The Structure and Accelerators of International Treaty Cascades*

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Abstract

What drives momentum in international treaty adoption? While scholars widely agree that norm cascades often depend on early support from key states, we know surprisingly little about how treaty cascades unfold in practice or which states are most influential in shaping them. We develop a theory that explains the distinct roles states play in the process of diffusion of international law. We then test this theory using a novel dataset on the timing of country-level adoptions for more than 700 multilateral treaties during 1946-2016. Employing a network-based inference algorithm, we analyze the sequences of treaty adoption to infer which states act as critical catalysts in treaty diffusion. Our results highlight that *influencer*-states—those that spur cascades—do so by offering a credible model for emulation and have access to a platform to mobilize support. Our results allow us to 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. The scale and diversity of this legal architecture make it nearly impossible for any single actor to design the system in its entirety to suit its own interests. Yet despite this decentralization, international treaty law exhibits persistent patterns in how treaties emerge, spread, and gain traction. This article identifies, describes, and explains those patterns.

Treaty-making is a delicate and time-intensive process. While the benefits of shaping treaty content are substantial—ranging from market access and first-mover advantages to long-term influence over global norms—successfully negotiating a multilateral agreement requires careful coalition-building. Influence is not always synonymous with material power: major powers that push too hard risk alienating others or derailing negotiations altogether. Instead, treaty-making often involves bargaining over opt-outs, exceptions, and legal language designed to minimize the cost of joining.

Although scholars widely agree that norm cascades often hinge on early support from key states (Finnemore and Sikkink 1998; Elkins and Simmons 2005), we know little about how treaty cascades unfold in practice or which states are most influential in driving them. Once a treaty opens for signing, which states act as critical catalysts? And what characteristics of early joiners shape the incentives for others to follow?

We answer these questions by developing and testing a network-based theory of treaty adoption. While some treaties gain momentum quickly, others stall. We begin with a core premise: adopting a treaty confers long-term benefits but also imposes short-term costs—most notably, the need to harmonize domestic law with treaty standards. For the states that helped shape the treaty—what we call influencer-states—these costs are relatively low. For other states, the cost of accession is proportional to how dissimilar their domestic institutions are from those of the influencers. Thus, a state's place in the temporal sequence of treaty signings offers a proxy for its role in shaping the agreement: earlier adopters tend to be those most closely aligned with the treaty's design.

The perceived value of joining a treaty increases with the number of existing members. Early on in the cascade, costs are clearer than benefits, and the treaty's prospects of wide-spread adoption are uncertain. Prospective joiners look for available indicators of the treaty's potential success, the most apparent of which are the characteristics of those who join before them. We argue that there are three specific characteristics or criteria of early adopters that signal potential success: the ability to provide a tested model for emulation, access to a platform to recruit support for the treaty, and a commitment to cooperate on equitable terms. When these criteria are not met, adoption may stagnate, a treaty never diffusing beyond a handful of its creators.

To evaluate this argument, we use data on treaty adoptions covering more than 700 multilateral treaties across multiple domains of international law. We conceptualize cascades as temporal sequences of country-level accessions and use a network inference algorithm to uncover the "typical" or the most likely pathway of state-to-state diffusion from a large number of observed sequences of individual treaty adoptions. The result is a tree-like network. At the root(s) of the tree are the few early adopters. As the treaty continues to spread and the number of pathways 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 timed 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: as the treaty cascade is ongoing, which of its aspects make it more or less likely to persist and succeed? In other words, what are the cascade-level determinants of adoption? An individual country's relative position within the estimated latent diffusion network—who preceded it and who followed—provides insight into its capacity to foster cooperation among states with divergent interests. Unlike traditional measures of power, such as military strength or trade asymmetry, our approach captures a more subtle form of influence: the ability to build coalitions and set legal precedents others choose to follow. While major powers may possess this potential, we find that middle powers often play this role.

Finally, we explore the structural determinants of treaty cascades. Using inferential network analysis, we show that a state's influence in the diffusion network is shaped by its prosperity, democratic institutions, and geopolitical standing. At the dyadic level, diffusion is more likely between states that are geographically proximate or share institutional, linguistic, or colonial ties.

The remainder of the article proceeds as follows. The next section situates our argument within the literature on international law and norm diffusion. We then develop the theoretical framework and derive testable predictions. After introducing the data and methodology, we present our empirical results. We conclude by summarizing our contributions and identifying avenues 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 international pressures and incentives. There is abundant evidence that the probability of adoption depends on domestic constraints (Chyzh 2014; Köke and Lange 2017). Human rights researchers argue that states may join treaties as a cheap signal to international or domestic audiences. 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 2010), though this effect is moderated by the presence of effective domestic judiciaries (Powell and Staton 2009; Conrad 2014; Conrad and Ritter 2013, 2019). Democracies and newly democratized states may join 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 join international environmental treaties (Bättig and Bernauer 2009), a finding motivated in the public goods allocation (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).

Most existing explanations model treaty participation in static terms. However, the process of treaty adoption is actually dynamic. It starts with treaty negotiation, in which interested parties propose, debate, and eventually agree on the specific language of the treaty. Once the treaty opens up for signatures, countries take turns reviewing and signing or negotiating additional amendments. As a result, some countries sign right away, while others may take months or years.

From a dynamic perspective, by signing a treaty, states join a group of those that acceded before them, which implies that each country's decision is affected by those of other joiners. International explanations of treaty participation emphasize this by positing diffusion processes such as economic competition or adaptation (Elkins, Guzman, and Simmons 2006; Franzese and Hays 2008; Hays 2009; Plümper, Troeger, and Winner 2009; Chyzh 2016), 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 conduits for transmitting international norms. While geographical proximity is 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 spreads, quickly or gradually, to the rest of the international community (Finnemore and Sikkink 1998; Elkins and Simmons 2005; Elkins, Ginsburg, and Simmons 2013). 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).

The actual mechanics of treaty cascades—what accelerates them—are not well 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). The specific characteristics of critical states are, however, a matter of disagreement. Some argue that the role of a critical state is primarily performed by major powers (Fordham and Asal 2007), while others point to crucial cases of major power exclusion from key international institutions (Hovi, Sprinz, and Bang 2012).

In the following section, we build on this literature to develop a theory of international treaty adoption cascades with the focus on the order and properties of acceding countries.

A Network Theory of Treaty Cascades

International treaties function like private clubs, offering members exclusive benefits such as preferential trade terms or enhanced cooperation on human rights and environmental protection. But membership comes at a cost: states must often reform domestic laws and institutions to meet treaty standards. For instance, European Union accession conditions on minority rights—like mother-tongue education—require not just legal change but also material investments in personnel and infrastructure. Because these changes may be politically costly or unpopular, states are incentivized to negotiate treaty terms that closely reflect their existing domestic frameworks (Milewicz 2020).

