkins, 1999, 78). While later the agreement was expanded to include substitutes for CFC's (HCFC's and HFC's), for the purposes of this paper I will only focus on the regulation of CFC's. Additionally, the fact that the substitute chemicals used ended up being harmful greenhouse gasses does not take away from the agreement's success in phasing out the originally targeted CFC's. The member states were required to reduce CFC production and consumption to 1986 levels by 1989, by 20% relative to these levels by 1993, and by 50% by 1998 (Hahn and McGartland, 1988-1989). As of 2016, 98% of all CFC's have been phased out (Low, 2016), and the ozone layer is respected to return to its natural levels (Sunstein, 2007). Due to such an outstanding success rate, Montreal is widely considered one of the most successful international agreements of all time. This is mainly due to the US behaving as a privileged group, and disproportionately supporting the agreement.

For Montreal, the projected costs to the US were $21 billion and the benefits, from reduced cataracts and skin cancer, were over $1.3 trillion if the US were to act unilaterally, and over $3.5 trillion with international implementation of the Montreal Protocol (Barrett, 2003). Additionally, the US was responsible for 30% of all CFC production, more than any other single country, with one company, Du Pont, being responsible for 15% (Hahn and McGartland, 1988-1989), and 50% of all CFC use (Sunstein, 2007). Indeed, unilateral action by the US alone would have been enough to decrease the projected damage to the ozone layer (measured in percent of ozone layer depletion) by 2050 by over 30% (from 15.7% to 10.4%) over the business as usual estimation (Barrett, 2003).

The US was a privileged group with regards to the ozone depleting substances issue because it was both a major causer of the problem, as well as a major victim of its potential consequences. Even assuming no reduction in CFC use by other states, simply by shrinking their own CFC production and consumption, the US would have reaped enormous benefits in the form of reduced medical costs over the next century, at a negligible cost. With the implementation of the Montreal Protocol, these benefits were expected to have increased almost threefold. This combination led the US to take strong actions to curb CFC's domestically and internationally.

As such, they were extremely aggressive with their negotiating position and their domestic actions before and during the Protocol's implementation. While the final agreement for Montreal stipulated for the 50% reduction in CFC use and production by 1998, the Reagan administration's initial proposal called for an 85% reduction (Parson, 2003). The final 50% number was a compromise between the final US proposal of 95% reduction and the European proposal of a freeze at 1986 levels (Sunstein, 2007). Because the Americans were so active on the issue, they pressured other states to follow along, especially once the scientific consensus

became clear on the impact on CFC's on ozone. Excise taxes were a popular method used by developed countries to assist the phase-out of CFC's by reducing the gap in cost between them and their substitutes, and the US placed the highest tax on their domestic producers (DeSombre, 2000). A decade before the agreement, as a response to public demand, the EPA banned the use of CFC's in aerosol cans, which led to a 95% reduction in aerosol production in the US (Sunstein, 2007). The American negotiating positions and actions taken domestically and in compliance with the Protocol were above and beyond its final parameters. This resulted in more expansive and effective CFC policies and helped pressure and incentivize other states to comply more fully with these policies.

Additionally, the US was instrumental in securing the participation of developing countries, which, while not large consumers or producers of CFC's, were expected to experience rapid demand growth, and thus were still important actors for the future of the agreement (Sunstein, 2007). While unilateral US action would have reduced potential ozone damage by over 30% by 2050, by 2100, the demand and production of developing countries would have increased to the point where unilateral US action would have only reduced ozone damage by 2% (51% reduction of ozone layer to 49%) (Barrett, 2003). So while unilateral US action would be beneficial in the midterm, in the long run, the Montreal Protocol and the participation of developing nations were necessary for the US and the world to avoid the disaster unchecked ozone depletion promised.

The US being such an enthusiastic participant encouraged China and India to sign on to Montreal, since these two states were extremely unlikely to partake in an agreement without the US (Sunstein, 2007). Developing countries held the same outlook on ozone depletion as they did on climate change, which was that it was problem caused by the developed world and as such the

developed world should bear the brunt of the cost of solving it (Sunstein, 2007). While the lack of mandates for developing countries was the main reason why the US did not ratify Kyoto, in this case, the US maintained support of Montreal even though developing countries were not bound by the same compliance period as developed countries (Sunstein, 2007). Instead, developing nations were allowed to increase their CFC use to meet domestic demand to specified levels for the ten years after their ratification of Montreal, and then would have to reduce their usage by 50% in the ten years following that (Sunstein, 2007). The Multilateral Fund, which was established by Montreal in order to facilitate the technological transfer between the developed and developing world, was disproportionately funded by the US, which contributed 25% of the initial $200 million allocation (Platlis, 1992) and has provided ~20% since then (Leahy, 2017).

The US was notoriously opposed to being relied upon so heavily for funding, even going as far to stipulate during negotiations for the Multilateral Fund that it would not establish a precedent of reliance on US funding to aid developing countries in IEA's (Patlis, 1992). However, due to the stakes of Montreal and the low costs, the Americans approved the Fund and their role in supplying it, despite being denied any additional privileges or influence for doing so. Montreal was a special case, where the benefits outweighed the costs by so much that the US delegation was willing to agree to additional costs to ensure the agreement would be successful.

In addition to the role of the Reagan administration, US industry is also essential in explaining the US's behavior in regards to the Montreal Protocol. As we will see with the Convention on Biological Diversity, it is possible for special interests to pressure Congress and the President to reject an agreement that would be beneficial for the nation as a whole. Thus, American industrial support for Montreal was vital. Initially opponents to international CFC regulation, producers like DuPont switched their stance when a whole the size of the continental

US was discovered over the Antarctic, at which point a CFC ban became inevitable (Barratt-Brown, 1991). CFC profits had been declining for years, and DuPont had identified possible substitutes by the end of the 1970's, although they were too expensive to be viable in the market (Maxwell and Briscoe, 1997). However, the US industry as a whole recognized that they could gain a competitive advantage over other producers, and also guarantee a market for their substitutes, by switching stances and supporting an aggressive Montreal Protocol (Maxwell and Briscoe, 1997). Additionally, an international agreement would eliminate the market for CFC's, making the substitutes the only viable products. US industry was also instrumental in pressuring the European Community (EC), which accounted for 43-45% of CFC production in 1986, to accept an agreement (Barratt-Brown, 1991). Contrary to the US, the EC was opposed aggressive controls due to industries desiring to maintain their market share and avoid the costs of shifting to substitutes (Sunstein, 2007). Once the US producers shifted their stance to support an agreement, the European producers begrudgingly followed (Parson, 2003).

