

# Using Trade Provisions to Make Environmental Agreements More Dynamic

This paper examines the impact of trade provisions on treaty dynamism. It differentiates between static treaties, which remain unaltered, and dynamic treaties, which generate new commitments, either by bringing about additional rules or attracting new parties. We argue that incorporating trade provisions into multilateral environmental agreements (MEAs) enhances their dynamism. Such provisions can empower interest groups to advocate for new international commitments and can prompt businesses in non-party states to pressure their governments to join the MEA. Analyzing a dataset of 647 MEAs, we find that provisions that restrict economic activities are associated with higher numbers of amendments and accessions. This insight is crucial for resolving the so-called ‘ambition/participation dilemma’ of MEAs and designing more adaptable treaties, particularly at a time when there is increasing enthusiasm for using trade measures to set up international climate clubs.

## Introduction

Treaties can be categorized as either static or dynamic (De Bruyne *et al.* 2020). Static treaties remain unchanged even when the surrounding context evolves. Over time, they may become increasingly inadequate in addressing the issue they were originally meant to tackle. They risk becoming “zombie” institutions (Gray 2018): technically in force but disconnected from their context. By contrast, dynamic treaties are “living legal animals” (Boisson de Chazournes 2009: 293). They are regularly revised and can potentially adapt to changing conditions (Haas *et al.* 1993). Institutional dynamism is particularly important for multilateral environmental agreements (MEAs) given the rapid changes in both the environment and our knowledge of it.

Our conceptualization of MEA dynamism covers two dimensions: (1) Rule-making: whether existing parties to an MEA update their commitments and adopt new rules; and (2) Membership: whether new parties subscribe to the existing set of rules provided in the MEA. It is sometimes assumed that these two dimensions pose an ambition/participation dilemma (Gilligan 2004; Von Stein 2008; Bernauer *et al.* 2013), whereby designing an MEA that combines ambitious rules with a broad membership is challenging.<sup>1</sup> The Paris Agreement, for example, boasts broad membership but entails modest obligations, while the Cartagena Protocol on biosafety has strict rules but a limited number of parties. However, effective MEAs often need both strong rules and broad membership.

This study takes a different approach by examining the evolution of MEAs and exploring ways to overcome the so-called ambition/participation dilemma over time (Downs *et al.* 1998). Although an MEA may initially lack ambitious obligations or broad membership, it has the potential to gradually gain depth and membership after its entry into force (Rowan 2021). An example is the Montreal Protocol on Substances that Deplete the Ozone Layer, which has been

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<sup>1</sup> The idea that strict obligations dissuade states from joining an MEA is contested in the literature (Rowan 2021; Farias and Roger 2022). This question, however, is beyond the scope of this paper.

amended 19 times between 1990 and 2018 to cover an expanding range of controlled substances and has attracted 151 new state parties since its entry into force in 1989 (DeSombre 2000; Parson 2003). Another illustrative case is the 1946 International Convention for the Regulation of Whaling, which has been amended 70 times and joined by 79 new countries. Replicating these successful instances of institutional dynamism is essential for achieving more effective global environmental governance.

In this context, this study asks: *what design features enhance the institutional dynamism of MEAs?* In other words, what seeds should be planted when an MEA is first negotiated to facilitate its growth in depth and membership over time? We hypothesize that incorporating trade provisions in MEAs enhances their institutional dynamism. We envision two different and independent causal mechanisms. Firstly, trade provisions can empower specific interest groups, such as providers of environmental goods and services, which then advocate for the adoption of additional international commitments. Secondly, businesses in countries not party to the MEA might experience a competitive disadvantage due to trade measures, prompting them to urge their governments to accede to the agreement. In both cases, trade provisions favor the incremental expansion of MEAs.

Relying on a dataset 647 MEAs, we find evidence supporting our theory. In particular, provisions that restrict trade are associated with higher numbers of amendments and accessions to an MEA. These findings are important to defuse the so-called ambition/participation dilemma and design more adaptive MEAs. Better understanding the effects of MEAs' trade provisions is both imperative and timely in light of the recent enthusiasm for using trade measures in global climate governance (e.g., Nordhaus 2015; Victor 2015; Keohane *et al.* 2017; Falkner *et al.* 2021).

