The Structure of International Treaty Diffusion *

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Abstract

How does the choice to adopt an international treaty spread around the world? Despite the consensus that the success of a norm cascade often hinges on early support by specific *critical* states, there is relatively little in the way of focused research on what makes some states more *critical* than others. We introduce a theory that explains the specific roles taken on by different states in the process of diffusion of international law, then test it with data from the content and signing/ratification patterns of over 700 multilateral treaties during 1945-2017. Using a new, network-based inference algorithm, we analyze the sequences of treaty adoption to infer the likely roles played by different states in the diffusion process and the most likely latent diffusion patterns among international states. The results highlight that a state's ability to play a critical role in a treaty adoption cascade does not always depend on material capabilities, and its use is actually negatively correlated with major power status. We argue that our results help rank-order states in terms of a different kind of influence over international relations—ability to foster cooperation among states with different and often conflicting interests.

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Introduction

International states are connected by a complex multi-layered network of international treaties. Yet this network is not uniform in density. Some global treaties are ratified with near universal support, whereas many fail to reach even a simple majority (Von Stein 2018, 879). While domestic politics and treaty design certainly explain some of this variation, treaty ratification is ultimately a sequential and strategic multi-actor process, such that decisions by individual countries affect, and are affected by, actions or expected actions of others. For instance, US unwillingness to ratify the Kyoto Protocol is often linked to the exemptions for developing economies, which made the Protocol palatable to other important players, such as China and India (Bush 2001). What explains the variation in international support for treaties?

From a temporal perspective, international treaty adoption follows an S-curve. By definition, the process starts with a few early adopter states, then accelerates until the number of adopters reaches a critical mass, causing a cascade that culminates in widespread acceptance (Finnemore and Sikkink 1998; Elkins and Simmons 2005). Empirical evidence of such cycles permeates every domain of domestic and international law, including human rights (Risse, Ropp, and Sikkink 2013; Simmons, Lloyd, and Stewart 2018), trade and investment (Elkins, Guzman, and Simmons 2006; Poulsen 2014), taxation (Franzese and Hays 2008; Thies, Chyzh, and Nieman 2016), environmental protection (Cao, Greenhill, and Prakash 2013), and immigration law (Turcu and Urbatsch 2015).

Despite much empirical evidence, the theoretical mechanics that drive these cascades are poorly understood *a priori*. While a cascade is easily recognizable upon completion, few theoretical accounts explain the mechanics that cause the inflections in its S-shape. Finnemore and Sikkink (1998, 901) hypothesize that the first inflection point occurs once a treaty gains the support of about a third of the international system or that of a *critical state*—a state whose decision to join triggers a domino-effect of others following suit. For example, the support of France and Great Britain is regarded as critical for the success of the anti-land mine treaty, although much credit also goes to the work of South African President Nelson Mandela (Price 1998). Others argue that the

role of a critical state is primarily performed by major powers (Fordham and Asal 2007). Notably, much of our understanding of cascades, as well as the related concepts of a critical state and the tipping point process, is derived from empirical study of a handful of individual treaties (e.g., the land-mine ban treaty, the Convention against Torture).

We develop a coalition-based theory of treaty adoption cascades by bridging the existing research on international treaties with that on coalition-building. We argue that, at its core, building support for an international treaty is a coalition-building task with the goal of building the widest possible coalition. As part of this goal, norm-entrepreneurs identify and approach prospective supporters, recognizing that (1) securing the support of some states early in the process is more important than that of others and (2) getting the support from some states is more costly than others. The resulting coalition of support essentially consists of the largest number of states whose support was the cheapest to obtain. The key prediction is that the sequences of treaty adoptions should exhibit a common pattern, with the same states leading and lagging in the process. This pattern should be especially prominent within specific legal issue areas, such as human rights, economic, or environmental law. This theoretical model also helps explain the known empirical observation that major powers, especially the United States, often lag in the treaty adoption process or never join at all.

We test our theory using aggregated data on the timing of treaty adoption across and within different domains of international law. Conceptualizing the timing of treaty adoption as "cascades" of countries signing or ratification international treaties, we use a network inference algorithm to construct a probabilistic tree-network of likely pathways of norm diffusion. At the root of the tree are the few early adopters. As the treaty continues to spread and the number of tree branches multiplies, we are also able to identify the key *influencer*-countries as well as *late adopters*. The inferred networks are entirely based on the observed timing sequences of treaty adoption.

The latent diffusion network that we estimate is a first-of-its-kind general measure of state influence that can shed considerable light on a key line of inquiry: how and why states choose to adopt international treaties. The individual countries' position within these estimated latent

diffusion networks gives us a proxy of a country's ability to foster cooperation among countries with different and often conflicting interests. In contrast to previous measures of state influence (e.g., power or trade asymmetry), the ability to foster international cooperation does not depend on material power: while major powers may have the potential to use this type of influence, the states that use it most often are middle powers. To further elucidate the theoretical logic, we supplement our statistical analysis with a more in-depth descriptive case study of the United States—a country, that according to our analysis, rarely uses this type of influence, instead relying on more familiar tools of compellence and economic conditionality.

After we situate the paper within the existing research on international law in the next section, we develop our theoretical model and derive several testable predictions. Next, we provide the technical description of the estimation approach and the data, and present the results. We validate the resulting latent measure of the network of policy in two ways: by performing an in-depth case study of the United States' role in fostering a diffusion cascade for treaties it supports and by analyzing the determinants of a state's position within the latent diffusion network. Finally, we conclude by summarizing the contribution and directions for future research.

Existing Explanations of Treaty Participation

Countries' decisions to adopt international legal treaties are a function of domestic institutions, treaty-specific design features, as well as the international pressures and incentives. There is abundant evidence that the probability of ratification depends on domestic constraints (Köke and Lange 2017; Chyzh 2014). Human rights researchers argue that states may use ratification as a cheap signal to international or domestic audiences or a constraint. Authoritarian regimes, for instance, often adopt human rights treaties as a cheap substitute to actually altering their use of repression (Hathaway 2007; Vreeland 2008; Hill Jr. 2010), though this effect is moderated by the presence of effective domestic judiciaries (Powell and Staton 2009; Conrad 2014). Democracies and newly democratized states may ratify international human rights or economic law as a substitute or complement to domestic protections of civil liberties or rule of law (Moravcsik 2000). Research on environmental cooperation, in contrast, shows that democracies are more likely to ratify interna-

tional environmental treaties (Bättig and Bernauer 2009), a finding motivated by the allocation of the public goods theory (Bueno de Mesquita et al. 2005).

Other research emphasizes the effect of treaty design, e.g., the inclusion of flexibility provisions, instruments for monitoring of compliance, and enforcement mechanisms (Abbott and Snidal 2000; Koremenos 2013, 2016). The trade-off is that flexibility in the treaty design may broaden the treaty's support base, yet too much flexibility may obviate the treaty's ability to change state behavior (von Stein 2008; Chayes and Chayes 1993; Downs, Rocke, and Barsoom 1996; Zvobgo, Sandholtz, and Mulesky 2020). Treaties that extend flexibility to select groups of states may result in a loss of support from other important players. For example, US President Bush referred to Kyoto's exemptions for developing countries as the reason for the United States's failure to ratify the treaty (Bush 2001).

Though both the domestic and design explanations model treaty participation in static terms, the process of ratification is actually very dynamic. As countries take turns considering, negotiating, and making decisions on whether to join a group of those that joined before them, assuming that each country's decision is unaffected by those of other joiners is quite a simplification. International explanations of treaty participation emphasize such dynamics and posit diffusion processes such as economic competition or adaptation (Chyzh 2016; Elkins, Guzman, and Simmons 2006), learning and imitation (Mitchell 2002; Simmons and Elkins 2004), and coercion (Sharman 2008). Diffusion outcomes are usually theorized to result from a combination of complementary or competing pressures, although the prominence of each mechanism may depend on the issue area. Recently, scholars have zeroed in on the channels of diffusion, asking what types of ties among states serve as the most important pathways for transmitting international norms. While geographical proximity has been traditionally treated as the most obvious and natural diffusion channel, researchers have also argued that diffusion may happen among countries that share memberships in the same international organizations (Cao 2009; Chyzh 2016) or alliances (Zhukov and Stewart 2013), among trade partners (Beck, Gleditsch, and Beardsley 2006; Dorussen and Ward 2008), or between countries with shared history or language (Cao 2010).

The diffusion process is theorized to follow a cascade or a wave that starts with a small number of early adopters, and gradually spreads to the rest of the state community (Finnemore and Sikkink 1998; Elkins and Simmons 2005; Elkins, Ginsburg, and Simmons 2013). The actual mechanics of treaty cascades—what cases the change in speed in the support for the treaty—are not well understood. Some argue that the first inflection point of a cascade—the point of acceleration in the speed at which the treaty gains support—is a function of treaty design, as many treaties' entry into force is conditional on a particular number of ratifiers (Finnemore and Sikkink 1998, fn 57). Treaty design, however, does not explain how and why treaties reach this required threshold of support. Other explanations emphasize the role played by *critical states*, though the specific characteristics of such states are a matter of disagreement (Fordham and Asal 2007). Our goal is to build on this research to develop a more nuanced theoretical explanation of the dynamics of treaty cascades.