Now, let us project the counterfactual scenario where the US does not participate in the negotiations or ratify the Montreal Protocol. First, in terms of direct effects, the US, because it was a privileged group, would have likely reduced its CFC output regardless of any agreement. Despite this, US absence would still be noticeable in that the actions of other states would likely not be as substantial. For instance, the US would not have contributed its 20-25% to the Monetary Fund. This would have reduced the effectiveness of the agreement by eliminating a good portion of the monetary incentives for developing states to participate. It is unlikely that other major actors (EC, Japan, Russia, etc.) would have contributed more to the fund than to make up for US absence since they were not enthusiastic participants. Without the US demand of a near complete CFC phase-out, the Protocol likely would have featured lower reduction

mandates. Without US industry pressuring European industry to accept multilateral regulations, they likely would have pushed harder against European ratification and threatened the ratification of the agreement in general. The absence of the 30% of total CFC production the US represented also would have given Japan and Russia a veto over the agreement even if the Europeans did sign on, since their emissions would then be required to meet the implementation threshold of 66% of total CFC production. American absence also would have undercut compliance with this agreement by ensuring a substantial market (recall the US accounted for 50% of CFC use) for ozone-depleting substances remained. Due to all of these factors, an agreement may have not even been feasible without the US pushing so aggressively for one. At the very least, a Montreal Protocol without the Americans involved would have featured lower requirements for CFC reductions and diminished incentives for all other states to comply with their commitments.

Were Kyoto failed, Montreal succeeded. Judging by the nearly complete phase-out of CFC's it inspired, it is one of the most successful international agreements of all time. Much of the success was due to the United States identifying it as a watershed issue, and negotiating as such. The US contributed to much to the agreement the Reagan administration specifically mentioned during negotiations that the elevated US participation was not to be interpreted as the establishment of a new precedent in regards to international environmental issues. US participation was essential for this issue, and was probably the biggest factor by a wide margin in the success of Montreal. Now, the differences established between Kyoto and Montreal will be juxtaposed to assess the effect of US participation on climate change agreements, and more broadly, on IEA's in general.

Comparison

The issue area of greenhouse gasses addressed in Kyoto is much more complex than ozone depleting substances. Nearly everything automated produces CO_2 or another greenhouse gas. CFC's, while still widespread in their own right, were used for much more specific purposes. Due to this, the phase-out of CFC's carried with it a much lower economic impact, and thus a lower barrier to implementation, than reducing greenhouse gas emissions. Because of this, the ozone issue likely is easier to solve than greenhouse gas emissions, which means Montreal had a greater chance of succeeding than Kyoto before taking into account any international actors. However, this does not rule out US participation as an important, or even a deciding, factor. Because the issue area for Montreal was narrower than Kyoto

As has been established, Montreal likely would have failed to exist, existed in a diminished state, or experienced compliance problems had the US not been a party and leader. Kyoto, meanwhile, would have likely existed in a relatively similar form as it does currently if the US either had been a member or had not participated in negotiations at all. The counterfactuals paint the picture that US participation was essential for Montreal, but not very impactful in regards to Kyoto. The most obvious difference between the two is that the costs for the US in Montreal were dwarfed by the benefits, while the opposite was true for Kyoto, which encouraged the US to behave as a privileged group for the former, and not the latter. The US had an extreme financial incentive to ensure that Montreal was successful, while they had the same incentive not to comply with Kyoto. As mentioned earlier, the US specifically stipulated during negotiations that its contribution to the Multilateral Fund for Montreal would not establish a precedent for future agreements, with Kyoto specifically in mind. The Multilateral Fund and accompanying transfer of knowledge and technology to developing countries was key in

reshaping their incentives to be more in line with compliance. No such reshaping exists for Kyoto, which begs the question of whether a similar mechanism being included would have led to a deal where developing countries were allowed to raise emissions to a certain level for a time, and then would be required to reduce them after, similar to Montreal. This would have encouraged wider participation by assuring developing countries that the developed world would not be allowed to increase emissions unchecked, while also providing some concessions to developing countries to assist in industrialization. One possible rule to be gained from this comparison is that IEA's, or at least climate change agreements, are more likely to succeed when it benefits the US economically to not only participate in them, but also to ensure other states do as well. Even accounting for the fact that more obstacles exist in creating a successful agreement on greenhouse gas emissions than one on ozone depleting substances, had the economic outlook for Kyoto more closely resembled that of Montreal, the US would have been similarly invested in its success and the agreement would have likely been more successful as a result.

Case Study #2: CITES and the CBD

Table 4

Aspects of Rational Design	**K8**	**K8**	**K7 and K9**	**K2**	**K11**	**K10**	**K4**	**K5**	**K5**	**K1**	**K3**	**K6**	**K6**	**Success**
IRD Variable / **Agreement**	**RF1 (1-6)**	**RF2 (1-6)**	**RF7 (1-5)**	**RF8 (1-5)**	**RF9 (1-6)**	**RF22 (1-5)**	**RF51 (1-5)**	**RA11 (1-2)**	**RA12 (1-5)**	**RA20 (# of members as of 1998)**	**RA30 (1-5)**	**RC15 (1-2)**	**RC16 (1-2)**	**RC10 (1-2)**
CITES	5.66	5.5	2.75	2.5	4.63	2.88	3.33	1.5	2	144	3	2	1.5	2
Convention on Biological Diversity (X)	6	6	3	1	1.5	2.33	4	1	2.89	175	4	2	2	1.1
Mean (SD)	2.87 (1.3)	3.55 (1.63)	2.83 (0.89)	2.53 (0.93)	2.69 (1.19)	2.33 (0.76)	3.36 (0.75)	1.09 (0.18)	1.9 (0.66)	82.41 (59.2)	3.29 (0.67)	1.72 (0.41)	1.78 (0.41)	1.68 (0.38)
R (Correlation with Success)	0.077	-0.299	0.262	0.196	0.365**	-0.072	0.358**	0.18	-0.711***	-0.491***	-0.344	-0.16	-0.338*	X

*** p<0.01, ** p<0.05, * p<0.1

The only differences between CITES and the CBD worth addressing are in regards to RF8, RF9, and RC16. The difference in RF8 is less than two SD's, and RF8 is also not correlated with agreement success. So while, the disparity shows that CITES addresses a slightly more complex issue area than the CBD, this should not have created substantial differences between the designs of each agreement, since the CBD issue area still scores between moderately and strongly complex. RF9, however, is starkly different between the two, with the difference being larger than 2 SD's, and the interpretation significantly differing as well. The scores for CITES represent a point between minor compatibility of interests and strong compatibility of interests, while the CBD is between strong incompatibility of interests and very strong incompatibility of interests. Because the actors involved had more common interests for CITES than for the CBD, the former likely had a higher baseline for success than the latter, before factoring whether the

US ratified or not. Finally, the results for RC16 differ by slightly more than 1 SD, and while the variable is negatively correlated with success, the difference in interpretation of the scores is again not substantial. CITES scores between “more or less evenly” and “unevenly” distributed costs, while the CBD features “unevenly” distributed costs. This may have slightly increased the odds of success for CITEs relative to the CBD, but more likely the impact on both design and success was inconsequential. As we will see, due to the role the US played in both, the fact that CITES was more likely to succeed than the CBD does not compromise the results from the case study.