Yet aligning diverse legal systems is neither easily achieved by consensus nor by coercion. Vast institutional variation among states makes it difficult to design one-size-fits-all treaties that accommodate all potential signatories. At the same time, the fragmented nature of global politics means that even powerful states cannot simply impose their preferences. Influence over treaty content is not strictly determined by material power, and states that push too aggressively risk alienating others or derailing the process altogether.

Treaty-making is thus a protracted, multistage process. States propose clauses, seek opt-outs, and bargain for favorable terms to reduce the cost of joining. States that help shape the treaty's provisions benefit doubly: they avoid costly domestic adjustments and, in effect, export their own legal norms to others. This diffusion of domestic law generates long-term strategic advantages—lower transaction costs, greater regulatory influence, and enhanced access to treaty benefits.

Crucially, treaty-making is a self-reinforcing process. Once legal experts, NGOs, and negotiators identify a framework that successfully balances competing interests, they often reuse it in future agreements (Cheng et al. 2021; Reinsberg and Westerwinter 2023; Wang et al. 2024). As a result, new treaties tend to replicate earlier legal models and draw on the same core group of actors—experts, advocacy networks, and supportive states (Clark and Pratt 2023). Influencer states—those central in shaping treaty content—thus gain lasting influence not only over a single agreement but across successive treaties in the same issue area. Because these states shape the rules, they face the lowest costs of joining and are typically the earliest adopters. Their strategic role is to initiate a membership cascade: a sequence in which others follow by joining the treaty they helped design.

Cascades unfold over time, and their success depends on earlier joiners. At the outset, treaty benefits are ambiguous while the costs are clear. But as more states join, benefits grow more tangible. Later joiners can better assess the treaty's impact, legitimacy, and payoffs. For example, the fiftieth member of an economic treaty can more reliably estimate market size and enforcement credibility than the fifteenth. Thus, the identity and characteristics of early adopters send strong signals to others.

We argue that early joiners must satisfy three criteria: (1) be able to provide a credible model to emulate, (2) have access to platforms for spreading ideas and recruiting others, and (3) be willing to adhere to the treaty on equitable terms. To be emulated, a state must demonstrate successful outcomes in the treaty's domain. Germany's influence on EU integration, for instance, is grounded in its postwar economic and political stability (Dobbin, Simmons, and Garrett 2007; Garrett 1992). Dissemination platforms—such as diplomatic networks, international organizations, and regional forums—are typically available to major or middle powers (Lake 2009; Thies and Nieman 2017). The final criterion—equitable commitment—often conflicts with the second. Pivotal states may demand preferential treatment, which risks undermining broad participation (Abbott and Snidal 1998).

For non-influencer states, the cost of joining is largely a function of institutional distance from the treaty's baseline (Lai and Reiter 2000; Lake 2009; Elkins and Simmons 2005). Still, they may adopt treaties for strategic reasons—such as locking in reforms, signaling credibility to international audiences, or shifting blame for unpopular policies (Moravcsik 2000).

Taken together, this framework underscores the structured persistence of treaty adoption. Early joiners not only shape treaty content but also cluster near the origin of adoption sequences, setting a path that others are likely to follow. Late joiners typically trace these established routes, weighing costs and benefits against the choices of earlier adopters. Once a successful sequence emerges, international legal experts often replicate it in subsequent agreements. The result is not random or ad hoc diffusion, but a relatively stable, path-dependent cascade—one that reflects enduring institutional alignments and strategic emulation.

We formalize this by conceptualizing treaty diffusion as a tree-like network: early adopters form the roots, later adopters branch outward. Our theory predicts that most treaties follow a similar branching pattern—especially within issue areas—because the cost-benefit structure of joining is shaped by persistent institutional alignments. Adoption paths are thus more than historical artifacts; they reflect enduring power asymmetries and institutional affinities among states.

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

Second, to make a treaty appealing to a broad range of potential members, influencer-states must combine prosperity with institutional stability. Major and regional powers often meet these criteria, but their effectiveness as leaders in a cascade depends on their willingness to compromise. Without concessions, their dominance may deter participation. In this regard, middle powers—states that are influential but less domineering—can be especially effective influencers. Their capacity to lead without intimidating others allows them to build broader, more inclusive coalitions.

Hypothesis 2: States with a proven model for emulation and a platform are more likely to influence others to sign treaties.

Third, since for non-influencers, the cost of adoption increases with political and economic difference between the influencer states that crafted the treaty, we expect that political and economic similarity increases the probability of joining.

Hypothesis 3: Institutional similarity with the influencer state increases the probability of treaty adoption.

Research Design

We test our theoretical predictions in two stages. In the first stage, we analyze the body of international treaties so as to probabilistically infer the most common adoption sequence followed by countries. That is, what are groups of states that consistently lead or lag in treaty adoption, and what is the most common order, in which states sign treaties. The algorithm we use to infer this order is described in detail below.

Once we obtain the results of the first stage of analysis, we use the inferred tree-network of treaty adoption cascade as the dependent variable in the second stage. In particular, each directed diffusion tie AB in the tree-network would indicate that country A tends to adopt treaties before country B and that A's adoption is likely to influence B's adoption. As a result, in the second stage of our analysis, we test hypotheses 2 and 3 by regressing these estimated ties on a set of covariates that measure economic prosperity, political stability, and political and economic similarity between the influencer and potential joiner.

Data on International Treaty Adoption

We obtained data 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. Since the concept of a cascade presupposes a treaty that is open to signing rather than exclusive, our data do not include treaties with restricted membership (e.g., NAFTA) or 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 entire sample, as well as 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.[2] We classified each issue area based on the categorization of UNTS.[3]

We estimate the network of norm diffusion using the date of the original signature. Signing a treaty signals initial commitment—our theoretical focus—while ratification is a process governed by domestic politics, which is beyond the scope of this paper. Research shows 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 plots densities in signings of select treaties over time, to showcase variation in the adoption cascades. Some treaties are overwhelmingly adopted within a few years, others exhibit a slower adoption cascade, and yet others are gradually signed over long time-periods. Notice, for example, the adoption cascade for the 1998 Rome Statute of the ICC was steep and quick, with a few laggards, while the adoption of the 1948 Genocide Convention stretched out for seven decades.

[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] The full sample also includes a number of other smaller categories that did not neatly cluster.

[3] 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").

