

Checking for Updates: Ratification, Design, and Institutional Adaptation

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Although most international agreements are concluded for indefinite periods, the issues they address and parties' preferences are constantly evolving. In some cases, parties seek to close any growing gaps between negotiators' expectations and the changing context by updating their original agreement to its new circumstances. States have several formal tools at their disposal to do so, such as protocols, amendments, and addenda. We refer to this process as institutional adaptation. This paper seeks to explain why some agreements are adapted numerous times during their lifetime while others are not. It argues that state parties are more likely to adapt their international agreements when they acquire new information about their partners' behavior, preferences, or the state of the environment. We focus on two key elements facilitating this process. The first consists of unexpected variation in treaty participation, and the second concerns the design features of the agreement. Relying on event history analysis and an original dataset of design features and membership of 371 multilateral environmental agreements (MEAs), we find that low levels of ratifications, high levels of accessions, highly institutionalized MEAs, and anticipatory design features are associated with more frequent institutional adaptation. These findings provide important lessons for the design of dynamic treaties.

A pesar de que la mayoría de los acuerdos internacionales se celebran por períodos indefinidos, tanto las cuestiones que abordan como las preferencias de cada una de las partes evolucionan constantemente. En algunos casos, las partes tratan de cerrar cualquier brecha creciente entre las expectativas de los negociadores y el contexto cambiante actualizando el acuerdo original a las nuevas circunstancias. A este efecto, los Estados tienen varias herramientas formales a su disposición, tales como protocolos, enmiendas y adendas. Llamamos a este proceso adaptación institucional. Este artículo trata de explicar por qué algunos acuerdos se adaptan numerosas veces durante su existencia mientras que otros no se adaptan nunca. El artículo argumenta que es más probable que los Estados participantes adapten sus acuerdos internacionales cuando adquieran nueva información sobre el comportamiento, las preferencias o el estado del entorno de sus socios. Nos centramos en dos elementos clave que facilitan este proceso. El primero consiste en un cambio inesperado en relación con la participación en el tratado, y el segundo se refiere a las características de diseño del acuerdo. Teniendo en cuenta el análisis histórico de eventos, así como un conjunto original de datos en relación con las características de diseño y de adhesión de 371 acuerdos multilaterales sobre medio ambiente (MEAs, por sus siglas en inglés), encontramos que tanto los bajos niveles de ratificaciones como los altos niveles de adhesiones, los MEAs altamente institucionalizados y las características de diseño anticipatorio están asociados con una adaptación institucional más frecuente. Estas conclusiones proporcionan lecciones importantes de cara al diseño de tratados dinámicos.

Bien que la majorité des accords internationaux soient conclus pour des durées indéfinies, les problématiques traitées et les préférences des parties évoluent constamment. Dans certains cas, les parties cherchent à refermer les écarts qui s'élargissent entre les attentes des négociateurs et l'évolution du contexte en mettant à jour l'accord initial pour prendre en compte les nouvelles circonstances. Pour ce faire, les États disposent de différents outils formels, comme les protocoles, les amendements et les addenda. Nous qualifions ce processus d'adaptation institutionnelle. Cet article tente d'expliquer pourquoi certains accords font l'objet de nombreuses adaptations au cours de leur durée de vie, et d'autres, d'aucunes. Il affirme que les parties étatiques adapteront plus certainement leurs accords internationaux quand elles acquièrent de nouvelles informations concernant le comportement, les préférences et l'état de l'environnement de leurs partenaires. Nous nous focalisons sur deux éléments clés favorisant ce processus : les variations inattendues dans la participation à un traité et les caractéristiques de la

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conception d'un accord. En nous fondant sur une analyse historique d'événements et un ensemble de données original sur les caractéristiques de conception et l'adhésion à 371 accords environnementaux multilatéraux (AEM), nous constatons que des niveaux de ratification faibles, des niveaux d'adhésion élevés, des niveaux d'institutionnalisation élevés des AEM et l'anticipation des caractéristiques de conception augmentent la fréquence de l'adaptation institutionnelle. Ces conclusions fournissent des enseignements importants pour la conception de traités dynamiques.

Introduction

Although most international agreements are established for indefinite periods, the issues they address, and parties' preferences and behavior change. As a result, gaps can appear between what negotiators anticipated when concluding the treaty and the treaty's evolving problem structure or context. For example, the scope of the problem, the number of parties involved, or their expectations may have grown. In some cases, parties close such gaps by adapting their original agreement to its new circumstances. Here, we are interested in formal adaptations to existing treaties through amendments, protocols, and addenda.¹

Some treaties have been adapted numerous times. For example, the 1979 Convention on the Conservation of Migratory Species of Wild Animals has been adapted for the first time in 6 years after its conclusion and 10 times after that (Mitchell 2002–2020). Other treaties have never been amended. The 1977 Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques has not been adapted despite the development of new environmental modification techniques in the last decades. Arguably, institutional adaptation can make treaties more relevant and effective, in tune with their political and scientific context. However, in this paper, we do not seek to evaluate whether adaptations close any gaps or serve other functions. Instead, we aim at explaining variation in the rate at which international agreements are adapted.

Such variation in adaptation has scarcely been explored in the literature on international institutions. Studies on international agreements have explained their design features (e.g., Koremenos et al. 2001; Marcoux 2009; Thompson 2010; Morin et al. 2022); membership (e.g., Bernauer et al. 2013; Spilker and Koubi 2016; Cortez and Gutmann 2017); and effectiveness (e.g., Young 1999; Mitchell 2006; Ward 2006; Kim et al. 2017). However, they have largely ignored treaty modifications. Notable exceptions include the International Regime Database project (Breitmeier et al. 1996), a study on the renegotiation of bilateral investment treaties (Haftel and Thompson 2018), and an article on transboundary freshwater agreement changes (De Bruyne et al. 2020). Other studies that do examine the lifetime of international agreements tend to concentrate on a small number of usually quite prominent cases, limiting generalizability. A case in point is the evolution of the international regime for climate change (e.g., Depledge 2006; Bodansky and Diringer 2010; Schiele 2014). Other examples include the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Sand 1997; Jinnah 2014), the Convention on Biological Diversity (Morgera and Tsoumani 2010), and the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Bridgewater and Kim 2021).

¹Our conception of institutional adaptation in this paper is restricted to formal treaty changes and should not be confused with other uses of the notion (e.g., Haas and Haas 1995; Burci 2005; Daßler et al. 2019).

The propensity to analyze international agreements as static objects of study is not surprising as institutions are notoriously sticky (e.g., Mahoney and Thelen 2009, 4). Further, some degree of stability is required for international law to maintain legal certainty and operate as a focal point (Pettersson and Keskitalo 2013, 214; van Asselt 2015, 257). International agreements' stickiness, therefore, makes cases of institutional adaptation all the worthier of scrutiny.

Public policy theorists (Kingdon 1984; Rose 1991; Baumgartner and Jones 1993; Sabatier and Jenkins-Smith 1993; Levy 1994) and historical institutionalists have, by contrast, investigated institutional change more extensively. However, they typically conceive institutional change as a "wholesale transformation" resulting from exogenous shocks (Mahoney and Thelen 2009). Yet, international institutions are often adapted through an incremental process of minor refinements (Zartman 1985; Chwieroth 2014). The frequent adaptation of some treaties also casts doubt on the necessity of rare external events such as power shifts (Daßler et al. 2019), a major international gathering (Manulak 2020), or sudden economic crises (Colgan et al. 2012).