A Coalition-Building Theory of Treaty Diffusion

We develop a theory of diffusion of support for international law by bridging insights from research on international law with the studies on coalition building. Our main goal is to isolate the specific factors that lead to the inflection points in the treaty support—the factors that prompt the increase in the speed of support, which in turn leads to the cascade's completion.

We start with a well-established premise that cascades in support of international treaties do not happen spontaneously, but are a result of tireless, continuous and concerted effort of norm entrepreneurs—domestic political actors, inter-governmental organizations (IGOs), non-governmental organizations (NGOs), private individuals or foundations. United by a common goal, norm entrepreneurs collect and disseminate information, lobby governments, shame noncompliers, and otherwise work towards precipitating the spread of the desired norm among international jurisdictions (Keck and Sikkink 1999; Murdie and Davis 2012; Bell, Clay, and Murdie 2012; Park, Murdie, and Davis 2021).

Second, spreading the norm to the widest possible audience is essentially a coalition-building task, though the type of a coalition sought is somewhat different from most legislative or peace-keeping coalitions. While these coalitions often require the minimal number of supporters, norm

cascades hinge on achieving the widest possible support within the international system. With this difference in mind, we can modify and apply the theoretical insights from coalition-building research to explaining treaty diffusion cascades.

Coalition-building, at its core, consists of putting together a "prospect lists" of countries who may be favorable to supporting the cause, perhaps after some additional concessions Henke (2017, 412). These lists of prospective joiners are rank-ordered based on three dimensions: the prospective country's interest in participation, the size of potential contribution, and the type of concessions that may be required to win the prospect's full support (Wolford and Ritter 2016; Henke 2017, 2019). A country's intrinsic interest in participation is determined by a combination of its intrinsic support for the legal norm embodied in the treaty, as well as any direct and indirect participation benefits. Direct benefits from economic treaties may include increases in trade and investment (Elkins, Guzman, and Simmons 2006; Franzese and Hays 2008; Chyzh 2016). Indirect benefits may include the ability to send reputational signals to domestic or international audiences (e.g., Hathaway 2007; Gibler 2008; Duque 2018; Crescenzi 2018).

A prospective joiner's contribution to the treaty cascade is in its potential to act as a critical state, whose decision to join affects that of others. A state's ability to take on the role of a critical state, in turn, is predicated on two criteria: an the ability to provide a well-tested model for emulation, and/or an ability to disseminate ideas and information. To satisfying the first criterion, a state must demonstrate exceptional performance within the relevant issue area. Germany's influence over the rules and practices of the European Union, for example, has been explained as a byproduct of the post-World War II stability of German economic and political institutions (Dobbin, Simmons, and Garrett 2007; Garrett 1992).

The second criterion—access to a platform for disseminating ideas—is only available to major or regional powers, as it presupposes establishing and maintaining a community of like-minded states (Lake 2009; McDonald 2015). Importantly, a state need to only satisfy one of the two criteria, in order to play a critical role in the diffusion process. Depending on their position on the issue, the effect of critical states on diffusion process may not always precipitate the cascade, but

may also impede, stop, reverse a cascade, or trigger a cascade of a competing norm. For conceptual clarity, we will hence refer to the subset of critical states whose support precipitates a cascade as *influencer*-states.

Finally, the support of some joiners is more costly than that of others. Securing the support of specific groups of states often requires additional concessions, such as exemptions or opt-out clauses for developing states (Simmons and Elkins 2004). Support of *influencer*-states, especially major powers, may come at a price of giving these states greater influence on the decision-making process for major powers (Abbott and Snidal 1998). In some cases, winning the support of specific states may result in losing the support of others—a prohibitive cost if the goal is to win universal or near universal support.

Since treaty cascades are predicated on building the widest possible coalition, the next step is to approach and secure the support of the largest possible subset of the prospects. Crucially, a cascade's success depends on the order, in which countries ratify the treaty. Countries tend to flock together based on institutional characteristics, ideational and foreign policy goals, and economic factors (Lai and Reiter 2000; Lake 2009; McDonald 2015). As the ratification process goes on, therefore, each additional ratification affects the remaining pool of subsequent ratifiers. While it is easiest to win the support from the countries with the largest intrinsic interest in joining the treaty, norm entrepreneurs have a strong incentive to focus their early efforts on securing the support of the potential influencer-states who can create momentum and influence the trajectory of the largest number of potential joiners.

In choosing the influencer-states to approach for support, the norm entrepreneurs must optimize between the costs and benefits each possible candidate can bring to the table. These costs and benefits, of course, are largely endogenous: aware of their value to the broader goal, states with the greatest influence potential may also require the largest concessions. An implication is a frequently observed outcome, such that the United States—a state that satisfies both of the criteria for playing the role of an influencer—lags in joining, never joins, or even removes itself from many international treaties, including some that it helped create (Kelley and Pevehouse 2015).

Importantly, international treaties are highly interdependent, especially within substantive issue areas. Treaties really start from scratch. New treaties often build on their predecessors, drawing on the expertise of the same experts and NGOs and support from the same core group of countries. The implication of this policy continuity is that we should also see persistent patterns in the treaty adoption cascades. We should see the same groups of countries take the lead on signing and ratifying treaties within (and likely even across) policy areas, with the same countries taking on the role of influencer-states, and the same countries lagging in adoption. This logic leads to the following hypothesis:

Hypothesis 1: There are persistent patterns in the sequence of states that make up treaty adoption cascades.

On most issues, securing early commitment from major or regional powers is simply too costly to be productive for the cause. States that satisfy the criterion—a proven track-record of exceptional performance in the relevant policy area—are much easier to recruit, almost by definition. Intrinsically favorable to the issue, these states are usually eager to shape export its domestic experience and help shape international law within an issue. Denmark, Finland, Norway, and Sweden, for example, have both strong domestic support for environmental protection and have played a large role in promoting international environmental cooperation (Sprinz and Vaahtoranta 1994). This leads to the following hypothesis:

Hypothesis 2: Major and regional powers are less likely to join treaties early in the ratification process.

This hypothesis is counter-intuitive. There is abundant evidence that major and regional powers are both extremely influential and use this influence to achieve their foreign policy goals (Lake 2009; Nieman 2016). It is important to clarify that in no way do we argue that major are not influential for international treaty cascades. On the contrary, we believe that the combination of extraordinary policy expertise and access to the largest possible platforms would make major powers extremely influential in triggering treaty ratification cascades. Aware of their exceptional influence potential, however, major powers often make their support conditional on costly (sometimes

prohibitively so) concessions. As a result, support of major powers often comes with substantial delay.

Research Design

Our core theoretical expectation is that there is a systematic and persistent order in the timing of treaty adoptions among international states. Some states act as early adopters by systematically taking the lead in adopting treaties within specific issue areas. Others states act as influencers—by adopting treaties within their proven areas of expertise, they send a signal about the "quality" and importance of the treaty to the rest of the international community, triggering a cascade of followers. Finally, the same subset of states are consistently late at adopting treaties, as they holds out their support until they are able to obtain acceptable concessions in the form of modification to the treaty (e.g., exemptions, additional decision-making power).

If we think of a treaty adoption cascade as a tree-like network, where the first adopter(s) form(s) the root(s), the second adopter(s) are the branches that spring from the root(s), and so on, our theory implies an existence of a single tree-like network that is more or less followed in the process of adoption of any treaty (overall and within issue areas). While the structure of this underlying tree is not easily inferred by eye-balling the body of international treaties, we can infer this structure using a recently developed algorithm, `NetInf` (Gomez-Rodriguez, Leskovec, and Krause 2010). This algorithm is designed to be used with data in which a set of units/nodes experience multiple time-stamped cascades of infection/events. Examples include several stories (i.e., cascades) spreading among news websites, or several policies spreading among American states (Desmarais, Harden, and Boehmke 2015). The latent network is inferred to explain the persistent patterns according to which events spread through the nodes.

Underpinning `NetInf` is a probabilistic model of infection (e.g., treaty adoption) diffusion through a set of nodes (e.g., states) that are connected through a directed network of diffusion ties. According to the `NetInf` diffusion model, each state that adopts a treaty after the initial state(s), does so via the diffusion of the treaty from another state. Each treaty is referred to as a "cascade" in the parlance of the `NetInf` algorithm. Each cascade can be represented by a tree in which

there is a branch segment that ends at each state (i.e., the target state), except the initial state(s), and begins at the state from which the treaty diffused (i.e., the source state) to the respective target state. One of the steps in the `NetInf` algorithm is to construct the trees that explain the diffusion of each cascade. The edges inferred in the network are those that can be used in many cascade trees. Intuitively, there are three factors that raise the likelihood that a diffusion tie from state i to state j will be inferred by `NetInf`: 1) If i ratifies many treaties before j, 2) if j tends to ratify soon after j—`NetInf` prefers to infer branches in cascades that span short times, and 3) j rarely ratifies treaties if i does not first ratify them. `NetInf` is a greedy algorithm in that it begins with an empty diffusion network, and edges are iteratively added, with the edge added in each iteration being that which most improves the fit of the cascades based on the inferred cascade trees.