Compared to the first case study, this second one differs in regards to the particular environmental issue both agreements address. The climate change issues Kyoto and Montreal contend with feature the US as the most primary actor, both in terms of causing the problem and in terms of necessity to solve it. However, other environmental issues such as species protection feature a more equitable distribution of responsibility in causing and solving the problem. As such, whether or not the US behaves as a privilege group may not be as impactful as it is on the climate change issue. The next case study, the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) and the Convention on Biological Diversity (CBD), involves species and wildlife protection, issues which inherently require the participation and compliance of all groups involved. This case should grant a better understanding of what impact US ratification has when the number of important actors is far greater. Due to this dispersion of responsibility and cost, the actions each individual nations should matter far less than collective participation. Compared to climate change, wildlife protection requires the compliance of a far greater number of nations. Whether US participation matters for agreement success is more

dependent on how effective it is in influencing compliance by numerous other states, as opposed to how much of the problem the US can solve through its own actions.

CITES

CITES, agreed to in 1973, was intended to protect endangered species by regulating international trade in those species. Member states are required to create and implement their own domestic policies to grant and check for permits on the import and export of species listed in one of three appendixes. Appendix I species, at risk of extinction that are or may be effected by international trade, are illegal to trade commercially and require both an import and export permit, as well as a non-detriment finding (guarantee the species is not harmed by its transportation) for special circumstances, like scientific research (CITES, Article III). Appendix II species, not at risk of extinction currently but that could become so if trade is not regulated, only require an export permit and a non-detriment finding (CITES, Article IV). Finally, Appendix III species are those listed domestically by one or more member states, who have asked the other members for assistance in regulating the trade of that species, and are trade-able as long as an export permit and certification of origin from the state(s) that designated the species as Appendix III (CITES, Article V). If a state is trading in a species that it is not supposed to trade in, then trade sanctions are generally used to encourage the rogue state to comply (Reeve, 2006). While it is considered one of the most successful wildlife protection treaties because nearly all member states have legislation that meets the requirements of CITES (Hill, 1990), there are also gaps in its implementation which make assessing its effectiveness in actually protecting species difficult. CITES is interesting because the US does act as a privilege group in regards to certain species, but this appears to actually be detrimental to their protection. I will argue that the reason for these detrimental actions is pressure on lawmakers and executives from

domestic wildlife protection groups. Thus, in order for the US participation to be beneficial, domestic pressures must not lead to policies that impede the agreement's goals.

With regards to the negotiation and implementation of CITES, the US was and is a key actor. Alone, it accounts for 20% of the imports of illegal wildlife and wildlife products, second only to narcotics in terms of illegal items smuggled into the US (McOmber, 2002). Historically, the US has been among the world leaders in species conservation, with the 1900 Lacey Act being the earliest example of US intervention in illegal species trade, species repopulation, and species introduction (Miles et al., 2002). In 1969, the Endangered Species Conservation Act included a provision that called for the Nixon administration to organize an international conference with the purpose of creating an agreement on trade in endangered species (Olive, 2014). The US initiated negotiations for CITES in 1972 in response to public and NGO demand (Weiss and Jacobson, 2000), and passing the Endangered Species Act in 1973 to comply with the agreement (McOmber, 2002). The US was the first country to ratify CITES (Koslof and Trexler, 1987), which would suggest that the agreement largely reflected their preferences. Indeed, during negotiations, the US, Canada, and Australia were the most influential parties, and the agreement ended up reflecting the interests of those three, neglecting the interests of developing countries (Miles et al., 2002). Africa, Asia, and Latin America are the main exporters, and North America, Europe, and Japan are the main importers of species listed in CITES (Alagappan, 1990). The regime is only effective so long as both the importing and exporting states cooperate and enforce the agreement, because if one side does not, then supply (poaching and illegal trade) will inevitably find demand (market for illegal imports), or vice versa (Hill, 1990). The lack of consideration given to the views of developing countries by the US, Canada, and Australia ends

up being responsible for many of the ineffective areas of the treaty. The lack of effective enforcement across the board, starting with the US, has also led to a less successful CITES.

CITES has been effective in creating policy changes. As mentioned, nearly all states have policies that meet the requirements of CITES. When a state is not in compliance, the trade sanctions have generally been effective in roping them back in. For instance, US sanctions or threats to do so led to Taiwan and Singapore amending legislation to comply with CITES, and also convinced Japan to stop their marine turtle trade (Sand, 1999).

However, in terms of preventing the decline or extinction of species, CITES has been less effective. Identifying the impact of CITES in this regard difficult due to a number of reasons. First, with over 31,000 species listed across the three Appendixes, it is nearly impossible to create a general assessment on how CITES has affected the trade and population dynamics of all its targets (Miles et al., 2002). Secondly, there are a multitude of other factors such as habitat destruction, climate change, invasive species, competition for resources, etc. that influence the population of a species (Miles et al., 2002). One study discussed in Miles et al. attempts to get around the above complications by focusing on twelve key species. The study found that the agreement was effective in regards to two of them, moderately effective for four, and barely or indeterminably impactful for the other six. With regards to protecting species that generate high public awareness, CITES has also been found to be ineffective (Miles et al., 2002). While CITES was scored an average of 2 (out of 2) in the IRD under the GOALS_FULFILL (RC10) variable, its success is probably more of a mixed bag than that number would indicate. While CITES has been effective in limiting legal trade in species, it is unclear whether this has led to much improvement in the situations of said species. This is due to the lack of effective and thorough enforcement, and the rise in illegal trade this allows.

Specifically, the United States especially has failed to effectively implement CITES by allowing imports to enter the country unchecked by only inspecting 25% of flora and fauna imports (Young, 2003). This is due to heavy understaffing; as of 1987, the US only employed 55 wildlife inspectors, and the remaining customs officials were largely not trained on how to implement CITES (Koslof and Trexler, 1987). This lack of enforcement leads to rampant abuse, or ignorance, of CITES regulations in the US. In 1994, a random inspection of fifty shipments by the Fish and Wildlife Service found that thirty of them contained illegal wildlife (Young, 2003). One of the biggest problems with regards to the effectiveness of CITES is the failure of industrialized countries to spend proper resources on enforcement (Garrison, 1994). If the US, as the largest market for illegal wildlife, does not inspect imports of wildlife for permits, then any controls other states might implement would be for not, since the lack of US enforcement perpetuates the black market and demand for poaching.