Figure 1: Examples of Treaty Cascades

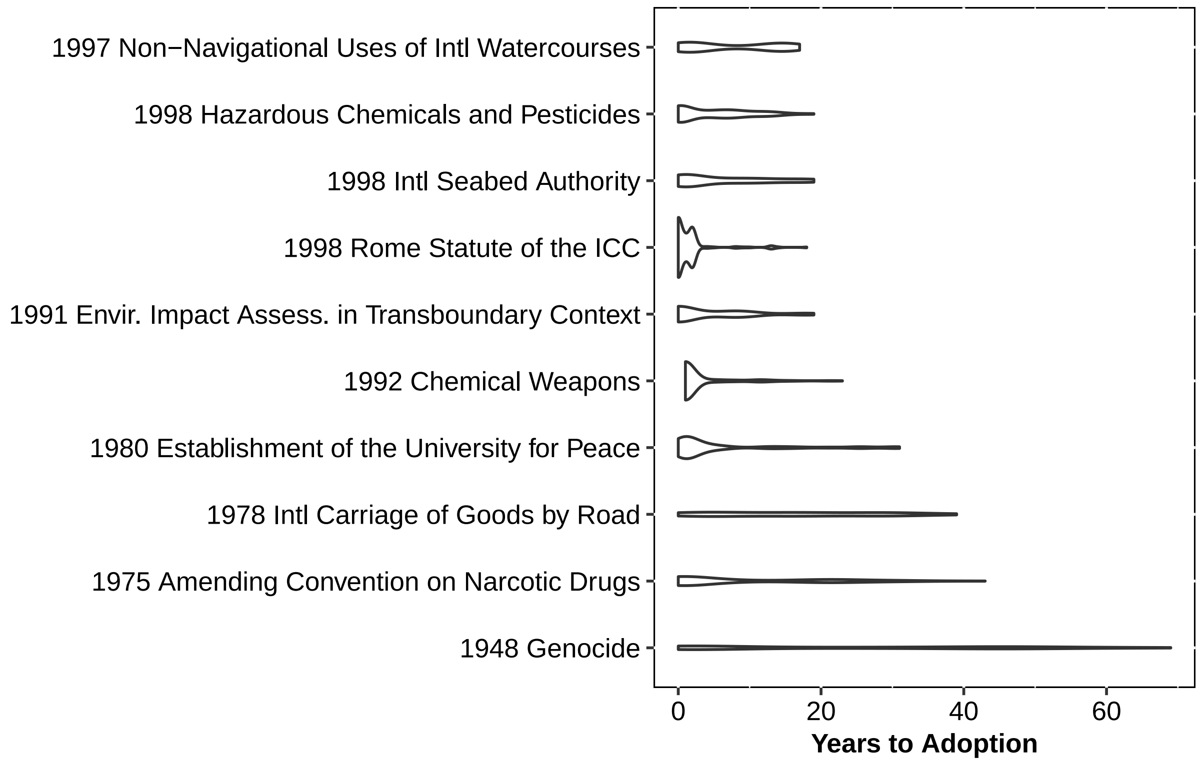


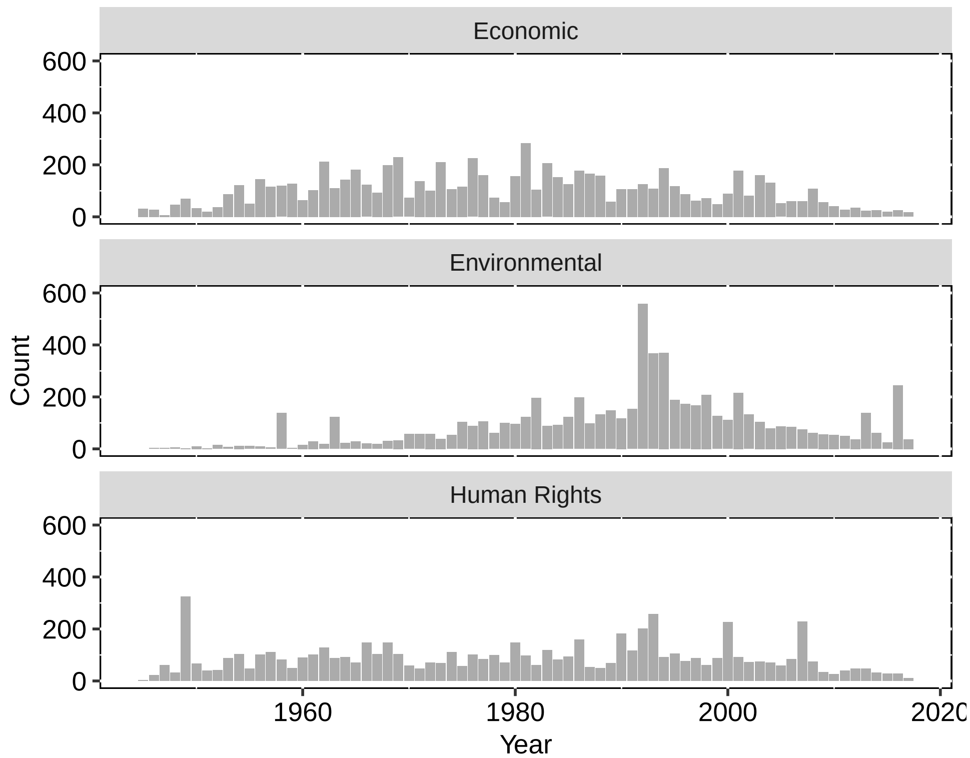
Figure 2 shows the total number of treaty signings at the member level, within each of the three issue area over time. Within the area of economic law, most of the activity falls in the middle of the time period, while the issue areas of human rights and environment exhibit a number of early spikes in signings. Within the area of environmental law, the starkest increase in signings and takes place in the nineties, which also coincides with a less stark, but notable increase in signing of human rights treaties.

Figure 3 shows the cumulative distributions of signings since the year of each treaty introduction. Economic treaty cascades take off the fastest, with over seventy-five percent of signings taking place within the first five years of treaty introduction. In contrast, environmental treaties require about ten years to reach that mark. Human rights treaties do so in about thirty years.