`NetInf` requires the researcher to select the number of edges to estimate. In the implementation of `NetInf` in the NetworkInference R package (Linder and Desmarais 2017), which we use for our application, each additional edge is evaluated using a test similar to Vuong's (1989) model selection test. Specifically, the p-value reflects the result of a test that the average improvement in the fit of the network to the cascades—in terms of the log likelihood—did not improve from adding the edge. Low p-values indicate that the fit did improve, whereas high p-values indicate a lack of fit improvement. In the analyses below, edges are inferred until the test for edge addition reaches the p-value 0.05.

`NetInf` also requires the researcher to specify the number of preceding years of adoptions that will be used to infer the newtork for time t. We experimented with several different values for this parameter, using both our theoretical expertise and model fit criteria to guide us. In the end, we chose to infer each network based on the 10-year window of adoptions.

Data on International Treaty Adoption: Descriptive Statistics

The data are obtained from the United Nations Treaties Series (UNTS) depository, which is a comprehensive collection of international treaties among states that are members of the UN. The depository includes about 1,600 multilateral treaties during 1900-2018. We excluded treaties

with restricted membership (e.g., NAFTA) and regional treaties.[1] We also excluded all non-state members (e.g., international organizations). After removing invalid entries, the resulting sample includes information on 764 treaties and 44,116 treaty-participant observations.

We perform our analysis on the whole sample and on subsamples of treaties by issue areas: human rights treaties, economic treaties, and environmental treaties. We have 268 human rights treaties (15,344 treaty-participant observations), 192 economic treaties (9,024 treaty-participant observations), and 81 environmental treaties (6,116 treaty-participant observations) in our data. We classified each issue area based on the categorization of UNTS.[2]

For the purposes of robustness, we estimate the network of norm diffusion using both the date of the original signature and the date of ratification. While signing a treaty may signal initial commitment to the norm, an international treaty is often not legally binding (does not become part of the domestic law) until it goes through the process of domestic ratification. This two-stage treaty accession process may therefore provide the norm-violators a perverse incentive to quickly sign the treaty with no intention to ratify. Research shows, however, that the act of signing may precipitate the acceptance of the norm, even for the states that do not go through the ratification process (Simmons 2009).

Figure 1 shows the total number of treaty signings (Subfigure 1) and ratifications (Subfigure 1) within each of the three issue area over time. The distributions of state signings and ratifications exhibit similar shapes within areas, albeit, as one might expect, the distribution of signings has a somewhat higher density than that of ratifications. Within the area of economic law, most of the activity falls in the middle of the time period, while the issue areas of human rights and environment exhibit a number of early spikes in signings that are not matched on the corresponding ratification graphs. Within the area of environmental law, the starkest increase in both signings and ratifications takes place in the nineties, which also coincides with a less stark, but notable increase in both

[1]Some treaties categorized as 'open multilateral' treaties in UNTS are actually regional treaties that are only open for signature by states of a certain region or international organization. We excluded regional treaties, with the exception of those open to cross-regional international organizations (e.g., ILO with 187 members, World Intellectual Property Organizations with 191 members or UNESCO with 193 members).

[2]UNTS data include information on the 'Subject terms' of each treaty which tags up to ten issue area that the treaty belongs to (for example, "commodity", "finance", "human rights", "women".

signing and ratification of human rights treaties.

Figure 1: Treaty Signings and Ratifications by Issue

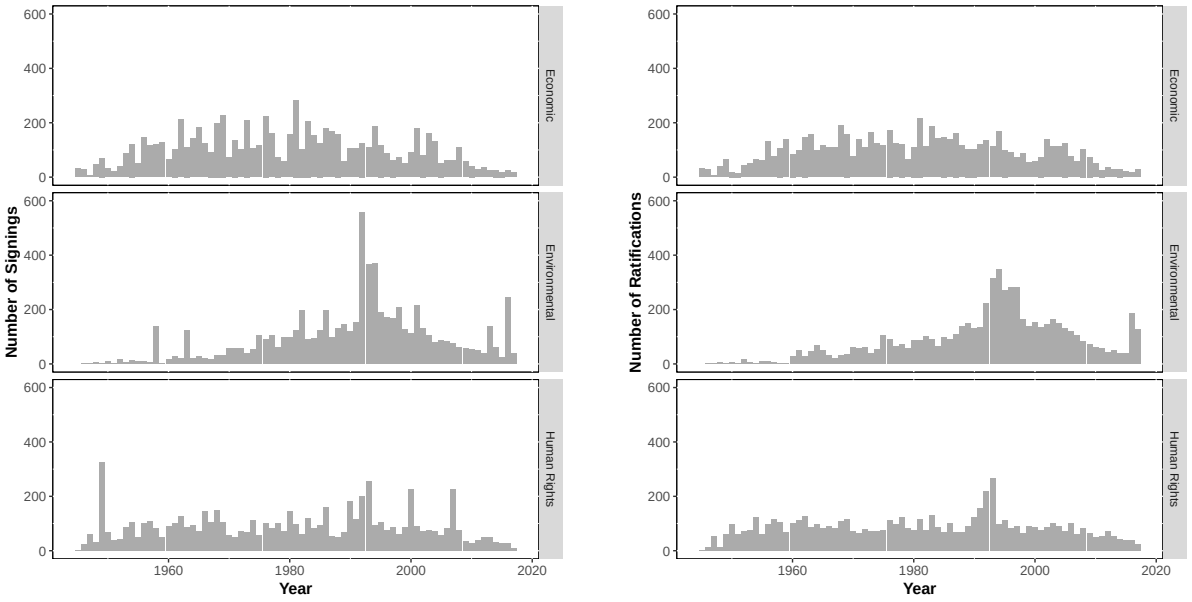
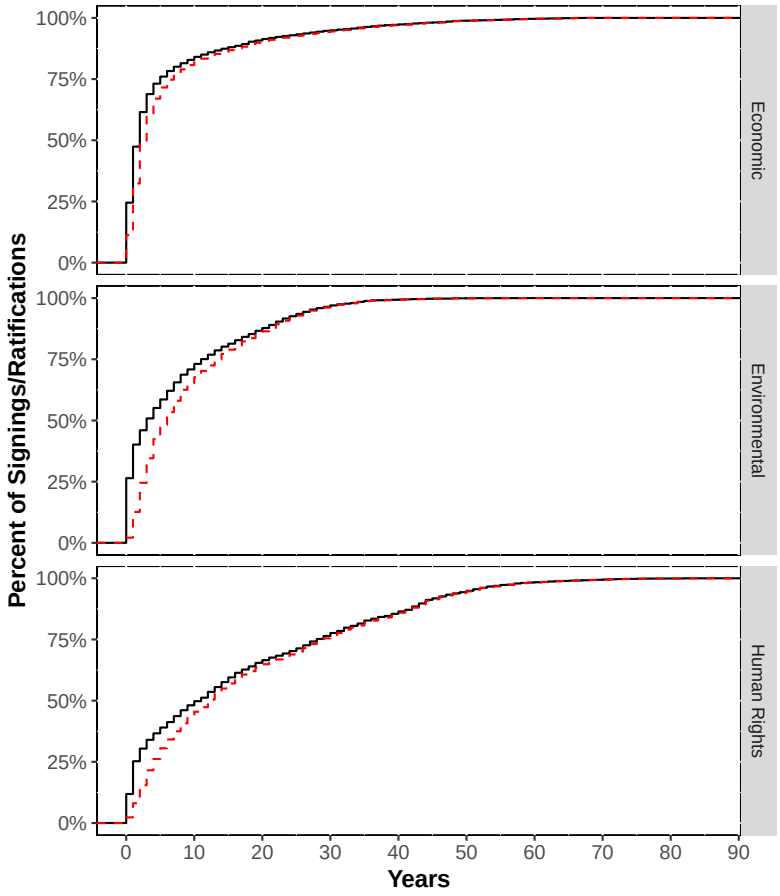


Figure 2 shows the cumulative distributions of signings and ratifications since the year of each treaty introduction. Again as expected, there is a small lag between signings and ratifications within each of the issue areas. Economic laws diffuses the fastest, with 25% of signings taking place in the year of treaty introduction, almost 50% within a year since introduction, and roughly 75% happening within the first 5 years. Environmental, and especially, human rights treaties, are much slower to gain signatories and ratifiers. While environmental treaties receive the same percentage of signatories as economic treaties in the first year, their subsequent growth in support is much slower. Diffusion of human rights follows the least steep rate of adoption.