Interestingly, the Americans may actually be hindering the agreement when they do take more significant, unilateral action. The most common form of unilateral action in regards to CITES, a complete ban on the trade of a species (Miles et al., 2002). The US often pursues unilateral bans not because they are the most effective way to limit trade in a species, but because bans are more politically popular domestically than less drastic measures such as limited trade (Miles et al., 2002). In fact, trade bans increase the price and demand for the species on the black market, which inherently more difficult to monitor and regulate, and also reduces the collective action capacity of the member states (Miles et al., 2002). For example, the US pushed for ivory trade bans to protect the African Elephant in 1988; despite this, an estimated 37,000 African Elephants are still harvested each year (Olive, 2014). Meanwhile African nations with stable elephant populations, such as Zimbabwe and South Africa, pushed for continued ivory

trade based on sustainable use, so long as profits are used to benefit wildlife management or national income and the country's Scientific Authority finds that exports will not be detrimental to the species (Garrison, 1994). A complete ban on ivory trade increases the incentives for poaching in states where poaching was not an issue, while sustainable use decreases the incentives for poaching by providing a legal market, and also makes it easier for the state to monitor population changes and limit trade as needed. Under sustainable use programs, states with thriving populations would be allowed to trade while states with unstable populations would not. While this would not eliminate the incentives for poaching, it would reduce them by ensuring a relatively stable legal market. However, when states (especially the US, as the largest market for wildlife imports) act unilaterally and ban trade, it reduces the collective action capacity of CITES and the ability of the parties to effectively regulate trade. Contrarily, when the US has engaged in sustainable use practices, such as crocodilian ranching programs, protection of the species has been more successful (Garrison, 1994). According the Crocodile Specialists Group, ranching programs are desirable because they "provide economic benefits to local communities" and help "to maintain a direct link between the health of wild populations and the ability to obtain a rearing stock." Programs such as this decrease the incentives for poaching and illegal trade, while tying the economic benefit a species can provide to the protection of that said species. While sustainable use programs may not be applicable for all species, there are cases where they have proven to be effective.

Why then, does the US support trade bans and not sustainable use policies when it comes to species, such as the African elephant, where there exist examples of successful programs? Domestic politics, influenced by interest groups and NGO's, provide the explanation. Essentially, it is more beneficial, both for politicians responding to interest groups and for

interest groups responding to their members, to list a species in Appendix I, which comes with a complete ban on commercial trade, than it is to list it in Appendix II, where trade is merely regulated (Miles et al., 2002). A ban on trade would seem to suggest a greater accomplishment by the interest group than legislating a limitation on trade, which explains the greater appeal. This is despite the fact that Appendix I species receive less funding than those in Appendix II (Miles, et al., 2002). The lobbying power of interest groups, coupled with the modest costs of banning trade in any single species, sometimes result in the US taking unilateral actions that reduce the effectiveness of the agreement, despite the fact that these actions are well intentioned.

In the counterfactual scenario where the US does not participate in negotiations or ratify the agreement, it is unclear whether CITES would even exist as a treaty, given that the US was the leader in wildlife protection during the 1960's and 70's and initiated the negotiations. However, assuming the negotiations begin by other means, then it is likely the agreement would have looked fairly similar. Canada and Australia, the other two most influential nations, would have still been the leaders of the negotiations minus the US, and it is unlikely that their preferences would have shifted. Perhaps, minus the powerful US influence, the developing countries could have pushed for their interests, mainly in regards to sustainable use policies, more aggressively and outnumbered the developing countries. If this was the case, then the agreement might have ended up being more successful due to the increased influence of the developed states, since most of the species listed are within their borders. Other possible effects of a lack of US participation arising from the removal of US wildlife market from CITES regulation would be minimal as well. The US only lightly regulates their market, as evidenced by the low number of inspectors employed and the prevalence of illegal wildlife among imports. Due to this lack of regulation, even a devolution to a completely unregulated US market would

not have a large impact on the overall levels of enforcement in CITES. Since the US is an importer of wildlife, American absence would not result in an increase in exports either. There are some cases where US threats or trade bans have influenced other states to better comply with CITES (Japan and marine turtles, Singapore and Taiwan ratifying), however, I have not found any evidence that this is a common occurrence, and thus, with so few cases, the absence of the American pressure exerting capacity would not be a substantial loss either. It would appear that US participation, aside from the initial leadership to begin negotiations, does not play an irreplaceable role in regards to CITES, and US unilateral actions may have even been more harmful than beneficial.

CITES represents an interesting case, because, in cases where the US acted as a privileged group in regards to protecting a species from trade-related dangers, the impact appears to be negative. This directly contradicts my hypothesis that the agreements where the US behaves as a privileged group are more likely to succeed than those where it does not. Had the US ratified CITES, but taken no unilateral actions and merely complied as if it were a non-essential member, it appears the agreement would have experienced greater success, at least in regards to species where sustainable use is a viable means of population control. Interest group and NGO activity appears to be the source of this gap in expectation and observation. In CITES, these groups use their own collective action to, most likely unintentionally, undermine the collective action capacity of the agreement as a whole by lobbying for and inciting unilateral action by the US.

The CBD

The final agreement to be discussed will be the Convention on Biological Diversity (CBD). Finalized in 1992, the US signed the CBD in 1993, however, the Senate has not ratified

it and no discussion on doing so has taken place since 1994. The agreement functions both as a wildlife protection agreement as well as a pseudo trade-agreement for genetic resources (Downes, 1994). Briefly, the CBD has 3 objectives: "(1) the conservation of biological diversity, (2) the sustainable use of its components, and (3) the fair and equitable sharing of the benefits arising out of the utilization of genetic resources" (CBD). Then, there are 4 steps of implementation: "first, develop national strategies for conservation. [Second], establish a system of protected areas. [Third], begin to rehabilitate damaged ecosystems [and finally], integrate the consideration of conserving biological resources into national decision-making" (*The Convention on Biological Diversity: Hearing Before the Comm. on Foreign Relations*, 1994). The CBD is generally considered an unsuccessful agreement, since biodiversity has, as of 2010, still been decreasing annually, despite nearly all states having incentives to preserve it, stemming from the benefits it can provide technologically, agriculturally, medically, economically, etc. (Brands, 2010, and Jowit, 2010). This represents an interesting case, considering that despite not ratifying it, the US still participated in negotiations and supported the agreement after it was implemented. As we will see, even though the US would benefit greatly benefited from a successful CBD and greater access to biological diversity, the agreement still failed, and other factors, mainly special interests represented by conservative US Senators, prevented the US from both ratifying the agreement and being a more effective participant and leader.