In addition, existing theories of institutional change rarely distinguish the creation of a new institution from the addition of new rules to an existing institution, as Jupille et al. (2013, 10) do, for example. In a constructive exception, Mahoney and Thelen (2009) conceptualize the former as "displacement" and the latter as "layering." In this paper, we examine how treaties are adapted by layering on additional protocols, amendments, and annexes to build around or upon the principles and rules already established. These incremental institutional changes correspond to what Young (2010, 378) describes as "additional flesh on the bones." While this distinction between institutional creation and adaptation is not always straightforward at the domestic level, the difference between adopting a new treaty and adapting existing ones is more evident in the fragmented international environment. Since institutional adaptation occurs only after some initial agreement exists, it is likely to require an account distinct from the more general accounts of institutional creation.

This paper argues that states are boundedly rational actors who adapt their treaties when they acquire new information about their partners' behavior, preferences, or the state of the environment. Had states had complete information to hand during negotiations, they would be less likely to adapt their treaties afterward. Various actors may transmit new information to decision-makers, including initial signatories, third parties, and non-state actors. This paper focuses on two sources of new information. The first consists of unexpected variation in treaty participation, such as failing to secure the expected ratifications or attracting unexpected accessions. The second concerns the design features of the agreement. Institutional mechanisms favoring debate among parties and dialogue with stakeholders facilitate information acquisition, which in turn is expected to make adaptation more frequent.

The paper relies on a dataset of design features and membership of 371 multilateral environmental agreements (MEAs). The case of environmental governance is particularly relevant to investigating institutional adaptation for two main reasons. First, environmental challenges and scientific information on their evolution arguably change faster than other governance domains, thereby calling for more frequent updates. Second, partly due to the first point, environmental governance is characterized by high numbers of initiating treaties and subsequent adaptations. Protocols and amendments are a more common practice in international environmental law than in other branches of international law. Therefore, this empirical case provides higher variation in the dependent variable. We employ event history models to examine this variation and find that low levels of ratifications, high levels of accessions, highly institutionalized MEAs, and anticipatory design features are associated with institutional adaptation. These findings provide important lessons for the design of future adaptable treaties.

The remainder of this article is organized as follows: the next section outlines our theoretical framework on institutional adaptation and how it relates to prior research on institutional change and design. Then, we describe the data and methodology used for the empirical analysis. We then present the findings before concluding with a discussion of the contributions of this paper and avenues for future research.

An Informational Theory of Institutional Adaptation

We assume that states are purposeful actors who try to anticipate the consequences of their actions but whose capacity to process information is limited. According to this bounded rationality assumption, states rely on cognitive heuristics to select satisficing institutional solutions (Simon 1972). We argue that institutional adaptation, evidenced by formal treaty change, results from the acquisition of new information that state parties did not have at hand during negotiations. While information acquisition can result in changes in causal beliefs and goals, it often more modestly leads to simple learning, i.e., “a change in means but not in ends” (Levy 1994, 286). States may gather information due to some unintended feedback process, such as a failure of the original design to work, or an intentional and perhaps even strategic feedback process, such as framework-protocol designs, intended to defer some decisions for further rounds of adaptation.

Three main factors hinder the search for new information by treaty parties. First, it is more demanding than exploiting current knowledge, as it requires identifying and considering alternatives to the institutional status quo (March 1991). Second, positive feedbacks tend to strengthen and stabilize existing knowledge (Fioretos 2011, 377). This path dependency effect is expected to be reinforced when knowledge is institutionalized, as in the case of international agreements. Third, states’ bounded rationality implies that the use of new information can be suboptimal (Jupille et al. 2013). Change is often riskier than the status quo. It can have unintended consequences and worsen the problem at hand (March 1991). As Rose summarizes: “Instead of new knowledge, policymakers prefer the assurance of doing what has worked before [...] Policymakers do not have the time or the knowledge to be maximizers, continuously seeking an ideal policy” (1991, 10). Moreover, new information is sometimes not picked up until it is too late for a regular adapta-

tion process to yield results, leaving decay, dissolution, or displacement the only options.

The bounded rationality assumption and hurdles arising from the search for fresh knowledge lead us to assume that for institutional adaptation to take place, states need to receive a strong and proximate piece of information indicating that the current circumstances deviate from what drafters expected when they negotiated the agreement. For instance, previous studies have shown that investor–state disputes provide new information to states on the consequences of their commitments. The said information may drive state parties to revise their bilateral investment treaties (Poulsen and Aisbett 2013; Haftel and Thompson 2018). However, as explained below, information providers are not necessarily external to a treaty framework. They also include treaty parties themselves. Three types of information are particularly relevant, each corresponding to a kind of uncertainty faced by treaty negotiators (Koremenos et al. 2001): information related to country preferences, information related to partners’ behavior, and information related to the state of the environment.

We acknowledge that not all state actors process new information equally or uniformly. For instance, powerful states have more capacity to process information than their less powerful counterparts. They are also more likely to convince other states that the treaty needs to be adapted to the said information. However, the processing of new information is challenging to observe empirically on a large scale. Still, it seems unlikely that most adaptations occur without new information contradicting expectations from the time of the agreement’s negotiation. While the observation of incoming information does not mean that all (or any) states necessarily process it, we expect to see more institutional adaptation in the presence of key new information than in its absence.

We focus on two specific information sources, which each garners two hypotheses. The first two hypotheses concern treaty participation and the last two relate to built-in design features.

The first source of information is a deviation from the anticipated participation to the treaty. Two scenarios are conceivable here. First, the number of ratifications may be unexpectedly low considering the number of signatories. By not ratifying the treaty, some initial signatories provide credible information to the other signatories about their dissatisfaction with this treaty (i.e., their preferences). These non-ratifying parties might have expressed their concerns over some missing or existing provisions during the negotiation process, but their threat of defection might not have been perceived as credible. In other cases, negotiators might have been supportive during the negotiation process but faced “involuntary defection” after the agreement was concluded (Iida 1996), either because some domestic constituents led a successful campaign and altered the party’s interest calculation or because of a domestic change in legislative or executive representatives. When ratification failures put the cooperation framework at risk, the collectivity of states may decide to adapt the agreement to reincentivize dissatisfied states to cooperate. This is often the case when the treaty specifies a ratification threshold for entry into force.

Other studies have demonstrated that dissatisfaction can lead to the creation of alternative institutions (Colgan et al. 2012; Morse and Keohane 2014; Faude and Parizek 2021), in the line of “displacement” rather than “layering” (Mahoney and Thelen 2009). Adjustments to the original institution are also a possible outcome though. States that recently participated in the negotiations of an agreement

but do not follow with ratification do not necessarily have an interest in abandoning the treaty altogether. Adjustments at the margin, such as an additional annex or a short amendment, may constitute an acceptable compromise.