Figure 3 shows the variation in the number of signatories and ratifiers by issue areas. Economic treaties tend to have fewer signatories and ratifiers than the other two types, which is consistent with a more regional focus of economic cooperation, described above. Human rights treaties tend to have more members, which is consistent with the goal of promoting universal norms. Environmental treaties are less regionalized than economic treaties, but more so than those in the human rights area. This may indicate that environmental problems vary in scope, with some requiring regional and others necessitating universal cooperation. Alternatively, smaller memberships of en-

Figure 2: Time Between Introduction, Signing, and Ratification by Issue

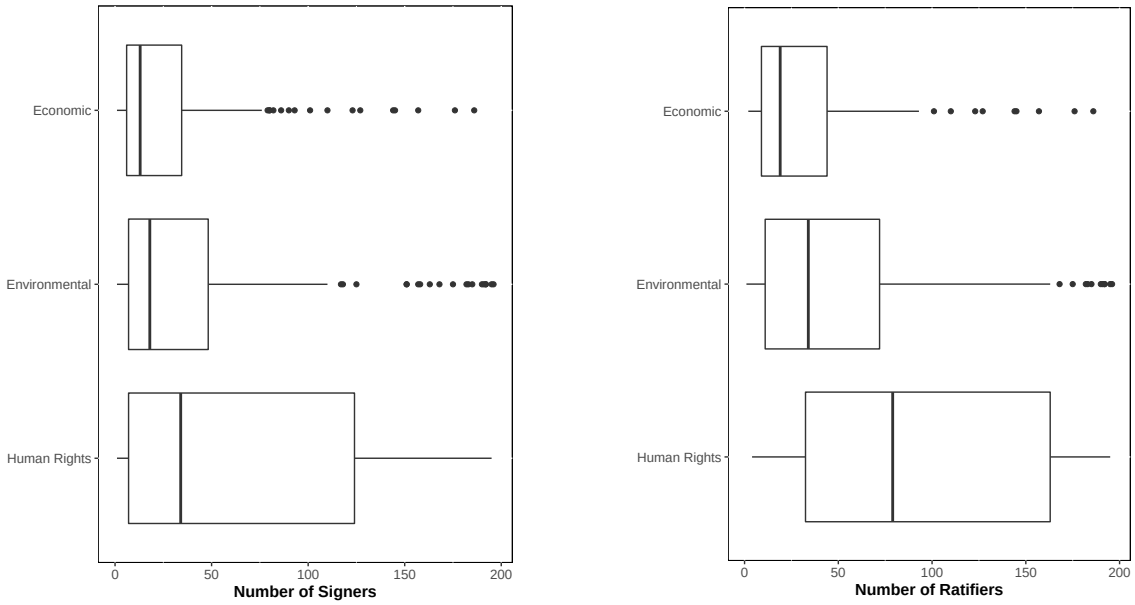


Notes: Black solid line represents signings, red dashed line represents ratifications.

vironmental treaties, compared to human rights treaties, may indicate a lack of global awareness and/or the sense of urgency as it relates to environmental problems.

Figure 4 showcases variation in the adoption cascades for a select number of treaties. Some treaties are overwhelmingly ratified within a few years since their introduction, others exhibit a slower adoption cascade, and others are gradually ratified over long time-periods. Notice, for example, that while the ratification cascade for the 1979 Air Pollution Treaty was steep and quick, ratification of a companion financing treaty was more gradual.

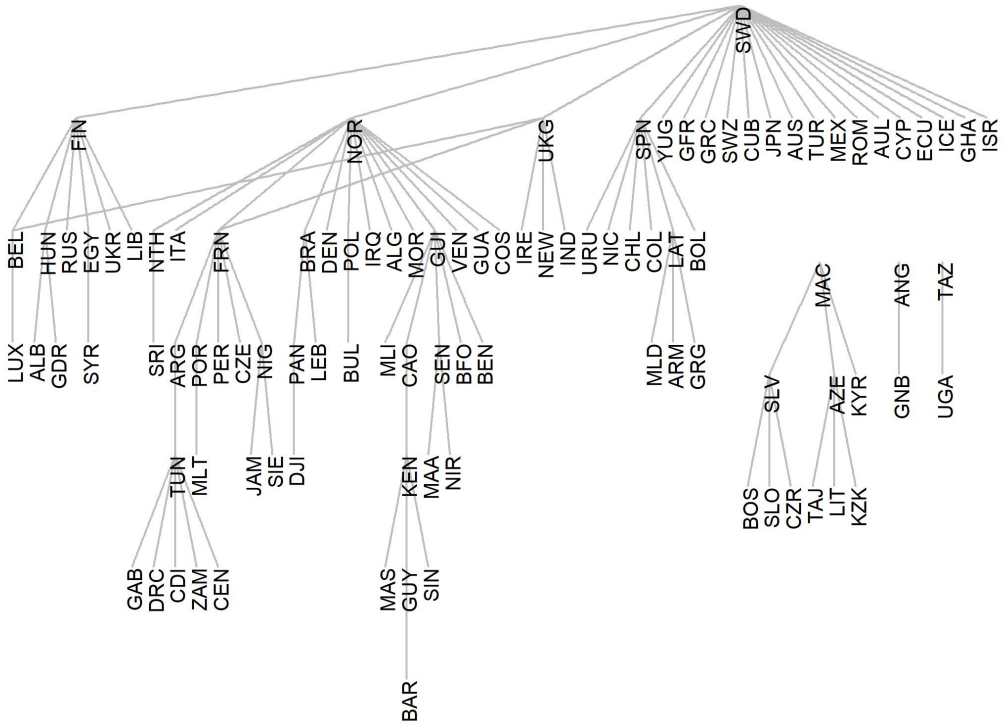
Figure 3: Number of Signatories and Ratifiers by Area



Note: The distribution of ratifiers includes countries that both signed and ratified. The sample of signers is much larger and includes treaties with no ratifiers, which skews the distribution for signers.

Figure 4: Treaty Cascades

Figure 5: Diffusion Network of Human right Treaties

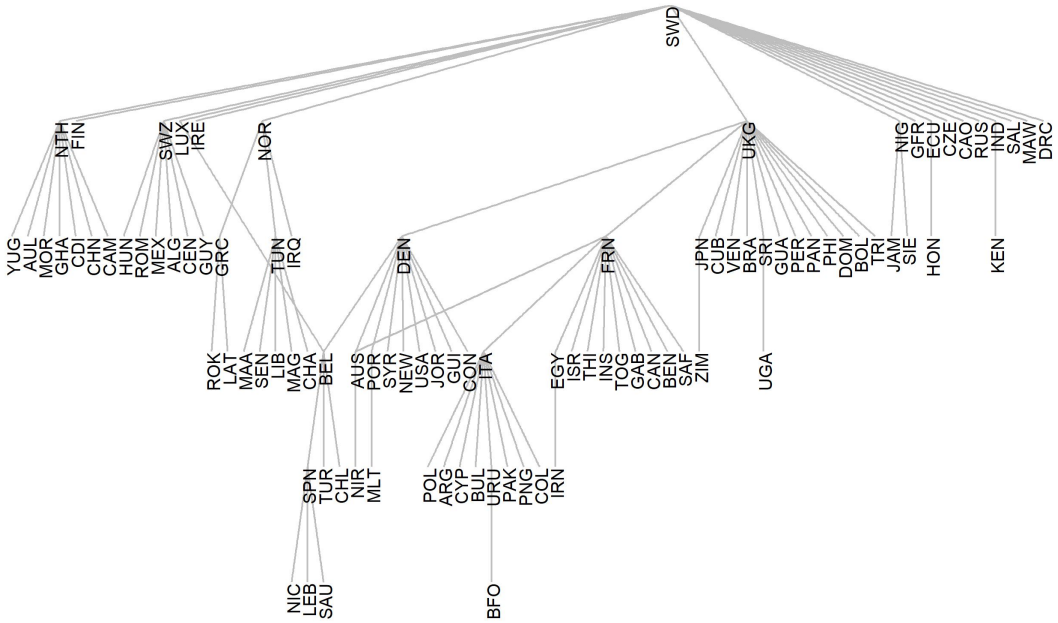


Network Inference Results

Our analysis of international treaties between 1912-2018 using the `NetInf` algorithm returned a tree-network of the most likely diffusion pathways among countries overall and by issue area. In this section, we present descriptive analyses of this inferred network. To reiterate, these results are obtained by using only information on the treaty adoption dates and no other variables.

Figure 5 presents a tree-network visualization of the top 100 most likely diffusion ties, and their most likely sequence, inferred by the algorithm within the area of human rights law. The nodes in this network are countries, and the lines between them represent outgoing diffusion ties from higher to lower tiered nodes, i.e. if there is a link between countries A and B, such that A is positioned above country B, then country B systematically adopts human rights treaties soon after