Just like in the previous three agreements discussed, the US plays a large role as a causer of the problem of biodiversity reduction. American research and industrial expansion into developing and wildlife rich nations contribute greatly to global pressures on biodiversity (Klein, 2016). The US has also been a global leader in biodiversity and wildlife protection since the 1970's (Bloomquist, 2002). Additionally, US industries heavily rely on and greatly profit from

biodiversity. For instance, 118 of the 150 most prescribed drugs come from plants, and biotechnologically modified plants comprise 85% of all US corn crops, 88% of cotton, and 91% of soybeans (Roberson, 2008, and Bang, 2011). However, unlike the other three agreements, because the developing nations that contain most of the world's at risk biodiversity possess sovereignty over their borders, the issue can be, at least "adequately", solved without US participation (Raustiala, 1997). Likely because of this, the CBD ended up containing provisions, mainly those relating to the redistribution of genetic resources to developing countries, that the US did not support. During the negotiations for the CBD, the US played a large role in initiating the talks, but the Bush administration began to distance itself once the scope of the agreement expanded, and even attempted to stall the talks right before the treaty was finalized (Raustiala, 1997). This is all to suggest that in regards to the CBD, the US did not have as much influence over the final results of the text as in Kyoto and Montreal, where the agreements were mostly compromises between the US and the European positions, or CITES, where the final agreement mirrored the preferences of the US and other developed countries. The agendas of developing countries, possibly due to learning from being shut out during CITES negotiations, were far more prominent in the CBD. They saw the treaty "as a way to reaffirm their sovereign right to their genetic resources and to promote a more equitable sharing of the benefits from biodiversity" (Raustiala and Victor, 1996). For instance, the CBD includes a provision requiring companies to share profits derived from products they developed using plant genetic material with the nations or villages from which they acquired the genetic resources (Bang, 2011).

Despite this, much of the agreement is still reflective of US preferences. For instance, the US secured a major concession in reducing the required funding for the Global Environment Facility (GEF), the international fund for the CBD and other agreements and projects, from $4

billion to $2 billion (from 1994-1998), of which they would contribute $430 million over the four years (Bloomquist, 2002). However, despite the US retaining influence over the direction of the GEF, conservative Senators believed developing countries were given far too much authority over fund, especially considering the US and other developed nations were providing most of the money (Bloomquist, 2002). Additionally, the final meeting before the agreement was finalized featured a large number of topic aimed at "making the treaty satisfactory to the US", which led to the final text consisting of "vague commitments, ambiguous phrases, and some awkward compromises" (Raustiala and Victor, 1996). The US would not have had to introduce any new laws to comply with the CBD, as existing legislation would be enough to do so (Snape III, 2010). Despite this attempt to appease the US, and the fact that the Americans were not being required to make any particularly substantial commitments, Bush administration did not sign the agreement. In 1993, the year after the agreement was opened for signature, the Clinton administration did sign, but no vote on ratification was ever held on the Senate floor.

Unlike Kyoto, where the rejection by the Senate was unanimous, the Republican minority was responsible for the rejection of the CBD. In 1994, 35 Senators signed a letter to Majority Leader George Mitchell, who had scheduled a vote on the CBD, that the vote be postponed until the concerns of the 35 were addressed (Bloomquist, 2002). Since 67 members of the Senate are needed to ratify a treaty, these 35 were enough to prevent the CBD from even making it to the floor. These Senators, mostly from agricultural states, were responding to pressure and lobbying by biotech, pharmaceutical, and agricultural interests (Bang, 2011). The dissenting Senators and the interests they represented feared that the CBD would threaten intellectual property rights negotiated in TRIPS, raise prices of genetic resources, allow other states to block the import of US products (through the preapproval provision for biotech products), strengthen the ESA and

wetland protection legislation domestically, threaten US jobs, and threaten private property rights (Bang, 2011, Raustiala, 1997, and Bloomquist, 2002). Even after the pharmaceutical and biotech industries switched their stances after the Clinton administration addressed their concerns, the US still did not ratify, due to the Clinton administration underestimating the strength of the agricultural industry's resistance (Raustiala and Victor, 1996, and Bang, 2011). Despite the fact that protecting biodiversity is beneficial to numerous US interests, including national security, environmental, scientific, biotech, farming and food, etc. (Snape III, 2010), domestic interests still kept the US from ratifying.

However, the failure of the US to ratify the treaty has not greatly affected the depth of its participation. Every presidential administration has chosen to fund and support the CBD, the US still sends a delegation to every COP, has been the largest global donor to the GEF, and as mentioned before, domestic legislation is already in compliance with the agreement (Dickie, 2016, and Snape III, 2010). The only observable difference is that the American delegation can only attend the COP's as an observer, which means they do not have a vote and can only influence the direction of the agreement informally (Klein, 2016).

While the US has still participated in the agreement, Snape III argues that their failure to ratify, and the resistance by the interests discussed earlier, has resulted in the agreement lacking teeth and generally being ineffective. He contends that "the engagement and leadership of the United States is necessary to protect biological diversity and the natural services enjoyed by Americans and others throughout the world" and that the US possesses essential knowledge and resources from its domestic environmental protection programs that would help other countries in developing theirs (Snape III, 2010). Additionally, US participation in the sharing of genetic resources and information would create benefits for all parties, through greater collective action

on problem solving and greater access to genetic resources for the US itself (Snape III, 2010). However, while the US participating in this manner would undeniably be beneficial to the agreement, I have discovered no evidence to suggest that, even if the Senate ratified the treaty, that any US administration would have been willing, or politically able, to contribute in a manner greater than they have historically, especially in regards to the exchange of information.

Because of this, I believe the counterfactual scenario where the US ratifies the agreement would look and perform in the same way that it has historically, since the US has basically been a fully participating member to this point. At the time of ratification, there were no obvious domestic consequences imminent from the loss of biodiversity on the scale of those seen in the ozone depletion issue. Thus, there were no incentives for the US to have pushed for a more expansive and costly agreement in a manner similar to their behavior in regards to the Montreal Protocol. While the agreement likely would have been less ambiguous and featured less of the "awkward" compromises and commitments discussed by Raustiala and Victor (1996), it is unlikely that this would have led to much greater success. The US still would have had the same incentives, influenced by the dissenting special interests of agriculture, biotechnology, and pharmaceuticals, to reduce the funding available to the agreement. Additionally, the incentives to fight against its widening scope and the provisions regarding profit and genetic resource sharing would have also still been present.

The far more interesting scenario for the purpose of determining whether US participation effected the success of the agreement is that where the US does not participate in the negotiations at all. Like in the case of CITES, it is not clear if there would even be an agreement without the US pushing to initiate negotiations. However, assuming CBD talks would have begun without US participation, the agreement likely would have been more effective in its

goal of promoting more equitable distribution of genetic resources and their profits. The European states would have been left to lead the negotiations, and they were far bigger supporters of the provisions designed to help developing countries reestablish sovereignty over their wildlife and genetic resources (Bang, 2011). The agreement would have been free of the last minute attempts to appease the US through changing the language, and thus would have been less vague, similar to the scenario with full US participation. Taking this into account, it is likely that the agreement would have had stronger provisions in regards to redistributing genetic resources than it did in the observed scenario.