The remainder of the article is divided into five sections. The first section reviews the literature on MEA design and effectiveness. The second introduces our hypotheses on trade provisions. The third presents our data and method. The fourth discusses our results. The last section concludes with policy recommendations on the design of MEAs, particularly related to climate change.

## Treaty ambition, participation, and design

There is a long-standing debate in the literature on the effectiveness of MEAs. Some scholars argue that most MEAs are effective (Chayes and Chayes 1995), while others contend that MEAs rarely lead to environmental improvements (Down 2000). One reason for this ambiguity is the absence of a consensual measure of treaty effectiveness. According to Oran Young (1994), effectiveness can be broken down into three successive steps: institutional output, behavioral outcomes, and impacts on the biogeophysical world. This latter level is the most challenging methodologically. Longitudinal data on the state of the environment are often fragmented or incomplete, especially in developing countries. Moreover, the causal chain connecting the adoption of an MEA to improved performance is long and indirect. Multiple variables can intervene, mediate, moderate, and confound this long causal chain, leading to over- or underestimations of MEAs' impacts (Mitchell 2006).

This paper focuses on the most immediate level of effectiveness: MEAs' institutional output. Studying the relationship between an MEA and its institutional output offers significant benefits. As Young observes, "the shortness of the causal chain in such cases makes the attribution of a variety of effects to the creation of regimes relatively uncontroversial" (2001: 116). Clearly, institutional output alone is just one aspect of treaty effectiveness and does not guarantee improved environmental performance. Nevertheless, from a methodological perspective, studying output is a first and prudent step to better understand MEA effectiveness. Furthermore, from a policy perspective, comprehending how MEAs institutionally expand over time is crucial to improve global environmental governance. MEAs that begin in a limited and modest manner must first generate tangible institutional output to have meaningful environmental impacts. Even MEAs that are more ambitious from the start risk becoming irrelevant in the face of changing geophysical and geopolitical contexts unless they produce institutional output that facilitates their ongoing adaptation.

This paper measures an MEA's output using the concept of institutional dynamism. We consider an MEA as dynamic when it generates additional commitments over time. Additional commitments can come from two different sources: either existing parties adopt new rules, or the existing set of rules attracts new parties.

The first dimension of institutional dynamism is well-documented by legal scholars. They have shown that several MEAs and their annexes have been amended to cover, for example, new harmful substances or new endangered species (Churchill and Ulfstein 2000; Boisson de Chazournes 2009; Wiersema 2009). It is frequent in environmental governance to initiate international cooperation with a relatively modest agreement that progressively gives rise to ever more ambitious rules. For example, the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora and its appendices were amended 22 times to add new protected species to the agreed list (Gehring and Ruffing 2008). The protocols to the International Convention for the Prevention of Pollution from Ships were amended multiple times, including to require new oil tankers to have double hulls, to prohibit the discharge of garbage into the ocean, to ban the discharge of sewage, and to limit the emission of sulfur oxide and nitrogen oxide emission from ship exhausts (Fitzmaurice 2023). However, most studies documenting this deepening of cooperation are descriptive and do not explain why certain MEAs provide a more fertile regulatory ground than others. The 1950 International Convention for the Protection of Birds and the 1973 Agreement on the Conservation of Polar Bears, for example, have not been amended once even though they were first concluded several decades ago, when the ecological context was quite different from what it has become. A recent study has found that MEAs with a collective body and amendment procedures are more likely to be amended, but these are more enabling than causal variables (Laurens *et al.* 2023).