Figure 6: Diffusion Network of Economic Treaties



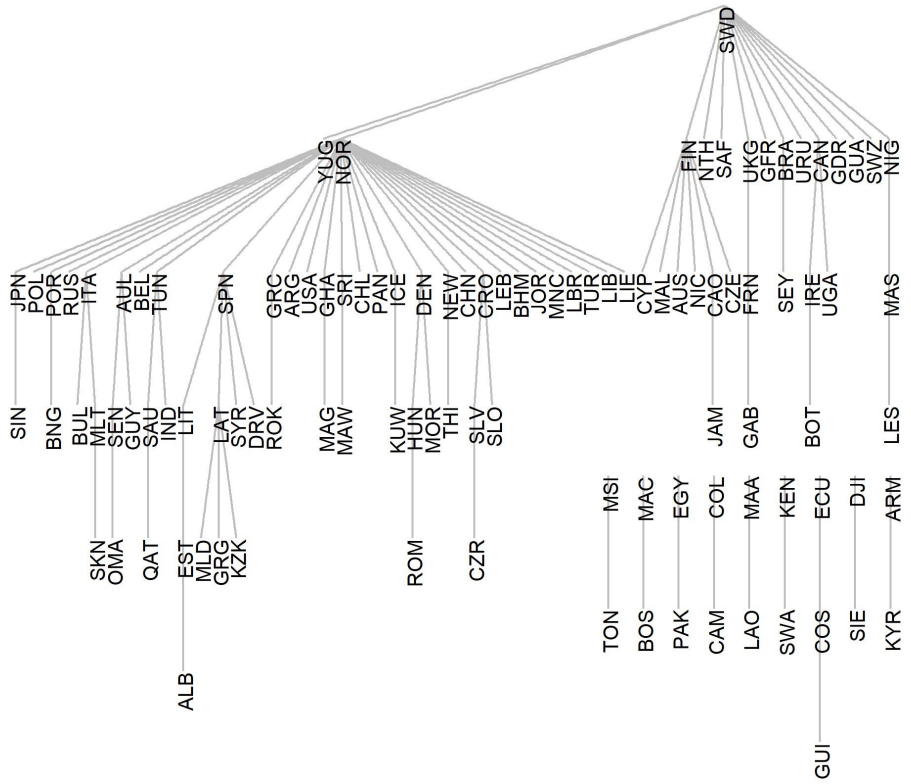
country A does so, and almost never the other way around. We interpret this relationship in the data as evidence that B uses A's adoption as a cue to adopt as well. This visualization essentially shows the likely sequence of adoptions that take place when an adoption cascade starts gaining speed (the first inflection point).

Countries that send a large number of outgoing diffusion ties are said to score high on *outdegree*.[3] Conceptually, we treat countries' outdegree as a measure of their overall influence in the respective issue ares, i.e., influencer-states are the states with the higherst outdegree. Countries that stand out based on their outdegree include France, Sweden, Spain, and Norway—all Western European democracies that one would expect to see on a list of countries that value the promotion of human right law. Notably, only one of these countries is a major power. Figures 6 and 7 show the analogous visualizations for the economic and environmental law, with similar results.

For a more systematic evaluation of the face validity of the inferred diffusion networks, we

[3]In network analysis parlance, a node's outdegree is the total number of its outgoing ties.

Figure 7: Diffusion Network of Environmental Treaties



present lists of the top 20 influencer-states based on the number of states to which they send diffusion ties over the preceding ten-year period in Table 1. The first column presents the results for the entire body of international treaties, that includes the three subsamples (economic, environmental, human rights), but also all treaties that were classified as the "Other" category. Although these lists feature some permanent members of the UNSC, such as the United States, the United Kingdom, and France, neither Russia nor China is identified among the top influencers on any issue. Moreover, the United States appears as a top influencer only in the overall diffusion network. In the three main areas under consideration, the United States appears well outside of the top 20 list, along with Russia and China. All in all, these results show that US, China, and Russia's reluctance to join international treaties is a part of a general pattern that goes beyond a handful highly prominent treaties (e.g., the International Criminal Court, the Kyoto Protocol).

Table 1: Top Influencer-States and Their Out-Degree (1912-2018)

All Treaties		*Economic Treaties*		*Environment*		*Human rights*	
Denmark	67	Sweden	30	Norway	36	**France**	**42**
Sweden	62	**United Kingdom**	**28**	Sweden	18	Sweden	35
Spain	51	**France**	**23**	Spain	13	Spain	34
France	**45**	Switzerland	22	Uruguay	12	Norway	27
United Kingdom	**45**	Denmark	21	Finland	11	Uruguay	25
Hungary	41	Italy	20	Latvia	11	Finland	24
Morocco	40	Tunisia	17	Poland	10	Latvia	23
Norway	36	Mexico	17	**France**	**9**	Hungary	19
Tunisia	35	Egypt	16	Brazil	9	Tunisia	19
United States	**31**	Spain	14	Nigeria	8	**United Kingdom**	**18**
Netherlands	30	Netherlands	14	Algeria	8	Guinea	18
Uruguay	27	Belgium	13	Cyprus	7	Cuba	16
Lithuania	26	Hungary	13	Ireland	7	Mexico	16
Greece	25	Norway	11	Senegal	7	Azerbaijan	15
Bulgaria	25	Greece	11	**United Kingdom**	**6**	Cyprus	13
Latvia	25	Cuba	11	Ghana	6	Netherlands	12
Finland	24	Austria	10	Kenya	6	Ireland	12
Cyprus	23	Germany	9	Italy	5	Argentina	12
Costa Rica	23	Bulgaria	9	Australia	5	Bulgaria	12
Romania	22	Lebanon	9	Canada	5	Egypt	12
Russia	**15**	**United States**	**7**	**Russia**	**3**	**Russia**	**10**
China	**7**	**Russia**	**4**	**United States**	**2**	**United States**	**4**
		China	**1**	**China**	**0**	**China**	**2**

Japan and Germany, the two states that are often regarded as major powers, are also missing from the list of top influencers. The states that do systematically appear in the lists of the top influencers are Sweden, Norway, Denmark, the Netherlands, Austria, and Spain. While generally perceived as influential, they are not commonly treated as the top policy influencers in quantitative international relations research (though see Holzinger, Knill, and Sommerer 2008). In contrast, some qualitative studies have emphasized the role of the Nordic countries, in particular (e.g., Brysk 2009; Sprinz and Vaahtoranta 1994; Hawkins 2004). As noted by these studies, for example, Sweden was among the first drafters of the Convention on the Rights of Persons with Disabilities and the Convention for the Protection of All Persons from Enforced Disappearance (Brysk 2009). Along with Norway, Sweden played the leading role in the promotion of the Convention against Torture (Hawkins 2004).

These results suggest that there may be a different dimension to what constitutes influence in international relation. Rather than solely based on material power and access to a platform, this

Table 2: Top Influencer-States and Their Out-Degree During Cold War (1945-1990)

All Treaties		*Economic Treaties*		*Environment*		*Human rights*	
Denmark	59	Sweden	25	Norway	27	**France**	**41**
Spain	54	**United Kingdom**	**23**	Sweden	21	Sweden	37
Sweden	53	Denmark	20	**United Kingdom**	**16**	Spain	27
Tunisia	43	Italy	20	**United States**	**10**	Tunisia	26
France	**43**	**France**	**18**	Tunisia	7	Norway	21
United Kingdom	**41**	Tunisia	17	Spain	7	**United Kingdom**	**15**
Norway	32	Norway	15	Italy	6	Yugoslavia	13
Morocco	31	Belgium	13	Finland	6	Guinea	13
Hungary	28	Austria	12	**France**	**6**	Israel	13
West Germany	26	Netherlands	11	Denmark	6	Bolivia	10
Yugoslavia	24	Switzerland	10	Japan	5	Costa Rica	10
Egypt	22	Hungary	8	East Germany	4	Greece	9
United States	**22**	Spain	7	Poland	4	Ecuador	9
Netherlands	21	Egypt	6	Portugal	3	Finland	8
East Germany	21	Algeria	6	Switzerland	3	Cuba	8
Finland	19	Argentina	5	Canada	3	East Germany	8
Japan	19	Japan	5	Morocco	3	Syria	8
Jordan	17	Poland	5	Malaysia	2	Netherlands	7
Austria	16	Australia	5	**Russia**	**2**	Cyprus	7
Cuba	14	Ecuador	5	Greece	2	India	7
Russia	**5**	**United States**	**4**	**China**	**0**	**Russia**	**5**
China	**3**	**Russia**	**3**			**United States**	**0**
		China	**0**			**China**	**0**

type of influence stems from a combination of policy expertise, the willingness to act as a policy innovator and leader within a given issue area, but also the willingness to cooperate with other actors. While major powers, such as the United States, China, and Russia often leverage their support from major international treaties in return for concessions on the treaty design or other issues, the states we identify as influencers treat the role as a benefit in itself.

Next, we explore these results in the temporal context. Table 2 presents the list of the top 20 influencers in each area for the period between 1945–1990, and Table 3 shows the same lists for the post-Cold War period (1991–2018).[4]

The Cold War period lists look very similar to those of the entire time frame, with the exception of the issue area of environmental law. Whereas neither Russia nor the United States appears on the list of the top 20 influencers within the environmental law in the analysis for the entire time

[4]The newly-independent states that formed at the beginning of the post-Cold War period generally adopt the same treaties are their predecessor states. Since these adoptions are more legal technicalities rather a part of the cascade, we minimize their weight by excluding any treaties that were initiated before the start of the time period under study. Thus the post-Cold war period only includes treaties that were negotiated in 1991 or after.

frame (1912–2018), both of these states are a part of such a list for the shorter, Cold War time frame, albeit Russia/Soviet Union is only in the 19th spot. This change suggests that, while the United States exercised its policy leadership within the environmental law during the Cold War time frame, it chose to cut back on its involvement after the Cold War.

Another prominent change between the two time periods is that in the United Kingdom's position on the list. With the exception of the area of environmental law, the United Kingdom is consistently among the top 10 influencers both overall and in the Cold War period. In the post-Cold War period, however, it drops out of the list on all but the economic treaties. France's position on the post-Cold War lists also drop multiple spots, leaving the top 20 altogether on the issue of economic law. Both the United Kingdom and France, in other words, choose to join other major powers in taking more of a backseat in the process of international treaty adoption.