First Stage: The `NetInf` Algorithm

While the structure of the latent diffusion pathway—the "typical" order in which states accede to treaties—is not easily inferred by eye-balling the body of international treaties, we can infer

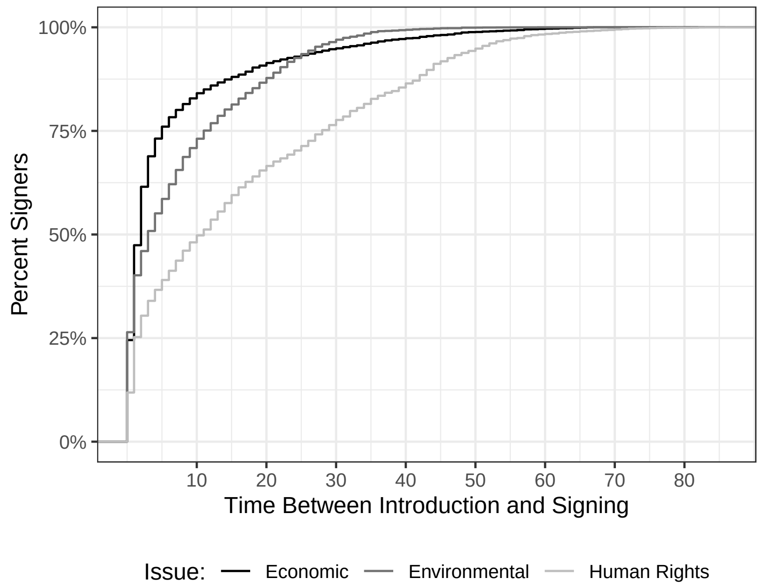
Figure 2: Treaty Signings by Issue



this structure using the network inference 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

Figure 3: Time Between Introduction and Signing by Issue



Notes: Figures plot the Kaplan-Meier failure function, i.e., the proportion of states signing or ratifying the treaty each year since the treaty's convention or, if a state enters the international system after the convention, each year since it entered.

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 increase the likelihood that a diffusion tie from state i to state j will be inferred by `NetInf`: 1) If i adopts many treaties before j, 2) if j tends to adopt soon after i—`NetInf` prefers to infer branches in cascades that span short times, and 3) j rarely adopts treaties if i does not first adopt 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 network 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 a 10-year rolling window of adoptions.

Second Stage: Predictors of Diffusion Ties

After we estimate the tree-network of treaty cascades with `NetInf`, we use the (directed dyadic) ties in the resulting network as the dependent variable in the subsequent analysis. Because our dependent variable is binary—country i is either inferred to systematically influence country j's adoptions or not—we estimate a temporal exponential random graph model (TERGM). A TERGM allows for isolating the effects of theoretically specified covariates while controlling for endogenous network processes, such as tie reciprocity or triadic closure.[4] We estimate models for four dynamic networks: those for the three policy areas along with one for all treaties combined.

Proven Model and Platform: Following hypothesis 2, influencer-states must provide a tested model for emulation and have a platform for dissemination. We measure these concepts using several variables. To account for power and economic prosperity, we include *Energy Consumption*, and *Energy Consumption, per capita*, obtained from (Singer, Bremer, and Stuckey 1972).[5] To proxy political stability, we include a binary indicator of *Democracy*, coded as 1 if a state scores above 0.5 the V-Dem Polyarchy measure (Pemstein et al. 2020). To further measure the ability to disseminate ideas and information, we include the annual count of a country's *IGO Memberships*, and *Number of INGO headquarters* located in a state. IGO data were obtained from the Correlates of War Project (Pevehouse et al. 2020), while the data on INGO headquarters came from Ryu (2020). The latter variable counts the number of headquarter of INGO with consultative status in

[4]Another strategy to account for endogenous network processes are to estimate an additive and multiplicative effects model (AME) (Minhas, Hoff, and Ward 2019).

[5]Our results are robust to using *GDP* and *GDP/capita* instead, though the lack of consistent data on GDP severely limits the temporal scope of our analysis.

UN Economic and Social Council (ECOSOC). Finally, we use binary measures of states' *Major Power* status coded based on whether a country holds a permanent seat on the UN Security Council.

Institutional Similarity: Hypothesis 3 posits that states are more likely to adopt treaties they observe adopted by similar others. We test this hypothesis by including several measures of similarity between the sender and receiver states in the estimated tree-network: *Joint Democracy*, a *Defense Pact*, *Common Language*, and *Common Colonial Legacy*. Data on alliances come from (Leeds et al. 2002), common language and colonial legacy were obtained from Kim et al. (2015).

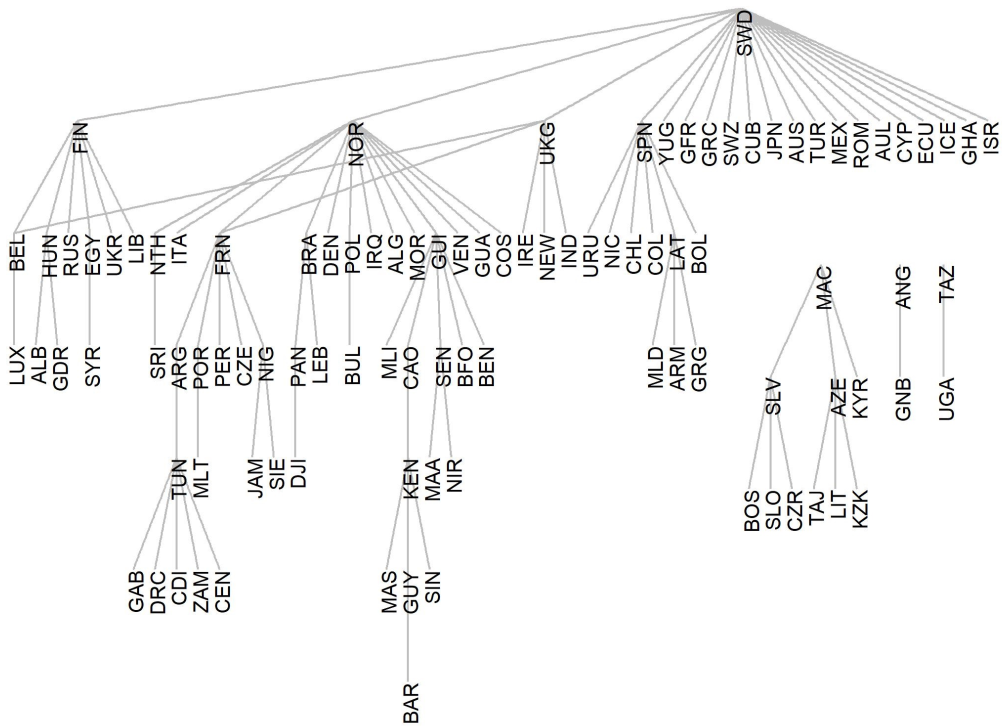
Network and Temporal Dependence: We account for two endogenous network processes—*Reciprocity* and *Triangles*. For the sake of convergence, the latter is measures using its more robust equivalent of geometrically weighted edgewise shared partners. We account for time by including a linear time trend and a lag of country's *Outdegree* (total number of outgoing ties in the the previous time period).

Network Inference Results

Our analysis of international treaties between 1946-2016 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 4 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 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).