A telling example is the 1990 London Revisions to the Montreal Protocol on Substances that Deplete the Ozone Layer. As [Patlis \(1992, 193\)](#) reports, China and India initially refused to ratify the Montreal Protocol, for it lacked provisions concerning monetary and technological assistance to developing countries. Representing 35 percent of the world population and thus having a considerable potential consumption of chlorofluorocarbons, the dissatisfaction of these countries could have severely undermined the treaty and its universal ambition. While drafters discussed funding mechanisms during the negotiations of the Montreal Protocol, the new information about emerging countries' refusal to ratify the treaty contributed to its adaptation. Article 10 of the 1990 amendment to the Protocol established a mechanism, including a Multilateral Fund, to enable developing countries with low levels of consumption of controlled substances to comply with their obligations under the Protocol. This adaptation likely played a role in China's and India's ratification the following year ([Zhao and Ortolano 2003, 711–12](#); [Pfluger 2010](#)). From this, we hypothesize that:

H1: *Treaties with low rates of ratification are more likely to be adapted.*

A second scenario related to participation is the accession of third parties to the treaty, i.e., countries that did not participate in the treaty's negotiations in the first place. Third parties deciding to join a treaty may suggest that the opportunity was not previously open to them or that they now view the agreement as a success or otherwise advantageous. Their accession informs existing signatories about their preferences regarding the issues governed by the treaty. Two reasons may prompt states to process such new information and adapt the treaty accordingly. First, numerous accessions may allow the signatories to capitalize on the agreement's success and establish deeper commitments. Second, the increase in membership may render the treaty maladapted to the interests of the new group of states. Accessions can change the bargaining equilibrium that was in place at the time of conclusion. In environmental governance, this shift is likely to operate when developing countries join a treaty initially concluded between developed countries or when exporters of an environmental good join a treaty concluded by importers.

For instance, the International Convention for the Regulation of Whaling was concluded in 1946 between ten countries whose main goal was to regulate whale stocks to ensure sustainable exploitation. Over the years, the relatively small club dominated by whaling nations has been joined by countries "who had no previous interest or knowledge of whaling," thereby gradually reversing the balance between whalers and anti-whalers ([Sigvaldsson 1996, 325](#), see also [Caron 1995](#)). In 1982, the number of participants had risen to thirty-seven and the general attitude toward whaling, highly influenced by environmental non-governmental organizations (NGOs), was becoming more preservationist. This shift in the balance of interests among parties, arguably not expected by the convention's drafters, led to the 1982 amendment to the Schedule to the Whaling Convention. The latter set the catch limits for killing whales for commercial purposes to zero (sub-paragraph 10(e), also known as the 1982 Moratorium). From this, we derive that:

H2: *Treaties with high rates of accession are more likely to be adapted.*

Beyond unexpected variation in participation, specific design features can capture information about the mismatch between a treaty's features and current circumstances. In that regard, a first source of information arises from interactions among treaty parties. These interactions can take various forms, including joint scientific cooperation, sharing of experience on implementation, and discussions about the treaty's effectiveness. Repeated interactions allow treaty parties to inform their partners about their changing preferences toward the issue at stake and their actions to implement the agreement (i.e., their behavior).

The institutional design feature that best enables state interaction within a treaty setting is the creation of an inter-governmental body. Usually called Conferences of the Parties (COPs) in international environmental law,² intergovernmental bodies bring together state representatives regularly. The creation of a COP should be differentiated from established procedures for adopting amendments and supplements, as COPs perform other functions and often act simultaneously as fora of dialogue, decision-making, and information retrieval. More than half of the treaties in our sample equipped with a COP apparatus do not mention the possibility for amendments. With their extensive range of functions, COPs can play two roles concerning information. First, state interaction through a periodic conference may generate new information about diverging or changing preferences and behaviors. Second, state interaction constitutes occasions to process the new information and discuss how the treaty might be adapted accordingly. In other words, new information transmitted by some state parties may create new design proposals, which the community of states then negotiates through bargaining tactics and reason-based arguing ([Gehring and Ruffing 2008](#)).

Numerous scholars have underlined the role of COPs as a central component of MEA adaptability ([Churchill and Ulfstein 2000, 628–29](#); [Brunnée 2002](#); [Wiersema 2009, 271–73](#); [Kim and Mackey 2014, 14–5](#); [van Asselt 2015, 259](#)) and some have provided anecdotal evidence of their role in treaty adaptation. The influence of COPs in institutional adaptation is notably evidenced when state parties are required to revise a list of controlled pollutants or protected species periodically. For example, [Gehring and Ruffing \(2008\)](#) demonstrate how state interaction within the context of the COP is crucial for adapting the list of species protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The CITES COP is tasked with accepting or rejecting listing recommendations from the secretariat. Listing decisions often impose costs on only a few member states that trade in a proposed species. They also benefit the few states that trade in the proposed de-listed species. As a result, two opposing camps typically coexist with a majority of states without partisan interest ([Gehring and Ruffing 2008, 137](#)). Opponents to secretariat recommendations can either seek to block the decision or behave cooperatively. States with no specific interest in the issue, for their part, can choose to side with one of the opposing camps for political reasons or support the management regime and vote in favor of the proposal. These bargaining strategies enable the transmission and processing of critical information about participants' preferences. They would not be as likely to manifest if the

²Other common designations include Commissions, Assemblies, Meetings, and Committees.

treaty did not establish a COP. Therefore, we hypothesize that:

H3: *Treaties that establish a COP are more likely to be adapted.*

The last source of information investigated in this paper corresponds to external non-state actors. External information providers include, among others, experts, scientists, NGOs, and businesses. Environmental issues affect a variety of stakeholders who can inform countries about the state of the environment based on their viewpoints, experiences, and expertise. For example, Ruggie (2003, 313) finds that in five instances of institutional adaptation of United Nations programs, governments “shared the stage with other social actors, including the corporate sector and civil society organizations.” External actors may *generate* new information, for example, through a consultative or scientific report. They may also pressure states to *process* this information through treaty adaptation. However, states do not automatically seek external feedback. Haas and Haas (1995, 262) observe that in most international organizations, “No effective scan of the technical and scientific communities for new ideas is undertaken to muster political support for organizational reforms.”

Receiving external input can be facilitated with adequate institutional mechanisms. For instance, the 1979 Convention on Long-Range Transboundary Air Pollution (CLRTAP) requires the implementation of the Cooperative programme for the monitoring and evaluation of air pollutants in Europe (EMEP, art. 9). New scientific insight from EMEP Centers gave teeth to the CLRTAP’s vague obligation to “reduce and prevent air pollution” (art. 2) by setting specific emission cuts in subsequent protocols (Lidskog and Sundqvist 2002). For example, computer simulations from the Task Force on Integrated Assessment Modelling served as a starting point for the negotiations of the 1985 Protocol, which calls for a reduction of sulfur emissions “by at least 30 percent” (Tuinstra et al. 2006, 354). Against this background, external feedback provisions, such as public participation requirements and the establishment of more formal advisory committees, can help countries receive and process information from non-state actors about the state of the environment.³ We expect this information to increase state awareness that some treaty provisions are outdated, ineffective, or incomplete. From this, we derive that:

H4: *Treaties that provide for dialogue mechanisms with stakeholders are more likely to be adapted.*

In summary, this paper examines two sources of information that state parties may receive during the life of a treaty. First, participation sends new information to state parties about participants’ and third parties’ preferences toward the issues governed by the treaty. Second, specific design features are expected to generate and help process new information about participants’ preferences, cooperation behavior, and the state of the environment. New information may stem from state and non-state actors. We do not deny that participation- and design-based information can foster other events than institutional adaptation, such as informal pressures from powerful actors (e.g., Stone 2011) or institutions dying or becoming “zombies” (Gray 2018; Eilstrup-Sangiovanni 2020). However, these alternative phenomena fall outside the scope of our study.