These results provide support for both hypotheses advanced in the theory section. Consistent with the first hypothesis, our analysis allows us to discern clear persistent patterns in treaty adoption, with some states leading the process, and others lagging behind. As tentative support for the second hypothesis, we also observe that states we generally this of as major and regional powers do not consistently appear high on the influencer lists. In the next section, we perform a formal statistical test of the second hypothesis.

A Case Study of the United States

So far, we have argued and shown empirically that major and regional powers, especially the United States, tend not to take on the role of influencer-states in the treaty diffusion process. Well cognizant of their global or regional influence, these states often withhold their support as leverage for extracting additional benefits or concessions. In this section, we further explore the evidence for this argument by focusing on the United States's treaty participation.

Figure 8 displays a summary of the United States' and Sweden's percentile ranks in the sequence of treaty ratification (or equivalent) for the treaties in our sample. Out of 764 treaties, the United States had ratified 308 or a little over 40% of treaties, while Sweden ratified 502 or approximately 65%. Among the treaties it ratified, the United States led the ratification process (was

Table 3: Top Influencer-States and Their Out-Degree After Cold War (1991-2018)

All Treaties		*Economic Treaties*		*Environment*		*Human rights*	
Norway	27	Costa Rica	13	Norway	19	Finland	18
Finland	21	Gabon	10	Australia	10	Spain	12
Sweden	17	Sweden	9	Canada	8	Slovakia	12
Canada	17	Switzerland	9	Slovenia	5	Sweden	9
Spain	13	Netherlands	8	Mauritius	5	Ireland	9
Panama	12	Ecuador	7	Jordan	5	South Korea	7
France	**12**	**United Kingdom**	**7**	Portugal	4	Lithuania	5
India	12	India	6	Ghana	4	Norway	5
Slovakia	11	Finland	5	Yemen	4	Bulgaria	5
Netherlands	10	Ireland	5	**France**	**3**	Hungary	5
Slovenia	10	**United States**	**5**	Denmark	3	Luxembourg	4
Costa Rica	10	Norway	5	Estonia	3	**France**	**4**
Hungary	10	Mexico	5	Guinea	3	Philippines	4
Denmark	9	Greece	4	India	3	Mauritius	4
Switzerland	9	Ivory Coast	3	Spain	3	Seychelles	4
United States	**9**	Italy	3	United Arab Emirates	3	South Africa	4
Indonesia	8	Togo	3	Italy	3	Albania	3
Italy	8	Peru	3	Czech Republic	2	Portugal	3
Ecuador	8	Jamaica	3	Croatia	2	Italy	3
Uruguay	8	Canada	3	Saudi Arabia	2	Denmark	3
United Kingdom	**6**	**China**	**1**	**United Kingdom**	**1**	**United Kingdom**	**1**
Russia	**1**	**France**	**0**	**United States**	**1**	**China**	**1**
China	**1**	**Russia**	**0**	**Russia**	**0**	**Russia**	**1**
				China	**0**	**United States**	**1**

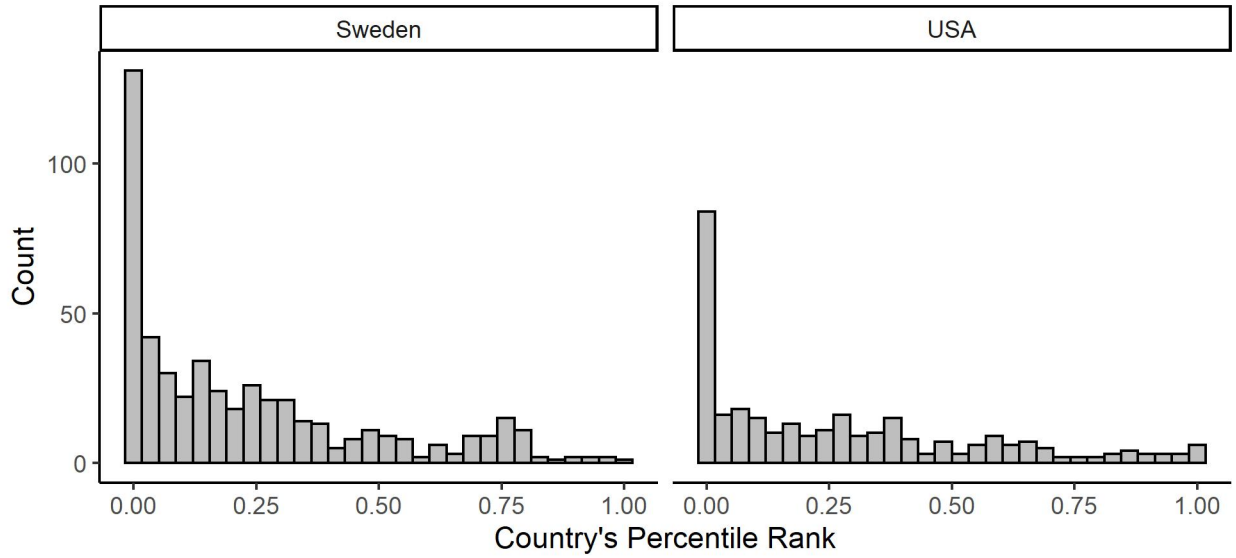
among the first to ratify) in only 80 cases, compared to Sweden that led the ratification process in 122 cases.

To assess the extent to which ratification by the United States triggers a cascade of ratifications throughout the international system, Figure 9 shows the number of states that ratified within a year of the United States (for the subset of treaties that the United States was among the first to ratify).[5] The figure provides some evidence that early adoption by the United States triggers a cascade of adoptions. In about 75% of cases, adoption by the United States is followed by anywhere between 5 and 96 adoptions within a year.

As a further demonstration of the paper's theoretical logic, we take a closer look at the treaty with the largest cascade of 96 follow-up signers, the agreement establishing the International Fund for Agricultural Development (IFAD) with the goal of providing financial assistance to developing

[5]The figure omits seven treaties that were ratified simultaneously and unanimously, since the concept of influence, as it is defined in this paper, presupposes that states will adopt as a consequence of observing an adoption (and possibly additional convincing) by an influencer-state. Simultaneous and unanimous adoption implies no need for influence.

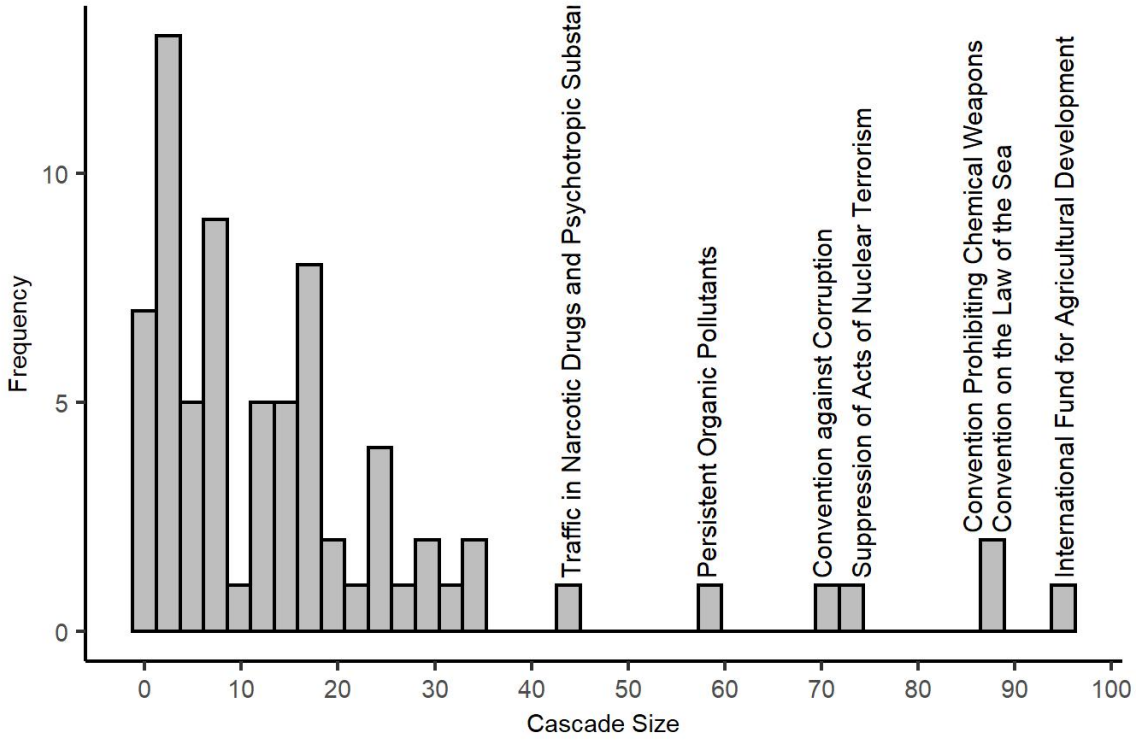
Figure 8: US' and Sweden's Percentile Rank in the Sequence of Treaty Adoption



states. The United States initially opposed the fund, arguing for a "less rigid, more informal" coordinating agency (Talbot 1980, 263). From its perspective, committing the food reserved to the fund meant losing food aid as a political tool. Likewise, the French delegation also expressed its opposition to the fund, grounding it in their long-term policy of targeting their developmental aid efforts on former colonies (Talbot 1980, fn. 15). Once the Organization of Petroleum Exporting States (OPEC) indicated its willingness to make a substantial financial commitment to the fund, however, the United States changed its position to that of reluctant acceptance, which shortly thereafter turned into enthusiastic advocacy (Talbot 1980). Recognizing the fund's importance to US's sizeable agricultural sector, US President Ford proposed a $200 million commitment to the fund, which was quickly passed by Congress. With the US on-board, a number of other countries, including West Germany, the Netherlands, Canada, the United Kingdom, and Saudi Arabia followed suit pledging additional, albeit smaller, financial commitments, with the goal to raise $1 billion.