Since the US had its domestic laws in place before negotiations took place, its lack of participation would not further diminish the limited effectiveness of the CBD in actually reducing the rate biodiversity loss or sustainable use. Even if the US did attempt ramp up its activities (pollution, emissions, deforestation, etc.) that cause biodiversity loss, developing states could prevent this from taking place within their borders by simply refusing to sign contracts with American companies or researchers, as Venezuela did after the US refused to ratify the CBD (Raustiala and Victor, 1996). However, it is also unlikely that the agreement would have been substantially more successful in this regard. The European States likely would have been required to replace funding no longer coming from the US. Assuming the original goal of $4 billion would have been implemented, instead of the US influenced $2 billion, then this would be over a $1 billion in additional costs for the Europeans. However, without US participation, it is likely that the funding for the GEF would have been lower in the first place, since the American contribution would not have been factored into the request. Likewise, since the US already regulated its own wildlife and biodiversity without CBD influence, there is no concern that the Americans would destroy their own biodiversity (at least not faster than in the observed

scenario). In fact, if more states took actions like Venezuela and refused to allow the US to use their lands, then the agreement likely would see higher rates of success in protecting biodiversity, since the US action in foreign countries is one of the largest causers of the problem. While this level of potential success cannot be confirmed, at the very least, it can be reasoned that US absence would not make the agreement more ineffective than it already has been.

Despite the benefits to the entire country, the US still did not ratify or participate as an effective leader in the CBD, due to special interests gaining enough Senatorial support to block the agreement from even reaching the floor. Even though the agreement would have been beneficial for the US, perhaps even to the degree that the US would have been willing to take on a role similar to Montreal, it would have been detrimental, or was at least perceived by the industries and Senators representing them, to interests with enough political clout to deny ratification. Thus, who the winners and losers are domestically from an environmental agreement must be also taken into account as a determinant of how effective and influential the US can be as a participant. If the losers are powerful enough, or organize effectively, they can influence US behavior to the point where they take actions that are likely detrimental to the success of potential agreements, as well as to the US itself on aggregate. Likely due to this pushback, it appears that the US was an inconsequential at best, and detrimental at worst, participant in the CBD.

Comparison

Both CITES and the CBD address biodiversity and attempt to conserve it. However, CITES is far more narrowly focused, dealing only with trade of identified species, while the CBD is best described as a framework convention, with few enumerated requirements, designed to facilitate further commitments later on. Due to this, CITES probably had an “easier” path to

success than the CBD, which must be taken into account. In both cases, the US played a crucial role in beginning the negotiations, and were important actors in terms of causing the problem. However, in regards to CITES, the US, as the largest importer of illegal wildlife, was a necessary participant in regulating the trade of species at risk of extinction. In the CBD, US participation was not necessarily required for the problem of biodiversity loss and genetic resource distribution to be addressed. These realities are reflected in the level of influence the US had over the final results of each agreement. Where CITES essentially reflected the desires of the US, Australia, and Japan, in comparison, the CBD was more skewed towards the preferences of developing countries and the Europeans.

In regards to the US status as a privileged group, it behaves as such in regards to certain species in CITES, while it does not do so for the CBD. Both cases feature special interests as powerful determinants of US action and whether it is beneficial to the agreement. In CITES, when the US behaves as a privileged group and unilaterally acts to ban trade in a species or pressures other states to do the same, it is in response to political pressure from environmental interests and NGO's. These bans have results contrary to their intended purpose, as the species becomes more vulnerable to poaching and illegal trade, which is harder to regulate than limited, legal trade. In this case, the US behaving as a privilege group and attempting to contribute to solving a problem is less effective than if the US were to engage in sustainable use and limited trade, and not attempt to go above and beyond what other states are doing. When the US behaves in this way, for example, in regards to crocodilian farming programs, the results are much better for the populations of the species, at least in regards to the number of individuals lost to poaching and illegal trade.

The CBD, on the other hand, does not feature the US acting as a privilege group as a result of the influence special interests, even though many of the conditions for the US to do so were met. The US economy benefits greatly from biological diversity, and would deduce even greater benefits with greater access to genetic resources through the CBD. Thus, the US should have had an outsized interest in helping to protect biodiversity in other nations, as well as the transfer of knowledge between states. However, the resistance and lobbying against the treaty by pharmaceutical, biotech, and agricultural industries (later just the agricultural industry) led to the US valuing the protection of its existing market share over the potential expansion into future markets and the greater protection of biodiversity.

Which special interests are involved, how sizeable and influential they are, whether they expect to benefit or suffer, and how influentially and effectively these interests can organize and lobby government must all be considered as important factors in whether US participation will benefit an agreement. With regards to CITES, wildlife protection interests pushed for more substantial US action, despite it being detrimental to some species, because a trade ban it was a "bigger" accomplishment than a limited trade policy. Meanwhile, US participation in the CBD was less effective and substantive than what would have been expected given the US zealousness in beginning the negotiations for the agreement due to the resistance of the agricultural, pharmaceutical, and biotech industries. In both cases, the special interest influenced actions of the US deters the potential success of the agreement.

Conclusion

The United States plays a unique role in international environmental politics. As the most industrialized nation, it is responsible for a disproportionate amount of nearly all environmental issues. This, coupled with its expansive financial and political power, give it the potential to

substantially influence whether or not any IEA will succeed. In theory, when the US is a privileged group, and has great self-interest in seeing a problem solved, it would be able to ensure this through the utilization of its vast resources.

To test if agreements with US participation are more likely to succeed, I utilized the GOALS_FULFILL variable in the International Regimes Database (IRD). In the 31 agreements that are applicable (open, multilateral agreements open to US participation, I found that agreements where the US has ratified see success on over 22% more of their goals (as defined by the IRD) than agreements where the US did not ratify. However, due to the small sample size (only 8 agreements without US ratification and only 34 goals listed for these cases) and the near impossibility of ruling out reverse causality (that the US only joins agreements that are likely to succeed), I decided against using statistical analysis.

Instead, I selected 13 variables from the IRD that I believe best represent the 11 factors that Barbara Koremenos identifies as being the main influencers of the design of a treaty. Using these variables, I identified two pairs of agreements, the Kyoto and Montreal Protocols and CITES and the CBD, that are similar enough to compare. Each pair features one agreement ratified by the US and one that was not.

Out of these four agreements, in only one, the Montreal Protocol, did the US substantially contribute to the agreement's success in such a manner that it could be reasonably argued that the agreement would not have succeeded without US participation. This is because the cost-benefit portfolio of Montreal was substantially skewed towards benefits for the US. The creation and expansion of holes in the ozone layer would greatly increase the rates of skin cancer, cataract, and other medical issues caused by UV radiation, and with relatively minimal investment, the US could prevent this. This clear threat not only galvanized public support for an agreement, but also

caused the domestic CFC industry also realized one was inevitable. To adapt, they invested in substitutes for CFC's and supported efforts for an international agreement. Because of this, the US was free from resistance by special interests that caused American ineffectiveness in CITES and the CBD. As a result of all these different conditions being met, the US was incentivized to ensure that Montreal agreement was successful, despite doing so raising its own costs from the agreement.

In the other three agreements studied (Kyoto, CITES, and the CBD), it appears that in the counterfactual scenarios where the US took the opposite action (did not ratify or participate in negotiations for the agreements that it did so for the observed scenarios, and vice versa) there would not have been a substantial difference in the ultimate success or failure of the agreement. This would suggest that US participation was inconsequential in these cases, even though the US was a major causer of the problem in all three.