Figure 4: Diffusion Network of Human right Treaties

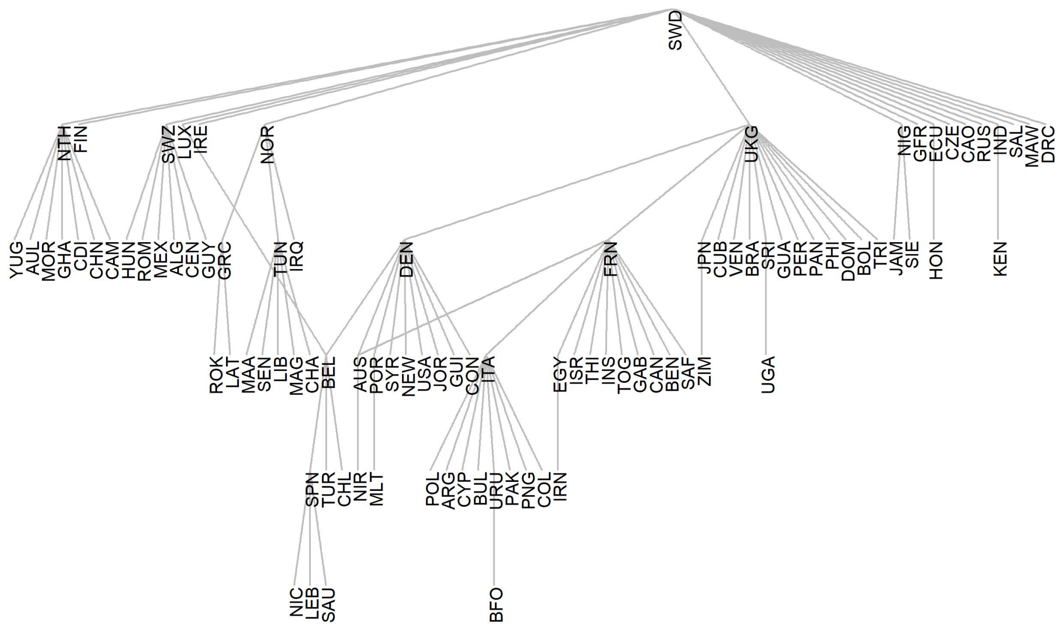


Countries that send a large number of outgoing diffusion ties are said to score high on *outdegree*.[6] Conceptually, we treat countries' outdegree as a measure of their overall influence in the respective issue ares, i.e., influencer-states are the states with the higherst outdegree. Countries that 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 rights law. Notably, only one of these countries is a major power. Figures 5 and 6 show the analogous visualizations for the economic and environmental law treaties, with similar results.

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

[6] In network analysis parlance, a node's outdegree is the total number of its outgoing ties (Cruz 2019).

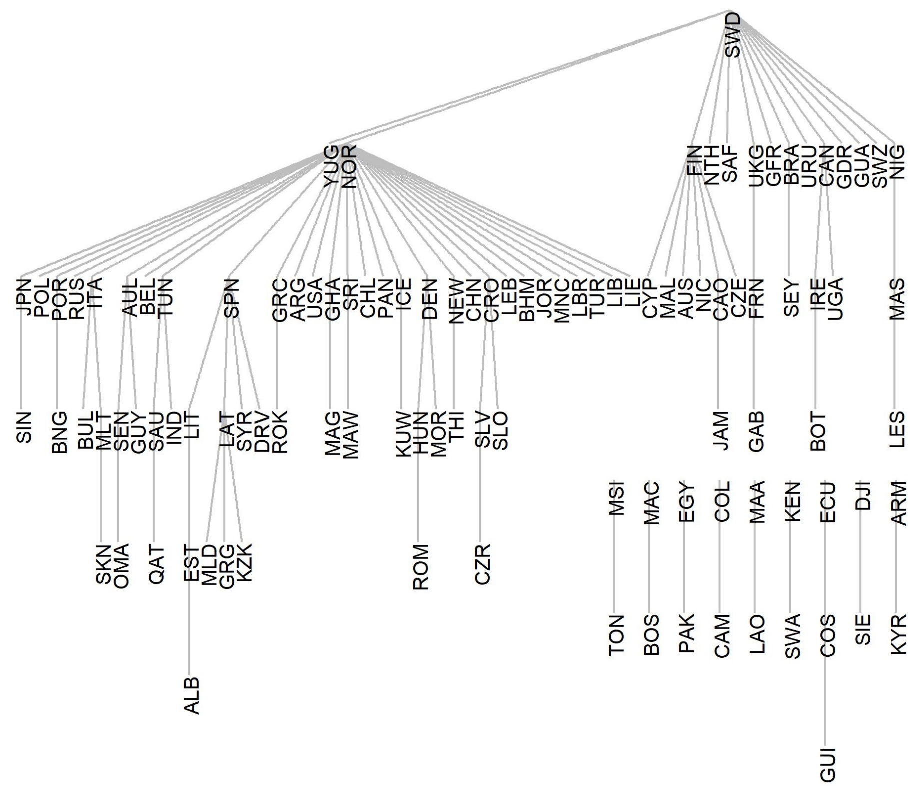
Figure 5: Diffusion Network of Economic Treaties



the entire body of international treaties. 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 issue areas, the United States appears well outside of the top 20 list, along with Russia and China.

Japan and Germany, the two states that are often regarded as regional 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., Finnemore 2003; Sprinz and Vaahtoranta 1994; Hawkins 2004; Brysk 2009; Mantilla 2018). As noted by these studies, for example, Sweden was among the first drafters of the Convention on

Figure 6: Diffusion Network of Environmental Treaties



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 relations. Rather than solely based on material power and access to a platform, this 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 for 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

Table 1: Top Influencer-States and Their Out-Degree (1946-2016)

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**

influencers in each area for the period between 1946–1990, and Table 3 shows the same lists for the post-Cold War period (1991–2016).[7]

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 appear on the list of the top 20 influencers within the environmental law issue area in the analysis for the entire time frame, 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 environmental law during the Cold War, it lost some of its influence 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

[7] 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.

Table 2: Top Influencer-States and Their Out-Degree During Cold War (1946-1990)

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**

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 economic treaties. France's position on the post-Cold War lists also drops multiple spots, leaving the top 20 altogether on the issue of economic law. Both the United Kingdom and France, in other words, take more of a backseat in the process of international treaty adoption.

These results provide support for the first two 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 major and regional powers consistently appear high on the influencer lists, along with regional and middle powers.