Our theoretical framework goes beyond exogenous explanations of treaty change, which adds to our understand-

ing of the phenomenon. However, taking internal sources of adaptation into account raises the challenge of endogeneity from omitted variables. Specifically, some conditions may lead drafters to establish intergovernmental and stakeholder committees to smooth the future adaptation of the treaty. Put another way, confounding factors may explain both adaptability in design and adaptation in practice. While endogeneity from omitted variables is inherent to any large-*n* study dealing with institutional design (see also Montfort et al. 2023), we have reasons to believe that the factors that drive the inclusion of COPs and dialogue mechanisms in treaties are different from those that drive the adaptation of these treaties. Existing research suggests that the inclusion of COPs might be related to the depth of the treaty, the issue-area it covers, and the degree of asymmetry among its parties, three variables that can be controlled for (Dür and Gastinger 2022). Likewise, research has found that the inclusion of dialogue mechanisms in international institutions is related to the exogenous event of the end of the Cold War and the following wave of democratization (Squatraro et al. 2016). With this in mind, we argue that endogeneity can be mitigated by careful observation of the problem structure of a given treaty. The following section presents a method to reduce the risk of omitted variable bias and assess our theoretical framework.

Data and Method

Data

This research relies on an original dataset of design features and membership of 371 MEAs concluded between 1945 and 2015. The text of the MEAs and data on their protocols and amendments mainly come from the International Environmental Agreements Database Project (IEADB, Mitchell 2002–2020; Mitchell et al. 2020). All MEAs in the sample are legally binding agreements under international law and were concluded by at least three sovereign states. Following the IEADB criteria, the treaties examined in this study seek, as a primary purpose, to protect the environment.

Table 1 shows the different types of adaptation in our sample: protocols, amendments, and amendments to protocols. Protocols are the most frequent adaptation type. Experts commonly refer to this strategy as the “convention/protocol” approach. It enables states to start cooperation with a broad treaty that includes general objectives before establishing more precise commitments once uncertainty is mitigated (Sebenius 1991; Bodansky and Diring 2010, 7–8). Cases in point include the 1992 United Nations Framework Convention on Climate Change and its 1997 Kyoto Protocol, as well as the 1992 Convention on Biological Diversity and its 2000 Cartagena and 2010 Nagoya Protocols. Table 1 also shows that MEA adaptation is not a rare process. Nearly 40 percent of the treaties in our sample had been adapted at least once by the end of 2015.

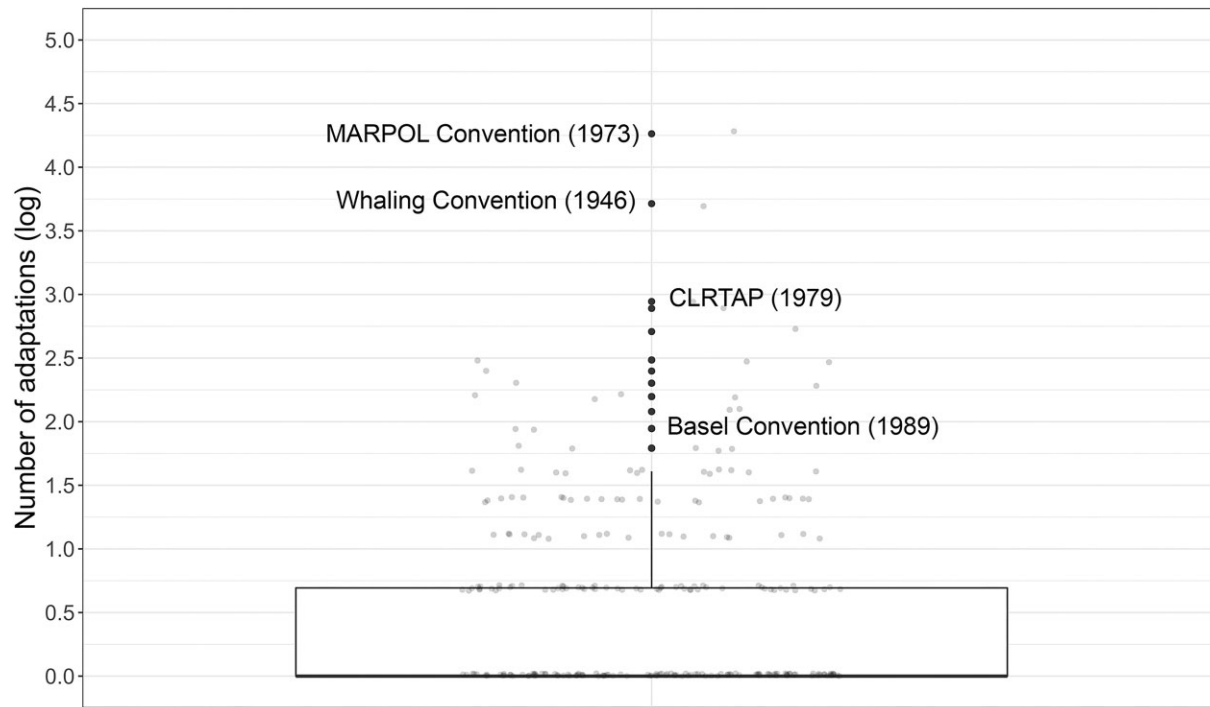
A Time-to-Event Model

To model the probability that a treaty is adapted at a given time, we fit a time-to-event (TTE) model. Our dependent variable, ADAPTATION, corresponds to the time interval (in days) between either the signature of an initiating MEA or its most recent adaptation (whichever is the latter), and the next adaptation. TTE models are well suited where the outcome of interest is the rate of an event that can repeat along a unit. They are preferred to traditional regression methods for these questions because they are better equipped to

³We acknowledge that external feedback can also stem from outside of a treaty system, in particular from international scientific panels such as the Intergovernmental Panel on Climate Change and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. However, tracking the influence of such bodies is not practicable for a large-scale sample of treaties.

Table 1. Distribution of different types of MEA adaptation.

	Protocol adoption	Treaty amendment	Protocol amendment	Adaptation (all)	No adaptation
Number (and proportion) of MEAs	85 (22.9 percent)	75 (20.2 percent)	12 (3.2 percent)	141 (38.0 percent)	230 (62.0 percent)

**Figure 1.** Number of adaptations per MEA as of 2015.

analyze the timing of events and deal with right-censoring, i.e., units that do not experience the event before the end of the study. One of the most popular types of TTE models is the semi-parametric Cox proportional hazard model (Cox 1972). Semi-parametric models make no assumption about the distribution of the baseline hazard (the risk of the event happening, ignoring the effect of covariates). However, the Cox model assumes that the observations are independent of each other. This assumption may be appropriate when only one event can occur per unit. By contrast, in our case, only modeling the time to one event is inefficient, as treaties can be adapted several times during their life (see Figure 1). An alternative approach would be to fit count models with the number of adaptations of each treaty as the dependent variable. However, these models do not account for the timing of events and assume a constant event rate.