For Kyoto, the cost-benefit portfolio was the inverse of Montreal, with the costs outweighing the benefits so decidedly that the US had no incentives to even ratify, let alone assume a role similar to Montreal. Additionally, Japan and Russia, who's ratification was necessary for the agreement to go into effect without the US, held preferences similar to the Americans, which leads to the counterfactual scenario of complete US non-participation leaves the agreement looking essentially the same. The US ratifying and complying with the agreement would have made it more successful simply due to the addition of US carbon emission cuts. However, the US still would not have possessed the incentives to expend the resources to assist or pressure other states to comply as well, so the overall impact on the agreement likely would have been negligible.

With regards to CITES and the CBD, special interests motivated the US to act ineffectively. With regards to CITES, wildlife protection lobbyists and NGO's sometimes lobby the US to enact trade bans on species at risk of extinction or endangerment, despite these bans creating more expansive black markets within the US (already the largest importer of illegal wildlife). These black markets create greater demand for illegal imports and poaching, which are more difficult to regulate, especially considering the US does not properly regulate even legal imports. Compared to sustainable use policies such as species farming or limited trade, these bans are less successful in protecting species. The US attempting to go above and beyond simple regulation of trade and banning trade in a species completely, and encouraging other nations to do so as well, is reminiscent of its actions with regards to Montreal. However, species protection from trade, inherently requires the cooperation of both importing and exporting nations, or else it will not be successful. In comparison, Montreal was not so dependent on coordination between states, as each state can reduce its CFC emissions independent of other states' actions. In cases such as CITES, where success is dependent on coordinated action among states as opposed to collection unilateral actions, the US acting unilaterally is actually more harmful than beneficial as it reduces the capacity for effective collective action.

Finally, the case of the CBD is an example of minority special interests preventing the US from becoming a leader in an agreement where it had interests in doing so. The pharmaceutical, biotech, and agricultural industries feared that the CBD would be harmful to them, so they opposed the agreement. They lobbied the US administration to distance itself from the treaty instead of fully participating in negotiations. A minority of 35 conservative Senators acting at the behest of these industries were able to prevent the Senate from even holding a ratification vote. This is in comparison to Montreal, where the interests that felt threatened (CFC

producers) supported the agreement, after initially attempting to block it in the same way. The CFC producers had developed substitutes, and recognized that an internationally mandated reduction of CFC's would ensure a market for their substitutes. The industries against the CBD feared that the agreement would reduce their market share and profits by regulating how they used land domestically, how genetic information they gained through research would be shared with other parties, and how the profits from genetic materials acquired in other nations would be split with those nations. The US administration was unable to soothe these concerns enough to win over the dissenters, which prevented the US from behaving in a manner more reflective of its general interests in protecting biodiversity.

The main finding of this thesis is that in order for US membership to increase the success of an IEA, a series of conditions must be met. First, the US must be both a major causer of the problem and a major victim of its consequences. The domestic consequences must be highly visible, and the benefits of participation must outweigh these costs. Finally, the industries and interests affected by the problem must be properly informed about its nature, compensated for potential losses they might incur, and/or reassured that they will not be harmed. If they are not, they may be able to lobby enough legislators or executives to negatively influence the US role in the agreement in question. If any or multiple of these factors are not met, then US participation will most likely be inconsequential to the success of that agreement. Interestingly, there does not seem to be a strong relationship between the political leanings of the administration in charge and the role the US played during negotiations. Only Kyoto was negotiated during a Democratic administration, and while the success of CITES and the CBD are mixed at best, the most successful agreement, Montreal, was negotiated during the Reagan administration, widely considered one of the more conservative and environmentally unfriendly presidencies in recent

US history. Due the difficulty of any one issue meeting all of the requirements listed, it is likely that US participation in most environmental agreements is not greatly important to their success in terms of overall compliance. The US is still an important member due to its large share of responsibility in causing environmental problems, but there are probably very few cases in which the stars would align and the US would be incentivized to behave as they did in Montreal.

Further research into this matter could include looking into more case studies using the IRD or another database that I may be unaware of. There are almost certainly numerous additional factors that influence US effectiveness in an agreement aside from the few that I have discussed, and additional in-depth analysis and comparisons of individual agreements would be able to identify them. Specifically, it would be interesting to look into a case where the US ratified an agreement that ended up being considered a failure, while a similar one where the US did not ratify succeeded.

Paris Agreement

To conclude this thesis, I will apply my research to the Paris Agreement that the United States recently abandoned. Paris strives to limit global warming to below 2° C at the minimum, and below 1.5° C more ambitiously. It is the most comprehensive climate change agreement to date, with 175 ratifying members, technically still including the US, since states cannot officially secede from the agreement until 3 years after it took effect in that country, with the process of secession taking another year itself. The Paris Agreement relies on Nationally Determined Contributions (NDC's), meaning states set their own voluntary carbon emission reduction targets, and encourages the developed world to assist the developing world implement their climate action plans through financial assistance and technology transfers. I believe that, during the negotiations of this agreement, the US actions were more similar to those seen before in the

negotiations in the Montreal Protocol than those seen in the Kyoto Protocol. Due to this, US participation likely would have increased the likelihood that Paris would have succeeded, and its absence will harm the agreement.

First, the US provides a good portion of the international funding for the climate change issue, especially to assist developing countries in reducing their emissions or finding ways to industrialize in an environmentally friendly way. For example, United States, under the Obama administration, provided 21% of the funding towards the Global Environmental Fund (GEF), gave $9.6 billion in climate financing aid to developing nations from 2011-2012, and additionally pledged $3 billion to the Green Climate Fund (created in 2010), of which it has given $1 billion already (Zhang et al., 2017). Like in Montreal, the US was also the most ambitious in terms of its goals, targeting a 26-28% emission reduction from 2005 levels, which represented 21% of the total commitments made by all Paris members (Johnston, 2017). The US was also instrumental in convincing other states to ratify the agreement and put forth their own reduction plans. President Obama and Chinese President Xi Jinping met numerous times, which culminated in 2014 with the two announcing a joint action plan that would also eventually serve as the two states' NDC's for Paris. China committed to reach peak emissions and have renewable energy sources account for 20% of national power generation by 2030 (Landler, 2014). With China and the US accounting for nearly 40% of total global carbon emissions on their own, their signal of cooperation in 2014 and the substantial commitment by China helped to build support for a stronger Paris agreement, while their continued cooperation after Paris likewise helped convince other states to ratify (Worland, 2016). Similar meetings took place between Obama and Prime Minister Modi of India, the third largest carbon emitter (Mufson, 2016). Like Montreal, the US took a leadership role during Paris, both in terms of their own commitments and in terms

of incentivizing other key states to participate. This indicates that US participation in Paris would have resulted in a more successful agreement than one where the US did not participate.