After a considerable fundraising campaign, the negotiations came to a halt, when it turned out that the total pledges added up to only $930 million, rather than the goal of $1 billion. The sticking point was that both the US and the OPEC made their commitments conditional on getting at least $1 billion of total contributions. The United States, in particular, stipulated that should the goal of

Figure 9: Distribution of the Number of Ratifications within a Year of That by the United States



$ 1 billion is not met, their own contribution will be reduced proportionately. This strong-arming technique prompted a second round of fund-raising, with several countries agreeing to increase their contributions so as to meet the $ 1 billion goal. Notably, even once the pledges met the stipulated target in December, 1975, the United States continued delaying its final acceptance, so as to leave some negotiating room on additional issues, such as the fund's site, the election of the IFAD's president, and the US candidacy for the office of IFAD's vice-president (Talbot 1980).

This case study provides several pieces of additional evidence for our theoretical argument. First, it demonstrates that major powers can and do play the role of the influencer-state for a select subset of treaties. In the case of IFAD, the United States chose to lead the groundwork for the fund's creation, recognizing the fund's benefits for its vast agricultural sector. Second, the case substantiates our argument that major powers' trade their support for concessions, and expect a significant say in shaping the treaties. Despite its clear interest in being a part of IFAD, the United States continued putting in additional conditions long after its original stipulation of $1 billion

pledges was met. It did so, even at the risk of unraveling the negotiations. At one point in the negotiations, it threatened to withdraw its support over a relatively trivial amount of $ 70 million. This type of a tough, and at times seemingly reckless, negotiating strategy is only available to major powers, who do not stand to lose much in case of a treaty's failure. In case of the United States, a failure to agree on IFAD would simply mean a reversion to the previous policy of exchanging developmental aid for political concessions.

Third, the case illustrates how, in the face of non-cooperative behavior by major powers, other states step in to help save the deal. In the case of IFAD, the states that played this role were Norway, West Germany, Canada, Japan, along with some of the OPEC states. Finally, the case shows how, as long as the treaty has even tentative support from a subset of major powers, the negotiations can proceed without the support of other influential states or groups of states. Neither the United States nor France originally supported IFAD, but they both changed their positions after the commitment from the OPEC.

Determinants of Influence in the Diffusion Network

In this section, we perform additional statistical analysis to evaluate at the determinants of a country's influence in the inferred latent networks of treaty diffusion. The dependent variable in this analysis is a country's outdegree in the treaty diffusion network estimated each year, measured as the total number of outgoing diffusion ties. Because our dependent variables represent a count of ties sent out to other states, we utilize a negative binomial regression model.[6] This leads us to specify models for four dynamic networks: those for the three policy areas along with one for all treaties combined.

According to Hypothesis 2, we expect that major and regional powers will, on average, send fewer outgoing diffusion ties, as these states tend to be late adopters. Our primary independent variable is a state's major power status coded based on whether a country holds a permanent seat on the UN Security Council. We include a series of control variables that help model the two

[6]We recognize that outdegree is technically capped at the number of other countries in the dataset. But we are comfortable using a distribution for unbounded counts, as the maximum out-degree observed is never close to the total number of countries in the system.

criteria of global influence: the availability of a platform, and the ability to provide a model for emulation. Specifically, we include a binary measure of *Democracy*, coded as 1 if a state scores 7 or above on the Polity scale (Marshall and Jaggers 2014). We control for power using the log of states' *GDP per capita*, and per capita *GDP Growth*, obtained from (Singer, Bremer, and Stuckey 1972) **this was the source for energy**.

To measure the ability to disseminate ideas and information, we control for *Total Trade*, *Number of Alliances*, *IGO Memberships*, and *Number of INGO headquarters* located in a state. Trade, alliance, and IGO data were obtained from the Correlates of War Project, while the data on INGO headquarters come from Ryu (2020). The latter variable counts the number of headquarter of INGO with consultative status in UN Economic and Social Council (ECOSOC).

Since the dependent variable, *Outdegree* in the diffusion network, is measured from a network estimated using data from the prior ten years we want to account for possible time trends beyond those captured by our covariates. First, we add in a linear time trend and an indicator variable for the *post Cold War* period along with an interaction for the two to capture a shift in the time trend after the Cold War. Second, to evaluate more extensive changes in the effects of key variables after the Cold War, we report separate estimates for years before and after the end of the Cold War, retaining a time trend within each. Lastly, because our latent networks use the prior ten years of treaty activity there will be substantial overlap in the data used to estimate the latent network each year and therefore in our outdegree variable from year to year. We address this by including lagged outdegree in all of our models.

Table 4 presents the results of these analyses the entire time period, and Tables 5– 6 separate the analysis into the Cold War and post-Cold War subsamples. The first model in each table reports the results for the entire sample of treaties, while models two through four show the results by issue area.

In both the full time period and the Cold War subsample, the effect of *Major Power* is negative and statistically significant for economic and human rights treaties but not for the environmental treaties subsample. It is significant during the Cold War period for all treaties, but the effect drops

to near zero in the subsequent period. When these two periods are combined in Table 4 the overall effect is larger but not significant (p=0.064). These results provide some support for Hypothesis 2, which posited that major powers are less likely to act as influencers in treaty diffusion cascades. In the post-Cold War the coefficient on *Major Power* is also negative, but only statistically significant in the subsample of economic treaties. This suggests that, in the post-Cold War period, major powers became somewhat more willing than previously to influence treaty diffusion cascades.

The only other consistent predictors of influence in the treaty diffusion network are *IGO Memberships* and *GDP per capita*. *IGO Memberships* is positive and statistically significant in all models, except the post-Cold War subsample of human rights treaties. This indicates that states with more IGO memberships are more likely to play an active role in treaty diffusion. This is consistent with our theory, as IGO memberships are often treated as venues for diffusion of ideas and norms (Finnemore 1993). *GDP per capita* has a nonlinear effect, with the linear term positive and the squared term negative in all models. Both are significant in all of the full period and Cold-War period models. After the Cold War they are only significant in the models for all treaties and the subsample of environmental treaties.

Conclusion

Identifying and ranking the most influential countries within various issue areas is a long-term research interest of international relations scholars. Much research equates influence with the status of a major or regional power (Lake 2009; Thies and Nieman 2017). Major power status is usually equated with material capabilities or major influence over the international system (Fordham 2011; Copeland 2013). Many studies, for example, equate this status with holding a permanent seat in the United Nations Security Council (UNSC), i.e. the United States, the United Kingdom, France, the Soviet Union/Russia, China, although this list is sometimes modified to include Germany and Japan, as the latter are comparable in terms of their economic and material power. Also based on economic and material capabilities, lists of regional powers usually include the so-called BRICS states (Brazil, Russia, India, China, and South Africa), or the members of the Organization of Economic Cooperation and Development (OECD). The drawback of using material and economic

power, or any other factors, as the *a priori* determinants of major power status, is that such a coding scheme does not allow for *a posteriori* analysis of the factors that determine why some states become more influential over the diffusion of norms in various issue areas.

In contrast, the advantage of our approach is that is allows us to construct a list of influencers as completely exogenous to the major power status, economic might, nuclear capabilities, or any other covariate, but solely based on the persistent patterns in the over-time network of norm diffusion (Desmarais, Harden, and Boehmke 2015). The resulting list and ranking may then be easily used to analyze the factors that precipitate norm diffusion or make some states more influential in certain policy areas.

Our results show great promise for understanding the spread of international norms and the treaties that embody them. Applying the `NetInf` algorithm to the diffusion of a very large sample of international treaties provides the opportunity to develop a broad understanding of how norms spread through the international system. This high level view offers a different perspective than results from the diffusion of a single or small number of treaties. This high-level perspective provides an opportunity to study the factors that determine leadership in treaty and norm diffusion in general, as well as shining light on patterns of leader-follower pairs and clusters.

In future iterations we plan to explore the structures of the policy-specific, latent diffusion networks in more detail to identify some of the aforementioned relationships. We also plan to draw on the policy diffusion literature to develop specific hypotheses about the structure of the estimates to guide an inferential analysis of the structure of the diffusion networks. While the literature on diffusion between states or subnational units has well-developed expectations about the effects of state or dyad-level relationships, little attention has been given to network-level relationships. Yet the mechanisms of diffusion suggest such patterns ought to exist: for example, competition ought to produce positive reciprocity while emulation by leader states would correspond to positive effects of out-degree. We plan to develop and test these hypotheses more fully in the next iteration.