Determinants of Influence in the Diffusion Network

In this section, we describe the results of the statistical analysis that evaluate the determinants of dyadic sender–receiver (influencer–follower) diffusion ties in the inferred latent networks (hy-

Table 3: Top Influencer-States and Their Out-Degree After Cold War (1991-2016)

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**

potheses 2 and 3). The dependent variable in this analysis is a directed diffusion link from country A to country B in the treaty diffusion network, estimated for each year.[8]

Table 4 presents the results of these analyses for all treaties, and Tables 5–7 separate the analysis by issue area. The first model in each table reports the results for the entire time period, while the other two separate the results into the Cold War and post-Cold War periods. The results are similar across tables, so we focus the discussion on Table 4, mentioning any differences as necessary.

Model for Emulation and Platform: To test hypothesis 2, we specified the models with a set of variables measuring influencer-state's (state A) ability to provide a tested model for emulation and access a platform for norm diffusion. In Models 1 and 2—the entire time period and the Cold War—all of the theoretical variables are positive and statistically significant. Major powers,

[8]There results are based on 1000 bootstrap replications for each model estimated using parallel processing on 5 CPU cores. Estimation times ranged between 5–10 hours per model, depending on the sample size. We performed all standard diagnostics and convergence checks on all models.

Table 4: Country-Pair Norm Diffusion Ties, 1946-2016

	Full Sample		*Cold War*		*Post-Cold War*	
	Coef.	95% CI:	Coef.	95% CI:	Coef.	95% CI:
Model for Emulation and Platform:						
Major Power A	0.608*	[0.545, 0.67]	0.544*	[0.409, 0.658]	0.662*	[0.616, 0.697]
Democracy A	0.078*	[0.001, 0.142]	0.137*	[0.068, 0.199]	-0.117*	[-0.159, -0.093]
Energy Consump./Cap. A	0.051*	[0.032, 0.083]	0.088*	[0.066, 0.11]	-0.003	[-0.021, 0.020]
Energy Consump. A	-0.035*	[-0.066, -0.025]	-0.065*	[-0.083, -0.044]	-0.033*	[-0.056, -0.021]
IGOs A	0.002*	[0.001, 0.010]	0.022*	[0.017, 0.030]	-0.003	[-0.004, 0.002]
INGO HQ A	0.084*	[0.016, 0.120]	0.027	[-0.031, 0.078]	0.013	[-0.043, 0.067]
Institutional Similarity:						
Joint Dem.	0.041*	[0.016, 0.079]	0.258*	[0.207, 0.330]	-0.008	[-0.026, 0.01]
Contiguity	0.131*	[0.030, 0.239]	0.371*	[0.269, 0.472]	-0.248*	[-0.29, -0.21]
Defense Ally	0.322*	[0.273, 0.379]	0.472*	[0.413, 0.534]	0.195*	[0.18, 0.217]
Common Language	0.399*	[0.348, 0.439]	0.302*	[0.22, 0.374]	0.351*	[0.310, 0.391]
Common Legacy	0.438*	[0.398, 0.461]	0.260*	[0.151, 0.336]	0.450*	[0.427, 0.477]
Receiver State Characteristics:						
Major Power B	-0.314*	[-0.378, -0.274]	-0.487*	[-0.585, -0.401]	-0.216*	[-0.255, -0.197]
Democracy B	0.140*	[0.056, 0.164]	0.021	[-0.016, 0.049]	0.125*	[0.075, 0.136]
Energy Consump./Cap. B	-0.018*	[-0.029, -0.001]	-0.027*	[-0.035, -0.019]	-0.001	[-0.009, 0.01]
Energy Consump. B	0.065*	[0.038, 0.074]	0.061*	[0.056, 0.067]	0.045*	[0.025, 0.051]
IGOs B	0.003*	[0.001, 0.009]	0.008*	[0.007, 0.009]	0.005*	[0.004, 0.009]
INGO HQ B	0.075	[-0.007, 0.109]	-0.054*	[-0.077, -0.033]	0.107*	[0.045, 0.141]
Network Variables:						
Edges	-4.205*	[-4.405, -3.956]	-4.831*	[-5.218, -4.535]	-3.990*	[-4.058, -3.945]
Reciprocity	-0.152*	[-0.246, -0.056]	-0.074	[-0.243, 0.111]	-0.322*	[-0.382, -0.27]
Triangles (gwoesp)	0.470*	[0.445, 0.497]	0.550*	[0.525, 0.572]	0.400*	[0.386, 0.414]
Outdegree (lag)	-0.004	[-0.012, 0.003]	-0.008	[-0.029, 0.010]	0.001	[-0.003, 0.001]
Linear Time Trend	-0.004*	[-0.012, -0.002]	-0.018*	[-0.026, -0.012]	0.004	[-0.001, 0.007]

Note: *p<0.05. Standard errors were estimated using bootstrapping.

democracies, countries with high per capita energy consumption (a proxy for wealth), more IGO memberships and INGO headquarters, are more likely to influence others' decision to sign treaties. Consistent with hypothesis 2, influencer states in the treaty cascade network are associated with economic prosperity, democratic institutions, and embeddedness in the IGO and INGO networks. *Energy Consumption A*, which is a measure of size rather than wealth is negative and statistically significant, once wealth is controlled for.

The post-Cold War period results, however, paint a less straightforward picture. While *Major Power A* remains positive and significant, *Democracy A* is negative, and the rest of the variables do not reach statistical significance. The effect of *Democracy A* is not statistically significant once