Additionally, US participation in Paris resulted from an executive agreement by President Obama, meaning it did not require approval by the Senate. Because of this, US actions were not affected by special interests and industries that would be harmed by greenhouse gas reductions. The requirement for domestic interests to fall in line in order for the US to effectively behave as a privileged group do not appear to apply to the Obama Administration in regards to Paris. This allowed the Obama administration to push for both a more ambitious agreement and for more ambitious domestic commitments without fearing the Senate refusing to ratify it to satiate special interests.

Due to the role the US played in negotiations, its absence will likely threaten the ability for the world to limit warming below the 2° C specified by Paris. Even though other states have reaffirmed their support for Paris, as a response to American freeriding, they could possibly delay their commitments until the US rejoins (Zhang et al., 2017). Even if other states do decide to follow through on meeting their targets, the absence of the US eliminates any "emission space" (wiggle room for states to fall short of their targets and not compromise the 2° goal) and raises the mitigation costs for all other states involved (Zhang et al., 2017). These rising costs will hit developing countries especially hard since the US will cut funding towards climate assistance (Zhang et al., 2017). These, along with other effects of US absence, project to make it difficult if not impossible for the Paris Agreement to limit warming below 2°. Because the US is the largest causer of the problem historically and the second largest emitter currently, its own contributions are vital for the success of Paris. The fact that the US played such a large role in funding to assist developing states and in convincing other key states to join further supports the

idea that the Obama administration acted as a privileged group in the negotiations leading up to the Paris Agreement. When Trump took office, the US position completely flipped, and with the absence of the US acting as a privileged group, it appears that the Paris agreement will greatly struggle to meet its goals. In my estimation, it likely will not do so unless the rest of the world commits to even more ambitious targets, and even then, the US would likely need to elect a new president in 2020 who would rejoin the agreement immediately. That is the degree to which US participation appears to be essential for the Paris agreement to succeed.

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Appendix 1:Averages for all Variables from the IRD, for all 31 Agreements

Aspects of Rational Design	**K8**	**K8**	**K7 and K9**	**K2**	**K11**	**K10**	**K4**	**K5**	**K5**	**K1**	**K3**	**K6**	**K6**	**Success**
IRD Variable / **Agreement**	**RF1 (1-6)**	**RF2 (1-6)**	**RF7 (1-5)**	**RF8 (1-5)**	**RF9 (1-6)**	**RF22 (1-5)**	**RF51 (1-5)**	**RA11 (1-2)**	**RA12 (1-5)**	**RA20 (# of members as of 1998)**	**RA30 (1-5)**	**RC15 (1-2)**	**RC16 (1-2)**	**RC10 (1-2)**
Antarctic Treaty	2.22	2	3.07	3.17	2.44	1.78	2.6	1	1.21	43	N/A	2	2	2
Conservation of Flora and Fauna	2.11	1.89	3.33	3.44	5	1.07	4.75	1.48	1.36	21	N/A	1.5	2	2
Conservation of Seals	2	2	3.9	3.8	5	1	4.25	1	1.29	17	N/A	2	2	2
CCAMLR	2	2	2.42	3.17	2.67	2.28	3.33	1	1.42	24	N/A	2	2	1.65
Protocol of Environmental Protection	3	2	4	3.6	5	1.83	2.5	1	1.54	27	N/A	2	2	2
Convention on Biological Diversity (X)	6	6	3	1	1.5	2.33	4	1	2.89	175	4	2	2	1.1
CITES	5.66	5.5	2.75	2.5	4.63	2.88	3.33	1.5	2	144	3	2	1.5	2
UNFCCC	2	5	3	1.5	1.75	2.5	3	1	3.6	176	3.5	2	2	1
UNFCCC Financial Mechanism	2	5	3	3	3	2.5	2.75	1	3.25	N/A	2.5	2	2	1
Kyoto Protocol (X)	2	5	1	1	1.5	2	2.5	1	2.5	192 (current)	4	2	2	1
UN Convention to Combat Desertification (X)	5	5.5	N/A	1	2	2.5	3	1	2.57	195	4	2	2	1.25
Basel Convention (X)	2	4.75	2.25	3.11	2	3.25	4	1.04	2.14	124	3.33	2	2	1.6
Amendment to Basel Convention (X)	2	4.5	2	3	1.5	3.5	2	1	1.75	N/A	3	2	2	1.5
Lome IV Convention	2	4.5	2.5	4	3.5	2	4	1.08	2.04	70	3.5	1	1	2
ICCAT	2	2	2.5	2	3	3	2.5	1	2	25	4	1.5	2	2
International Convention for the Regulation of Whaling	2	2	2.38	3.75	3.7	2.25	4	1.1	2.28	41	3	1.75	2	1.25
London Convention of 1972	4.2	2.17	4	1.69	3.6	N/A	3.18	N/A	N/A	87	3.5	1	N/A	1.89
LTARP	3	1.5	4	1	1	4	3	1	1	42	4	2	1	1.4
1st Sulfur Protocol (X)	3	2	3	2	2	3	3	1	2	22	N/A	2	1	2
NOX Protocol	3	2	3	2	2	3	4	1	1.5	31	N/A	1	1	2
VOC's Protocol (X)	3	2	3	2	2	3	4	1	1.5	21	N/A	1	1	2
2nd Sulfur Protocol (X)	3	2	3	2	2	2	4	1	1.5	27	N/A	2	1	2

International Tropical Timber Agreement	4	4	2.5	2	2.5	3.5	4	1.5	2.33	62	4	1.5	2	1.7
OILPOL	1	1.5	1	4	1.5	1	2	1.05	2.09	71	4	1	2	1
MARPOL	1	2	1	3	2	1	2	1	1.95	97	4	1	2	1.75
Ramsar Convention on Wetlands	6	5.5	3.25	2.25	5	2	4	1.61	2.64	115	3	1.33	2	1.7
Vienna Convention	2.4	5.33	5	3.5	3.25	2.25	3.33	N/A	N/A	172	2.5	N/A	2	1.4
Montreal Protocol	2.5	5.33	3	3	2.5	2.33	3	1	1.25	167	2.5	2	2	1.87
London Amendment to the Montreal Protocol	3	5	3	2.5	2	2	4	1	1.38	130	2.5	2	2	2
Copenhagen Amendment to the Montreal Protocol	3	5	3	2	2	2	4	1	1.25	99	2.5	2	2	2
Multilateral Fund to Montreal Protocol	3	5	2	2.5	2	2	4	1.25	1	N/A	2	2	2	2
Mean (SD)	2.87 (1.3)	3.55 (1.63)	2.83 (0.89)	2.53 (0.93)	2.69 (1.19)	2.33 (0.76)	3.36 (0.75)	1.09 (0.18)	1.9 (0.66)	82.41 (59.2)	3.29 (0.67)	1.72 (0.41)	1.78 (0.41)	1.68 (0.38)