Finally, we also intend to draw on the text of the treaties themselves. This could involve topic modeling that would provide a different way to split the treaties into different groupings.

Or it could involve incorporating text-based measures of the treaties such as length or syntactical complexity. Diffusion mechanisms such as learning will have greater influence for more complex treaties whereas emulation may matter more for less complex treaties.

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Table 4: Negative Binomial Model of Outdegree, 1951-2005

	All Treaties	Economic	Human Rights	Environment
Lagged Degree	0.078∗	0.160∗	0.161∗	0.246∗
	(0.010)	(0.023)	(0.018)	(0.075)
Democracy	−0.008	−0.100	0.124	−0.004
	(0.073)	(0.093)	(0.100)	(0.136)
Major Power	−0.459	−0.703∗	−1.393∗	0.238
	(0.248)	(0.266)	(0.440)	(0.206)
Regional Power	0.086	0.155	−0.046	0.199
	(0.133)	(0.217)	(0.196)	(0.245)
GDP per capita (log)	1.441∗	1.966∗	1.802∗	2.849∗
	(0.468)	(0.665)	(0.548)	(0.938)
GDP per capita (log) squared	−0.084∗	−0.116∗	−0.111∗	−0.163∗
	(0.028)	(0.040)	(0.032)	(0.054)
GDP Growth	0.001∗	−0.002	−0.001	−0.002
	(0.000)	(0.002)	(0.001)	(0.002)
IGO Memberships	0.016∗	0.026∗	0.010∗	0.026∗
	(0.003)	(0.004)	(0.003)	(0.006)
Number of INGO Headquarters	0.000	0.003	0.002	0.002
	(0.001)	(0.001)	(0.002)	(0.001)
Trade per GDP (log)	0.078∗	0.045	0.100∗	−0.006
	(0.036)	(0.057)	(0.046)	(0.082)
Number of Alliances	−0.003	−0.008∗	−0.001	−0.010∗
	(0.003)	(0.004)	(0.003)	(0.005)
Post Cold War	−0.089	−0.324	−0.540	0.453
	(0.215)	(0.323)	(0.293)	(0.518)
Linear time trend	−0.003	−0.008	−0.006	0.044∗
	(0.004)	(0.006)	(0.004)	(0.008)
Post Cold War × Time trend	0.000	0.004	0.011	−0.017
	(0.005)	(0.007)	(0.006)	(0.011)
constant	−5.603∗	−9.035∗	−7.103∗	−16.172∗
	(1.908)	(2.755)	(2.299)	(4.072)
Dispersion (α)	0.289∗	0.288∗	0.351∗	0.482∗
	(0.042)	(0.052)	(0.067)	(0.084)

Note: N=6865. p<0.05. Robust standard errors reported in parenthesis.

Table 5: Negative Binomial Model of Outdegree, 1951-1990

	All Treaties	Economic	Human Rights	Environment
Lagged Degree	0.093∗	0.195∗	0.181∗	0.422∗
	(0.013)	(0.032)	(0.020)	(0.108)
Democracy	−0.103	−0.175	0.110	−0.235
	(0.091)	(0.133)	(0.111)	(0.242)
Major Power	−1.161∗	−1.203∗	−1.975∗	−0.212
	(0.332)	(0.331)	(0.512)	(0.304)
Regional Power	−0.029	0.035	−0.140	0.202
	(0.152)	(0.246)	(0.206)	(0.287)
GDP per capita (log)	1.717∗	2.760∗	2.561∗	3.083∗
	(0.697)	(1.087)	(0.752)	(1.391)
GDP per capita (log) squared	−0.100∗	−0.164∗	−0.157∗	−0.177∗
	(0.042)	(0.067)	(0.045)	(0.081)
GDP Growth	0.001∗	−0.007∗	−0.001	−0.006
	(0.000)	(0.003)	(0.002)	(0.005)
IGO Memberships	0.020∗	0.028∗	0.019∗	0.033∗
	(0.004)	(0.006)	(0.004)	(0.008)
Number of INGO Headquarters	0.006	0.011	−0.020	0.009
	(0.003)	(0.005)	(0.014)	(0.005)
Trade per GDP (log)	0.050	0.024	0.078	−0.066
	(0.039)	(0.071)	(0.047)	(0.088)
Number of Alliances	−0.003	−0.006	−0.004	−0.014∗
	(0.003)	(0.005)	(0.004)	(0.007)
Linear time trend	−0.006	−0.010	−0.010∗	0.033∗
	(0.004)	(0.007)	(0.005)	(0.010)
constant	−7.037∗	−12.495∗	−10.492∗	−17.434∗
	(2.844)	(4.393)	(3.095)	(5.975)
Dispersion (α)	0.316∗	0.370∗	0.319∗	0.768
	(0.050)	(0.071)	(0.065)	(0.150)

Note: N=4598. p<0.05. Robust standard errors reported in parenthesis.

Table 6: Negative Binomial Model of Outdegree, 1991-2005

	All Treaties	Economic	Human Rights	Environment
Lagged Degree	0.060∗	0.116∗	0.131∗	0.154∗
	(0.008)	(0.017)	(0.020)	(0.046)
Democracy	0.130	−0.089	0.216∗	0.161
	(0.084)	(0.119)	(0.109)	(0.149)
Major Power	−0.051	−0.670∗	−0.528	0.225
	(0.249)	(0.327)	(0.608)	(0.224)
Regional Power	0.212	0.290	0.059	0.279
	(0.121)	(0.175)	(0.203)	(0.218)
GDP per capita (log)	0.919∗	1.113	0.832	2.928∗
	(0.388)	(0.581)	(0.538)	(1.127)
GDP per capita (log) squared	−0.055∗	−0.065	−0.053	−0.169∗
	(0.024)	(0.034)	(0.033)	(0.066)
GDP Growth	0.001	0.002	−0.000	−0.001
	(0.001)	(0.002)	(0.002)	(0.003)
IGO Memberships	0.012∗	0.025∗	0.005	0.023∗
	(0.003)	(0.004)	(0.003)	(0.005)
Number of INGO Headquarters	0.000	0.003∗	0.000	0.002
	(0.001)	(0.001)	(0.002)	(0.001)
Trade per GDP (log)	0.083	0.030	0.104	0.036
	(0.045)	(0.064)	(0.059)	(0.091)
Number of Alliances	−0.002	−0.009∗	0.003	−0.007
	(0.003)	(0.004)	(0.003)	(0.005)
Linear time trend	0.001	−0.003	0.008	0.026∗
	(0.004)	(0.004)	(0.005)	(0.009)
constant	−3.216∗	−5.619∗	−3.412	−15.437∗
	(1.536)	(2.455)	(2.127)	(4.701)
Dispersion (α)	0.176∗	0.127∗	0.315∗	0.208∗
	(0.037)	(0.046)	(0.065)	(0.082)

Note: N=2267. p<0.05. Robust standard errors reported in parenthesis.

Table 7: Negative Binomial Model of Outdegree, 1951-2005 (no lag)

	All Treaties	Economic	Human Rights	Environment
Democracy	−0.116	−0.247	−0.013	−0.114
	(0.120)	(0.158)	(0.180)	(0.198)
Major Power	0.021	0.042	0.261	0.290
	(0.283)	(0.422)	(0.469)	(0.387)
Regional Power	−0.157	−0.029	−0.261	0.055
	(0.290)	(0.404)	(0.471)	(0.331)
GDP Growth	0.001∗	−0.001	−0.002	−0.003
	(0.000)	(0.002)	(0.002)	(0.003)
GDP per capita (log)	1.993∗	2.286∗	2.290∗	1.484
	(0.623)	(0.913)	(0.893)	(1.076)
GDP per capita (log) squared	−0.111∗	−0.130∗	−0.135∗	−0.069
	(0.038)	(0.054)	(0.054)	(0.063)
IGO Memberships	0.047∗	0.061∗	0.042∗	0.053∗
	(0.004)	(0.005)	(0.006)	(0.006)
Number of INGO Headquarters	0.001	0.001	−0.005∗	0.001
	(0.002)	(0.001)	(0.002)	(0.002)
Trade per GDP (log)	0.100	0.090	0.137	−0.093
	(0.062)	(0.077)	(0.085)	(0.114)
Number of Alliances	−0.009	−0.019∗	−0.009	−0.019∗
	(0.005)	(0.007)	(0.007)	(0.006)
Post Cold War	−0.196	−0.173	−0.676	0.609
	(0.294)	(0.379)	(0.401)	(0.607)
Linear time trend	−0.011	−0.018∗	−0.015∗	0.054∗
	(0.006)	(0.007)	(0.007)	(0.011)
Post Cold War × Time Trend	−0.002	−0.005	0.009	−0.023
	(0.007)	(0.008)	(0.009)	(0.014)
constant	−8.593∗	−11.166∗	−9.470∗	−12.867∗
	(2.554)	(3.717)	(3.648)	(4.556)
Dispersion (α)	0.755∗	0.859	1.329∗	1.010
	(0.088)	(0.154)	(0.180)	(0.197)

Note: N=6866.∗ p<0.05. Robust standard errors reported in parenthesis.