To address these limitations, we use an extension of the Cox model suited to analyzing recurrent event data: the Prentice, Williams, and Peterson gap-time (PWP-GT) model (Prentice et al. 1981). This model is recommended when “it is reasonable to assume that the occurrence of the first event increases the likelihood of a recurrence” (Amorim and Cai 2015, 331). This assumption seems reasonable here, as prior adaptation likely enables subsequent adaptation. We define our models in terms of gap time, which means that the models estimate covariates’ effect for each adaptation since the previous event (i.e., the signature or previous adaptation of this agreement).

Main Independent Variables

To test H1 and H2, the first set of explanatory variables concerns MEA participation. First, we compute the proportion of original signatories that have ratified the MEA at the date of adaptation (thereafter called the “R/S proportion”).⁴ An R/S proportion below 1 indicates that some initial signatories did not bind themselves legally to the treaty, either because of the executive’s or legislative’s dissatisfaction with some aspects of the treaty or domestic pressures. Then, we subtract the R/S proportion from 1 (“1–R/S”) so that the highest proportions of ratifications become the lowest levels of NON-RATIFICATION. Second, we measure ACCESSIONS as the difference between the number of signatures at the date of adaptation and the number of initial signatures. Formal adaptation can be a lengthy process. Accordingly, the effect of NON-RATIFICATION and ACCESSIONS on adaptation is unlikely to be immediate. Therefore, we apply a 1-year lag to these variables in all the models. The robustness checks in the Online Appendix present several alternative measures of the participation-related variables, including dichotomizing these variables, combining them into an ordinal variable around “neutral,” and exploring 2- and 5-year lags for each.

The second set of explanatory variables concerns time-invariant design features of the initiating MEA. A team of

⁴For the numerator, we rely on the date of domestic entry into force instead of the ratification date if the treaty is not subject to ratification. For the denominator, we consider a country to be an original signatory if it has signed the treaty before its entry into force.

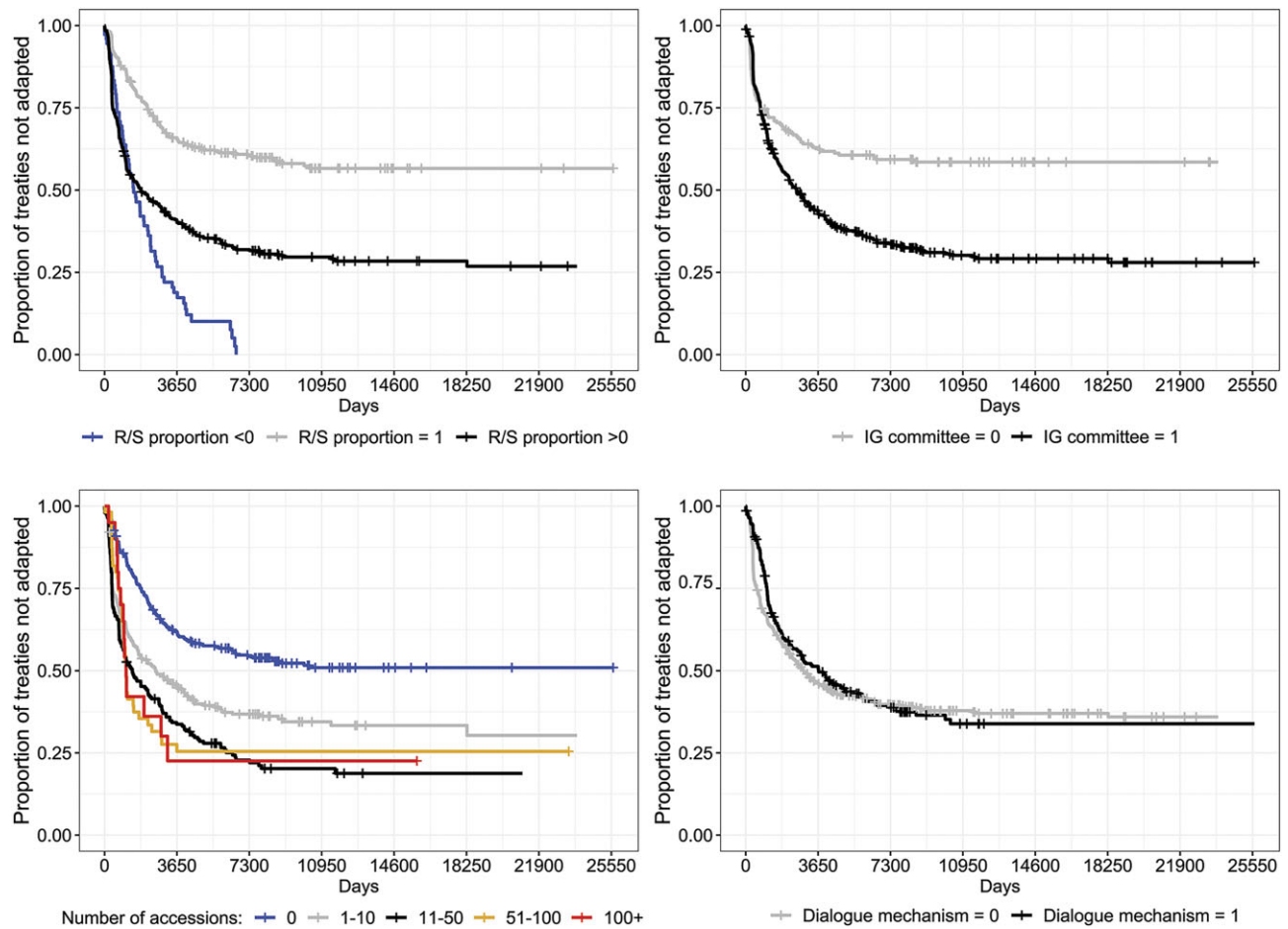


Figure 2. Kaplan–Meier survival estimates of MEAs.

coders was trained to read each MEA with the software NVivo and a detailed codebook. False-positive results were weeded out by using different coders to analyze the selected provisions. Lastly, we assessed the frequency of false negatives by asking an additional coder to code 10 percent of the agreements a second time. We measure the institutional ability of parties to interact during the life of an MEA with the binary variable *INTERGOVERNMENTAL COMMITTEE*. This variable indicates whether the treaty establishes a periodic meeting of state representatives, regardless of its name. Second, we examine the presence of institutional mechanisms allowing parties to receive information from external stakeholders with the variable *EXTERNAL FEEDBACK*. This variable takes on the value 1 if the treaty encourages public participation in the implementation or creates a stakeholder committee, and 0 otherwise. Stakeholder committees can involve NGOs, academics, scientists, civil society members, and other non-state actors. Their names vary and include scientific, technical, and advisory committees.

Figure 2 below presents non-parametric Kaplan–Meier survival estimates of MEAs for each independent variable. The probability of survival, represented by the y-axis, corresponds to the probability that an MEA is *not* adapted at a given time. In other words, adaptation can be thought of here as the “death” of the MEA in its initial version. The Kaplan–Meier estimates show that a negative R/S proportion, at least one accession, and an intergovernmental committee are associated with a lower probability of survival

without adaptation. This is in line with H1, H2, and H3. In contrast with H4, however, the survival probability remains relatively stable regardless of whether or not MEAs create dialogue mechanisms with stakeholders.