Table 5: Country-Pair Norm Diffusion Ties, Economic Issues, 1946-2016

	Full Sample		*Cold War*		*Post-Cold War*	
	Coef.	95% CI:	Coef.	95% CI:	Coef.	95% CI:
Model for Emulation and Platform:						
Major Power A	0.485*	[0.389, 0.562]	0.532*	[0.310, 0.686]	0.272*	[0.200, 0.322]
Democracy A	0.028	[-0.110, 0.112]	-0.017	[-0.213, 0.179]	-0.172*	[-0.239, -0.130]
Energy Consump./Cap. A	0.086*	[0.056, 0.137]	0.214*	[0.151, 0.265]	-0.007	[-0.028, 0.029]
Energy Consump. A	-0.066*	[-0.118, -0.047]	-0.153*	[-0.206, -0.087]	-0.047*	[-0.079, -0.036]
IGOs A	0.004*	[0.002, 0.015]	0.033*	[0.028, 0.040]	-0.002	[-0.004, 0.004]
INGO HQ A	0.094*	[0.001, 0.133]	0.047	[-0.038, 0.131]	0.003	[-0.058, 0.034]
Institutional Similarity:						
Joint Dem.	-0.031*	[-0.05, -0.008]	0.116*	[0.064, 0.198]	-0.030*	[-0.055, -0.006]
Contiguity	0.049	[-0.079, 0.166]	0.326*	[0.161, 0.492]	-0.319*	[-0.450, -0.207]
Defense Ally	0.316*	[0.266, 0.374]	0.375*	[0.255, 0.466]	0.203*	[0.178, 0.238]
Common Language	0.543*	[0.487, 0.589]	0.449*	[0.336, 0.530]	0.474*	[0.406, 0.539]
Common Legacy	0.728*	[0.633, 0.796]	0.280*	[0.090, 0.435]	0.879*	[0.852, 0.915]
Receiver State Characteristics:						
Major Power B	-0.400*	[-0.479, -0.349]	-0.609*	[-0.652, -0.559]	-0.254*	[-0.314, -0.217]
Democracy B	0.098	[-0.031, 0.138]	-0.110*	[-0.179, -0.063]	0.105*	[0.023, 0.130]
Energy Consump./Cap. B	-0.021	[-0.037, 0.006]	-0.022*	[-0.031, -0.012]	0.010	[-0.004, 0.028]
Energy Consump. B	0.070*	[0.030, 0.084]	0.045*	[0.032, 0.055]	0.048*	[0.017, 0.058]
IGOs B	0.005*	[0.002, 0.014]	0.018*	[0.017, 0.021]	0.006*	[0.005, 0.013]
INGO HQ B	0.141*	[0.022, 0.194]	-0.087*	[-0.13, -0.042]	0.236*	[0.143, 0.284]
Network Variables:						
Edges	-5.124*	[-5.331, -4.742]	-5.227*	[-5.984, -4.728]	-4.952*	[-5.072, -4.852]
Reciprocity	0.175*	[0.045, 0.284]	0.311*	[0.149, 0.455]	0.044	[-0.100, 0.182]
Triangles (gwoesp)	0.618*	[0.563, 0.64]	0.423*	[0.351, 0.464]	0.620*	[0.579, 0.651]
Outdegree (lag)	0.007	[-0.016, 0.022]	-0.013	[-0.077, 0.029]	0.021*	[0.012, 0.025]
Linear Time Trend	-0.002	[-0.014, 0.001]	-0.025*	[-0.033, -0.018]	0.004*	[-0.004, 0.007]

Note: *p<0.05. Standard errors were estimated using bootstrapping.

treaties are subsampled by issue area (Tables 5–7).

Institutional Similarity: To test hypothesis 3, we included several variables measuring institutional similarity between the sender and receiver of diffusion ties. In support of this hypothesis, the results show that the probability of diffusion ties increases when two countries are jointly democratic, contiguous, or share a defense alliance, a common language, or institutional legacy. In the post-Cold War period, the effect of contiguity is negative.

In issue-specific subsamples, the effect of *Joint Democracy* is less consistent, not statistically significant or negative in the post-Cold war period. The latter is consistent with the argument that in later time periods, democracies start expanding their international regimes to include autocracies

Table 6: Country-Pair Norm Diffusion Ties, Human Rights Issues, 1946-2016

	Full Sample		*Cold War*		*Post-Cold War*	
	Coef.	95% CI:	Coef.	95% CI:	Coef.	95% CI:
Model for Emulation and Platform:						
Major Power A	0.728*	[0.639, 0.800]	0.546*	[0.434, 0.637]	0.808*	[0.714, 0.875]
Democracy A	0.075	[-0.003, 0.108]	-0.010	[-0.069, 0.052]	0.006	[-0.048, 0.035]
Energy Consump./Cap. A	0.067*	[0.045, 0.097]	0.131*	[0.115, 0.151]	0.001	[-0.021, 0.025]
Energy Consump. A	-0.048*	[-0.079, -0.039]	-0.085*	[-0.101, -0.072]	-0.033*	[-0.06, -0.026]
IGOs A	0.002*	[0.001, 0.010]	0.021*	[0.017, 0.026]	-0.002	[-0.003, 0.004]
INGO HQ A	0.197*	[0.127, 0.231]	0.132*	[0.064, 0.200]	0.134*	[0.076, 0.170]
Institutional Similarity:						
Joint Dem.	0.034	[-0.006, 0.090]	0.313*	[0.243, 0.399]	-0.076	[-0.095, -0.058]
Contiguity	0.029	[-0.114, 0.174]	0.368*	[0.255, 0.478]	-0.592*	[-0.686, -0.507]
Defense Ally	0.302*	[0.271, 0.337]	0.337*	[0.292, 0.376]	0.218*	[0.205, 0.233]
Common Language	0.338*	[0.261, 0.399]	0.204*	[0.095, 0.313]	0.356*	[0.294, 0.410]
Common Legacy	0.452*	[0.419, 0.470]	0.315*	[0.268, 0.346]	0.458*	[0.433, 0.490]
Receiver State Characteristics:						
Major Power B	-0.345*	[-0.399, -0.305]	-0.506*	[-0.574, -0.436]	-0.234*	[-0.275, -0.211]
Democracy B	0.088*	[0.004, 0.114]	0.010	[-0.028, 0.042]	0.087*	[0.025, 0.100]
Energy Consump./Cap. B	-0.030*	[-0.039, -0.011]	-0.023*	[-0.031, -0.015]	-0.023*	[-0.031, -0.008]
Energy Consump. B	0.069*	[0.04, 0.079]	0.060*	[0.053, 0.067]	0.050*	[0.024, 0.056]
IGOs B	0.003*	[0.001, 0.010]	0.008*	[0.007, 0.010]	0.005*	[0.004, 0.011]
INGO HQ B	-0.027	[-0.116, 0.013]	-0.235*	[-0.264, -0.205]	0.051	[-0.018, 0.080]
Network Variables:						
Edges	-4.588*	[-4.735, -4.338]	-4.845*	[-5.076, -4.662]	-4.613*	[-4.727, -4.537]
Reciprocity	0.140*	[0.042, 0.228]	0.183*	[0.058, 0.313]	-0.015	[-0.134, 0.074]
Triangles (gwoesp)	0.594*	[0.555, 0.629]	0.678*	[0.649, 0.703]	0.496*	[0.460, 0.530]
Outdegree (lag)	-0.008	[-0.021, 0.003]	-0.003	[-0.04, 0.021]	-0.011*	[-0.016, -0.009]
Linear Time Trend	-0.005*	[-0.013, -0.002]	-0.023*	[-0.029, -0.017]	0.006	[-0.001, 0.009]

Note: *p<0.05. Standard errors were estimated using bootstrapping.

(Mitchell 2002).

Receiver State Characteristics: We did not develop specific predictions for follower states (state B), but the results show that major powers and affluent states are less likely to be receivers in the diffusion network—as discussed above, these tend to be the senders. *Democracy B* and *IGO B* is positive and statistically significant in Models 1 and 3, suggesting that democracies and countries that are more embedded in the IGO network are more likely to be the recipients of international treaty diffusion ties. The rest of the variables do not have consistent effects across time periods.