Controls

We also add several control variables to our TTE model. First, MEAs can recognize the possibility and detail the procedures to amend or supplement the agreement. These provisions allow states to process information generated through participation, parties’ interactions, and stakeholder feedback. Some MEAs, such as the Montreal Protocol, merely acknowledge the possibility of adopting amendments (art. 11, para 4, h). Many others remain silent on the subject. In these cases, the amendment rules established under article 40 of the Vienna Convention on the Law of Treaties applied should let the parties decide to adapt the treaty. However, numerous MEAs deviate from the Vienna Convention residual rules (Boockmann and Thurner 2006; Fitzmaurice and Merkouris 2020). Since specific provisions on amendments and addenda provide a clear pathway to adapting the institution, we expect them to increase the adaptation hazard. The variable *ANTICIPATORY MECHANISMS* thus captures the presence or absence of such provisions.

Second, substantial changes in power dynamics between the signatories to an MEA may lead to institutional adaptation (Knight 1992; Thelen 1999; Moe 2005; Mahoney and

Thelen 2009, 209). Less powerful countries may gain bargaining power during the life of the institution and demand, as a result, that the treaty is adjusted to better reflect their preferences. For instance, Daßler et al. (2019) document how emerging powers such as Brazil and India pushed for the adaptation of the 1992 Convention on Biological Diversity to include a binding access and benefit-sharing mechanism. The latter was finally included in the 2010 Nagoya Protocol to the convention. We measure CHANGE IN POWER ASYMMETRY as the percent change of the Gini coefficient of the parties' GDPs since the treaty's signature or its previous adaptation (Bolt and van Zanden 2020).

Third, the variable DEPTH captures the "extent to which [a treaty] requires states to depart from what they would have done in its absence" (Downs et al. 1996, 383). On the one hand, one can expect deep treaties to be adapted more quickly and often than shallow ones because states will likely pay less attention to the effectiveness or outdatedness of loose commitments. On the other hand, states can purposely begin cooperation by concluding a shallow agreement with a view to negotiating additional and more technical instruments in the future. We measure DEPTH with an additive index of eight binary items included in MEAs.⁵ These items indicate whether the MEA sets up restrictions in the following areas: trade, production, extraction, sell, consumption, transport, construction, and pollutant emissions.

Fourth, some MEAs in the sample have a primary objective of creating an INTERNATIONAL ORGANIZATION (IO). This is the case, for instance, of the 1951 Convention for the Establishment of the European and Mediterranean Plant Protection Organization and the 1967 Convention on the International Hydrographic Organization. These MEAs may be less likely to be formally adapted through amendments and protocols because the IO can adapt its mandate or activities over time without having to amend the founding treaty. Therefore, we include a binary control indicating whether the MEA's *raison d'être* is to create an IO.

Fifth, to mitigate the risk of endogeneity from omitted variables, we add three controls about the problem structure (Mitchell 2006). The latter may influence both the design and adaptation of a given treaty. The first variable is PREFERENCE DIVERGENCE at the time of signature. PREFERENCE DIVERGENCE raises strategic distrust among partners. Accordingly, it may increase the perceived need to include adaptability features in the treaty as a protection against unwanted behavior (Laurens 2023). It is also possible that partners with diverging preferences struggle to reach an agreement beyond overarching cooperation goals. If this is the case, we expect the adoption of a protocol or an annex to be more likely in the future to establish more precise obligations. We measure PREFERENCE DIVERGENCE as the standard deviation of signatories' ideal point estimates based on their votes at the United Nations General Assembly (Bailey et al. 2017).

The second control related to problem structure is the NUMBER OF SIGNATORIES to the initiating treaty. The NUMBER OF SIGNATORIES inform us about the nature of the problem. Specifically, large numbers of signatories indicate that the problem requires global cooperation, in contrast with more circumscribed issues, such as river protection or local endangered species. Global cooperation is characterized by starker preference divergence and North–South divides (Najam 1994). This may call for more flexible designs and frequent adaptations. Large memberships also increase the need to centralize information and decision-

making (Koremenos et al. 2001), a function usually assigned to COPs. At the same time, higher numbers of signatories render adaptation more burdensome and thus less palatable. Therefore, while we expect the NUMBER OF SIGNATORIES to be correlated with both adaptability features and adaptation, it is difficult to predict whether the association is positive or negative.

Lastly, specific environmental issues may call for more frequent updates than others. We control for this possibility with the categorical variable SUBJECT, which can take on the following values: Agriculture (the reference category), Conservation of species and biodiversity, Energy, Fisheries, Freshwater, General environmental cooperation, Habitat and ocean, Pollution, and Other issues. This last variable also reflects different enforcement and distribution problems, which likely influence institutional design (Koremenos et al. 2001). For instance, states may have more incentives to defect from a treaty setting greenhouse gas emissions targets than one allocating fishing quotas. If drafters anticipate a high risk of free-riding, they may be more inclined to design an adaptable treaty that can accommodate the fluctuating interests of its participants.

Results

Table 2 displays the results of the models. The first column summarizes the findings when only the main explanatory variables are included in the model, and the third column provides the results of the full model with controls. The coefficients reported in columns 1 and 3 are logged hazard ratios. A positive coefficient indicates that the variable is associated with an increased adaptation hazard (or risk). To ease interpretation, columns 2 and 4 report the exponentiated coefficients, i.e., hazard ratios.

As a proportional hazard model, the PWP-GT model assumes that the effect of covariates on times to event remains constant throughout the follow-up time. However, in international relations, "one might expect that the effect of one or more predictor variables on the hazard rate increases or decreases over time" (Box-Steffensmeier et al. 2003, 35, quoting Teachman and Hayward 1993, 359). Based on a Schoenfeld residuals test, we observe that the proportional hazard assumption is violated by several variables in our model and the model as a whole. Therefore, we interact the offending variables with the natural logarithm of time, as recommended by Box-Steffensmeier et al. (2003). The coefficients are reported in column (5) and the hazard ratios in column (6).

We find strong support for our first and second hypotheses that NON-RATIFICATION and ACCESSIONS increase the probability of adaptation. NON-RATIFICATION of the initiating treaty increases the risk of adaptation by a factor of 26–42 depending on model specifications (see columns 4 and 6). ACCESSIONS increase the risk by a factor of approximately 1.5. These positive effects are statistically significant at the 0.001 level in all model specifications.

Evidence for our hypotheses on design is more mixed. At first glance, neither INTERGOVERNMENTAL COMMITTEES nor EXTERNAL FEEDBACK provisions are associated with a significant increase in the rate of MEA adaptation. This is unexpected, as 87 percent of the 131 MEAs adapted at least once score 1 on the INTERGOVERNMENTAL COMMITTEE variable (see also Figure 2). One limitation of PWP models is that the estimates can become unstable when some cases experience many events. As recommended by Amorim and Cai (2015, 331), we address this shortcoming by removing extreme outliers in robustness checks. With this adjustment, the effect

⁵These items were coded with the same method as the other design features considered in the paper.

Table 2. Results on MEA adaptation.

	(1) β	(2) $\exp(\beta)$	(3) β	(4) $\exp(\beta)$	(5) β	(6) $\exp(\beta)$
Non-ratification	3.34*** (0.41)	28.16	3.26*** (0.45)	25.98	3.73*** (0.73)	41.62
Accessions (log)	0.42*** (0.03)	1.52	0.34*** (0.04)	1.41	0.42*** (0.04)	1.52
IG committee	0.76 (0.13)	2.14	0.51 (0.13)	1.67	-5.35 (1.49)	0.00
External feedback	-0.34 (0.10)	0.71	-0.45 (0.12)	0.64	-0.83 (0.84)	0.44
Anticipatory mechanisms			0.76* (0.18)	2.14	0.71* (0.18)	2.02
Change in power asymmetry			-0.34 (0.28)	0.71	-0.31 (0.29)	0.73
Depth			0.22* (0.04)	1.24	0.40** (0.06)	1.49
IO			-0.10 (0.15)	0.91	1.99 (1.13)	7.32
Preference divergence			0.66*** (0.13)	1.94	0.62*** (0.13)	1.86
Number of parties (log)			-0.12 (0.06)	0.88	-0.10 (0.08)	0.90
Conservation of biodiversity			0.79* (0.20)	2.21	0.65* (0.21)	1.92
Energy			-2.00 (1.02)	0.14	-1.99 (1.02)	0.14
Fisheries			0.35 (0.21)	1.42	0.21 (0.21)	1.24
Freshwater			0.33 (0.26)	1.39	0.25 (0.27)	1.28
General environmental cooperation			0.26 (0.40)	1.30	0.16 (0.40)	1.17
Habitat and ocean			0.42 (0.21)	1.53	0.23 (0.23)	1.26
Pollution			-0.41 (0.48)	0.67	-0.81 (0.51)	0.44
Other issues			0.73* (0.20)	2.08	-0.14 (0.45)	0.87
Time \times Non-ratification					-0.00 (0.00)	1.00
Time \times Accessions					-0.00* (0.00)	1.00
Time \times IG committee					3.81 (0.98)	45.28
Time \times External feedback					0.09 (0.17)	1.10
Time \times Depth					-0.01 (0.00)	0.99
Time \times IO					-0.30 (0.17)	0.74
Time \times Parties					-0.00 (0.00)	1.00
Time \times Subject					0.09 (0.04)	1.09
Observations	894		873		873	
R^2	0.26		0.40		0.44	
Maximum possible R^2	1.00		1.00		1.00	
Log likelihood	-3,178.69		-3,033.10		-3,003.81	
Wald test	177.27*** (df = 4)		312.77*** (df = 18)		375.26*** (df = 26)	1
LR test	274.11*** (df = 4)		452.49*** (df = 18)		511.07*** (df = 26)	
Score (logrank) test	308.18*** (df = 4)		482.12*** (df = 18)		524.07*** (df = 26)	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

The table presents results from PWP-GT models. Coefficients in columns (1), (3), and (5) are logged hazard ratios with robust standard errors in parentheses. Columns (2), (4), and (6) report the coefficients in the exponential form (hazard ratios). Coefficients indicate an increase or decrease in the hazard rate (or risk) of adaptation. Hazard ratios above 1 thus suggest a higher risk of adaptation, whereas hazard ratios below 1 suggest a lower risk.

of INTERGOVERNMENTAL COMMITTEES becomes positive and statistically significant (see Table 6 in the Online Appendix), which brings it in line with our hypothesis and the descriptive findings.⁶ Dialogue mechanisms with stakeholders do not seem to impact MEA adaptation, irrespective of model specification. Lastly, we find a positive and statistically significant effect of ANTICIPATORY MECHANISMS, i.e., amendment and addendum provisions.

Turning to other control variables, the DEPTH of the agreement is found to increase the risk of adaptation. This finding raises doubt on the argument that treaty adaptation is primarily used to complement shallow agreements. It may be that deeper commitments are more carefully monitored and frequently adjusted than shallower ones.

PREFERENCE DIVERGENCE also has a significant increasing effect on the adaptation hazard. This suggests that partners with diverging preferences are more likely to adapt an MEA

than partners with homogenous preferences. Although a possible explanation could lie in the difficulty of reaching a full-fledged agreement at the outset for countries with divergent preferences, which may call for successive incremental negotiations, we acknowledge that a convention-protocol design may be the preferred option where preferences diverge among partners. This problem is partly addressed in Table 3 below by isolating adaptations through protocols from adaptations through amendments. The other control variables are not found to have a significant effect on adaptation. In robustness checks, we add three further controls: the number of withdrawals and the presence of majority or consensus decision-making provisions (see Table 5 in the Online Appendix).

To complement our analysis, we run two separate TTE models to distinguish adaptation through *protocols* from adaptation through *amendments*. Protocols typically involve more demanding procedures than amendments, including higher decision-making thresholds and the deposit of formal instruments of ratification (Brunnée 2002). Protocols also usually include more numerous commitments than

⁶Indeed, the agreement with the most adaptations, MARPOL, lacks an intergovernmental committee, suggesting an outlier with high leverage on the final results.

Table 3. Results on MEA adaptation when splitting the sample of adaptations.

	(1) <i>Protocols</i>	(2) <i>exp(β)</i>	(3) <i>Amendments</i>	(4) <i>exp(β)</i>
Non-ratification	4.45*** (0.61)	85.60	4.21*** (0.88)	67.43
Accessions (log)	0.25** (0.08)	1.29	0.43*** (0.05)	1.54
IG committee	1.22*** (0.29)	3.40	1.52*** (0.25)	4.59
External feedback	0.19 (0.22)	1.21	-0.89* (0.14)	0.41
Anticipatory mechanisms	-0.13 (0.24)	0.88	1.65** (0.34)	5.19
Change in power asymmetry	-0.37 (0.50)	0.69	-0.39 (0.35)	0.68
Depth	0.02 (0.12)	1.02	0.17 (0.05)	1.18
IO	-0.33 (0.29)	0.72	-0.37 (0.18)	0.69
Preference divergence	1.25*** (0.25)	3.48	0.87** (0.20)	2.39
Number of parties (log)	-0.17 (0.12)	0.84	-0.14 (0.09)	0.87
Conservation of biodiversity	1.00 (0.66)	2.73	0.94* (0.22)	2.55
Energy	0.16 (1.16)	1.18	-15.73*** (1,180.92)	0.00
Fisheries	1.12* (0.62)	3.08	0.42 (0.23)	1.52
Freshwater	1.58* (0.66)	4.84	0.25 (0.34)	1.28
General environmental cooperation	1.38* (0.74)	3.99	-0.09 (0.61)	0.91
Habitat and ocean	1.81*** (0.62)	6.10	0.36 (0.24)	1.43
Pollution	2.22*** (0.61)	9.19	0.02 (0.27)	1.02
Other issues	1.51 (0.93)	4.55	-1.07** (0.61)	0.34
Observations	487		658	
R^2	0.28		0.50	
Maximum possible R^2	0.96		1.00	
Log likelihood	-691.99		-1,674.66	
Wald test (df = 18)	152.19***		1,477.01***	
LR test (df = 18)	157.71***		458.03***	
Score (logrank) test (df = 18)	266.00***		456.85***	