Network Variables: Finally, ERGMs allow for modeling several endogenous network variables, including *Edges*, *Reciprocity*, *Triangles*, and *Outdegree*. *Edges* models the baseline probability

Table 7: Country-Pair Norm Diffusion Ties, Environment Issues, 1946-2016

	Full Sample		*Cold War*		*Post-Cold War*	
	Coef.	95% CI:	Coef.	95% CI:	Coef.	95% CI:
Model for Emulation and Platform:						
Major Power A	0.728*	[0.639, 0.800]	0.546*	[0.434, 0.637]	0.808*	[0.714, 0.875]
Democracy A	0.075	[-0.003, 0.108]	-0.010	[-0.069, 0.052]	0.006	[-0.048, 0.035]
Energy Consump./Cap. A	0.067*	[0.045, 0.097]	0.131*	[0.115, 0.151]	0.001	[-0.021, 0.025]
Energy Consump. A	-0.048*	[-0.079, -0.039]	-0.085*	[-0.101, -0.072]	-0.033*	[-0.06, -0.026]
IGOs A	0.002*	[0.001, 0.010]	0.021*	[0.017, 0.026]	-0.002	[-0.003, 0.004]
INGO HQ A	0.197*	[0.127, 0.231]	0.132*	[0.064, 0.200]	0.134*	[0.076, 0.170]
Institutional Similarity:						
Joint Dem.	0.034	[-0.006, 0.090]	0.313*	[0.243, 0.399]	-0.076*	[-0.095, -0.058]
Contiguity	0.029	[-0.114, 0.174]	0.368*	[0.255, 0.478]	-0.592*	[-0.686, -0.507]
Defense Ally	0.302*	[0.271, 0.337]	0.337*	[0.292, 0.376]	0.218*	[0.205, 0.233]
Common Language	0.338*	[0.261, 0.399]	0.204*	[0.095, 0.313]	0.356*	[0.294, 0.410]
Common Legacy	0.452*	[0.419, 0.470]	0.315*	[0.268, 0.346]	0.458*	[0.433, 0.490]
Receiver State Characteristics:						
Major Power B	-0.345*	[-0.399, -0.305]	-0.506*	[-0.574, -0.436]	-0.234*	[-0.275, -0.211]
Democracy B	0.088*	[0.004, 0.114]	0.010	[-0.028, 0.042]	0.087*	[0.025, 0.100]
Energy Consump./Cap. B	-0.030*	[-0.039, -0.011]	-0.023*	[-0.031, -0.015]	-0.023*	[-0.031, -0.008]
Energy Consump. B	0.069*	[0.040, 0.079]	0.060*	[0.053, 0.067]	0.050*	[0.024, 0.056]
IGOs B	0.003*	[0.001, 0.010]	0.008*	[0.007, 0.010]	0.005*	[0.004, 0.011]
INGO HQ B	-0.027	[-0.116, 0.013]	-0.235*	[-0.264, -0.205]	0.051	[-0.018, 0.080]
Network Variables:						
Edges	-4.588*	[-4.735, -4.338]	-4.845*	[-5.076, -4.662]	-4.613*	[-4.727, -4.537]
Reciprocity	0.140*	[0.042, 0.228]	0.183*	[0.058, 0.313]	-0.015	[-0.134, 0.074]
Triangles (gwesp)	0.594*	[0.555, 0.629]	0.678*	[0.649, 0.703]	0.496*	[0.46, 0.53]
Outdegree (lag)	-0.008	[-0.021, 0.003]	-0.003*	[-0.040, 0.021]	-0.011*	[-0.016, -0.009]
Linear Time Trend	-0.005*	[-0.013, -0.002]	-0.023*	[-0.029, -0.017]	0.006	[-0.001, 0.009]

Note: *$p<0.05$. Standard errors were estimated using bootstrapping.

of tie formation, analogous to the intercept in ordinary least squares. The positive and statistically significant coefficient on *Triangles* indicates that the probability of a tie between A and B increases with the number of other nodes they are both connected to. The negative and statistically significant coefficient on *Reciprocity* indicates unidirectionality of diffusion ties. *Outdegree (lag)*, while not statistically significant, is a variable intended to model whether states that sent out a large number of ties in the previous time period are more likely to send diffusion ties in the current time period. We interpret the lack of significance as an indication that the network has a large number of moderately influencial states rather than a few states that send out most of the diffusion ties. This is consistent with our robustness checks and descriptive analysis. The linear temporal term is negative and statistically significant, which implies that the tree-network forms fewer ties as the time goes on.

Conclusion

Identifying and ranking the most influential countries within various issue areas has long been a central interest in international relations. Much of this literature equates influence with material power—whether defined by economic capacity, military capabilities, or institutional standing such as a permanent seat on the United Nations Security Council (Lake 2009; Fordham 2011; Copeland 2013; Chiba, Machain, and Reed 2014; Thies and Nieman 2017). This approach typically assumes a priori that major powers are also the most influential in shaping international norms and institutions. However, such classifications leave little room for a posteriori analysis of why certain states emerge as influential in particular domains of international cooperation.

This article offers a new approach to understanding influence in international cooperation by shifting the focus from material power to diffusion dynamics. Rather than relying on static classifications of major powers, we identify influencer-states based on their position in temporal adoption sequences across more than 700 multilateral treaties. Our theory argues that earlier joiners—those whose domestic institutions are closely aligned with a treaty's standards—bear lower adjustment costs and are more likely to trigger cascades of adoption. For a cascade to persist, these early adopters must provide a credible model for emulation, have access to platforms for diffusion, and commit to equitable cooperation.

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 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. Our empirical analysis show that influencer-states tend to be economically prosperous, democratic, and institutionally embedded in both intergovernmental and transnational networks.

Future research can build on these findings in several directions. First, more detailed exploration of issue-specific diffusion networks can illuminate how institutional, geographic, or cultural affinities shape adoption paths. While much of the diffusion literature has focused on dyadic or state-level traits, relatively little attention has been paid to network-level structures and their role in norm propagation. Second, modeling cumulative adoption curves—akin to studies of US state-level policy diffusion—offers a complementary approach to estimating influence over time (Boehmke et al. 2017; Pollert et al. 2025).

Finally, future work can incorporate the text of the treaties themselves. Topic modeling could provide an alternative method for clustering treaties into coherent families, while text-based measures such as length or syntactic complexity could help distinguish when diffusion occurs through learning versus emulation. Complex treaties may demand more technical capacity and deliberation, encouraging learning-driven diffusion; simpler treaties may spread through mimicry.

By moving beyond static assumptions about power and influence, our approach offers a dynamic and empirically grounded way to understand how international norms spread—and who leads the way.

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