The table presents results from PWP-GT models. Coefficients in columns (1) and (3) are logged hazard ratios with robust standard errors in parentheses. Columns (2) and (4) report the coefficients in the exponential form (hazard ratios). Coefficients indicate an increase or decrease in the hazard rate (or risk) of adaptation. Hazard ratios above 1 thus suggest a higher risk of adaptation, whereas hazard ratios below 1 suggest a lower risk.

amendments and, in turn, require lengthier negotiations. Thus, we control whether different patterns characterize each type of adaptation. The results are shown in Table 3. The positive effect of NON-RATIFICATION and ACCESSIONS found in Table 2 can also be observed for both types of adaptations taken separately. Three additional insights from splitting the sample are worth mentioning. First, the positive effect of INTERGOVERNMENTAL COMMITTEES becomes highly statistically significant in both samples. As previously explained, one likely explanation is that treaties with very high numbers of adaptations disproportionately influence the results and that splitting the sample makes their number of adaptations lower. Second, the negative effect of EXTERNAL FEEDBACK becomes statistically significant at the 0.05 level in the sample of adaptations through *amendments*. This suggests that, contrary to our expectations, MEAs that provide for dialogue mechanisms with stakeholders are less likely to be amended. This result should be interpreted with caution, as it is robust in neither the protocol sample nor the truncated sample presented in the Online Appendix (Table 6). Third, the effect of ANTICIPATORY MECHANISMS is only statistically significant in the sample of adaptations through *amendments*. A total of 70 percent of MEAs in the full sample include provisions on amendments, whereas only 21 percent mention additional instruments such as protocols and annexes. Therefore, it is not surprising that these provisions mainly influence adaptation through *amendments*.

Overall, we find strong evidence supporting our first and second hypotheses on participation and evidence for our third hypothesis on institutional design conditional on the exclusion of an outlier. Therefore, our findings are in line

with our theoretical argument that both participation and design choices influence adaptation. However, information resulting from states' ratification behavior seems to resonate stronger than information enabled by a treaty's built-in features. This suggests that state ratification practices are an important information for institutional adaptation decisions.

Discussion and Conclusion

What happens to international agreements after countries have agreed to sign them is underexplored. More than half of the treaties examined in this paper have never been formally adapted. This confirms the oft-stated argument that conventional international law is sticky and could question the "fit" of MEAs as an instrument for effectively tackling evolving problems (Young 2002; Galaz et al. 2008; Ebbesson 2010). Nevertheless, many institutions do adapt, at least formally, and their study can help identify the conditions under which they do so more rapidly or more often. Answering this question can help states design more agile institutions that facilitate the processing of incoming information and anticipate their transformation or, alternatively, institutions that can be expected to resist changes and maintain continuity (Hollway 2022).

This paper adds to the few large- n studies that have delved into the life cycle of treaties on two fronts. First, at the theoretical level, it offers an original argument based on information acquisition, MEA participation, and design. While the International Relations and policy literatures have investigated institutional change at length, state participation is

generally ignored in current theories. In addition, examining the post-signature ratification behavior and interactions of state participants sheds light on the endogenous processes leading to adaptation. In this sense, without ignoring the external influence of third parties and stakeholders, the paper dialogues with the policy studies and historical institutionalist literatures, which point to the limits of overly exogenous accounts of institutional change (Greif and Laitin 2004; Streeck and Thelen 2005; Mahoney and Thelen 2009; Montfort et al. 2023). Our results provide further evidence that dramatic exogenous events, the focus of most theories of institutional change (e.g., Colgan et al. 2012; Daßler et al. 2019), are not necessarily the best explanations for incremental change, and that internal processes occurring within treaty bodies should not be overlooked.

Second, at the empirical level, the paper investigates institutional adaptation on a sample of more heterogeneous treaties than what has been done to date. Although all treaties in our sample deal with environmental protection, the issues they cover and their memberships are diverse. The resulting variation in the need for adaptation is not necessarily captured in the more homogenous collections of treaties previously studied (e.g., Haftel and Thompson 2018; De Bruyne et al. 2020). Therefore, although high scientific uncertainty, protocols, amendments, and accessions are arguably more frequent in environmental governance, the heterogeneity and number of MEAs suggest the theory tested here could travel to other fields of governance.

Our results support our proposition that both dissatisfaction with a treaty and its attractiveness to third parties increase adaptation frequency. We also find evidence on the association between intergovernmental treaty bodies and adaptation, which has often been implied but rarely tested. Lastly, we find no discernable impact from other design features that could foster MEA adaptation, such as stakeholder and scientific committees.

The non-significant effect of stakeholder committees and public participation requirements may indicate that these provisions are ill-designed or not implemented. It could also suggest that states' interests overshadow non-state actors' feedback and knowledge in prompting institutional adaptation. Yet, scientists', businesses', and NGOs' views and expertise are a wealth of information. They can help ensure that the treaty is in line with up-to-date scientific knowledge and adequate to meet the needs of the population impacted by the environmental problem. Scholars and policymakers should thus pay careful attention to the effectiveness of these adaptability features.

Methodological challenges remain to be treated in future research on institutional adaptation. First, comprehensive data on the adaptation of bilateral environmental agreements are not yet available. Accounting for these treaties in statistical models may lead to further insightful findings unrelated to participation, as accessions and low ratification rates are rare in the bilateral context. Examining broader samples of treaties from different domains such as trade, investment, and security could also prove enlightening.

Furthermore, international environmental law evolves through diverse forms of decisions adopted within a treaty system (Gehring 2008, 485). In other words, some MEAs that have not been formally adapted can nevertheless be dynamic. For instance, the Inter-American Convention for the Protection and Conservation of Sea Turtles has not been amended since its signature in 1996. Yet, it has been supplemented by numerous COP resolutions. This kind of adaptation should not be ignored, as informal international lawmaking increasingly complements formal treaty-making

(Pauwelyn et al. 2014). Investigating informal adaptation could even shed new light on the role of stakeholder feedback on institutional adaptation. However, at the time of writing, data shortcomings make it impossible to account, on a large scale, for alternative forms of treaty adaptation such as COP decisions and resolutions. Against this background, in-depth case studies could help disentangle the causal mechanisms between institutional design and informal adaptation. Still, COP decisions are more flexible and less costly than formal treaty adaptation. This makes our results even more meaningful to understand why states choose to adapt a treaty.

To conclude, our results provide several policy lessons. First, thinking ahead about well-designed treaty bodies and adaptation procedures is key to preventing the treaty from becoming a sleeping beauty. In particular, creating intergovernmental treaty bodies facilitates frequent state interaction, the discussion of potential treaty adaptations, and the gathering of incoming information from parties, scientists, and civil society. However, the mere existence of adaptability provisions is not sufficient to make treaties more adaptive, especially when it comes to dialogue mechanisms with stakeholders. Compliance with such provisions during the life of the treaty is also crucial. Last, our results highlight how meaningful states' fast or slow ratification of international institutions are for adaptation decisions. Ratification failures may put the treaty at risk of never entering into force, and may thus threaten to jeopardize costly and lengthy negotiation efforts. This incentivizes powerful states to condition their ratification upon the satisfaction of their strategic domestic interests. More research is needed to understand when states slow-walk ratification.

Supplementary Information

Supplementary information is available at the *International Studies Quarterly* data archive.

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