The second dimension of dynamism – increased membership – is explored in studies aiming to explain variation in MEA participation. The Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat has attracted more than 150 accessions since its entry into force in 1975, whereas the 1993 Convention Concerning the Prevention of Major Industrial Accidents has remained staled at 18 parties for the last 10 years despite being

open to accession. Scholars have found several variables associated with the number of MEA ratifications, including economic openness (Egger *et al.* 2011), the influence of powerful parties (Schulze and Tosun 2013), ecological vulnerabilities (Sprinz and Vaahtoranta 1994), domestic institutions (Bättig and Bernauer 2009), and the ratification choices of related states (Perrin and Bernauer 2010). Most of these studies do not examine the specific design features of MEAs contributing to increased membership. Exceptions include studies on the attractiveness of funding mechanisms (Carraro *et al.* 2006; Mohrenberg *et al.* 2019), assistance provisions (Bernauer *et al.* 2013), transparency mechanisms (Koubi *et al.* 2020), and differential treatment for developing countries (Farias and Roger 2022). However, the literature on MEA membership typically considers the number of ratifications from a static perspective, at the time the MEA is concluded. Few studies look at how certain design features can create a dynamic setting and attract new members over time.

The existing literature on the design of MEAs provides limited insights into what explains subsequent dynamism. Building on the insights of Koremenos and her colleagues (2003), several studies suggest that the design of MEAs is determined by the specific problem structure they aim to address (Mitchell 2006; Thompson 2010). However, this literature has paid scant attention to the dynamic nature of treaties over time. Treaty design is usually regarded as a dependent variable, rather than an independent variable. Although there are a few exceptions (Gehring 2008; Young 2010; Laurens *et al.* 2023), most studies explain the initial design features of MEAs, as opposed to the consequences of design choices.<sup>2</sup> As Ronald Mitchell and his colleagues argue, too few research projects “assess the effects, rather than the determinants, of variation in [international environmental agreements] features” (2020: 115).

This paper bridges the literature on MEA effectiveness with the literature on MEA design by investigating the consequences of specific design choices on institutional dynamism. It departs from traditional debates on what drives design choices or on whether MEAs are generally effective. Instead, it analyzes how certain design features can be the “active ingredients” (Mitchell 2006: 74) of institutional dynamism. In doing so, it combines the precision of the literature on MEA design with the policy relevance of the literature on MEA effectiveness.

## The trade provisions hypotheses

Several MEAs incorporate trade provisions.<sup>3</sup> These provisions range from banning the export of endangered species and quarantine protocols for plants to promoting international environmental certifications and favoring foreign investment to build infrastructure on a shared river basin. For example, the 1998 Rotterdam Convention mandates proper labeling and notification by exporters of hazardous chemicals and pesticides. The 2010 Nagoya Protocol promotes preferential access to technologies utilizing genetic resources for their original

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<sup>2</sup> Studies looking at treaties other than MEAs have drawn inspiration from neofunctionalism or historical institutionalism to show how institutions change over time and undergo transformations (Fioretos 2011; Copelovitch and Putnam 2014; Voeten 2019).

<sup>3</sup> In fact, some analysts consider MEAs, such as the Basel and the Stockholm Conventions, as trade agreements, even though these MEAs have a very different structure and purpose than traditional preferential trade agreements.

providers. The 2009 Agreement on Port State Measures allows states to refuse docking to vessels involved in unregulated fishing. Other significant MEAs with trade elements include the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Cartagena Protocol on biosafety, the Basel Convention on hazardous wastes, the Stockholm Convention on persistent organic pollutants, and the Minamata Convention on mercury.

Studies have already found that MEAs with trade provisions can have significant and substantial effects on trade flows (De Santis 2012; Aichele and Felbermayr 2013; Kim 2016; Borsky *et al.* 2018; Ederington *et al.* 2022; Morin *et al.* 2023). This paper explores the idea that these trade provisions enhance MEA dynamism, leading to additional parties and/or commitments. We remain agnostic as to whether negotiators strategically incorporate trade provisions with the intention to make MEAs dynamic. We focus instead on the effect of these provisions, and we consider two positive feedback mechanisms.

The first mechanism involves domestic business interest. Trade provisions can strengthen the economic and political position of some business actors, such as producers of environmental goods, while disadvantaging others, such as producers of polluting goods. In this way, trade provisions alter the relative capacity of different businesses to influence domestic policymaking. These changes in domestic lobbying capacities, in favor of environmental businesses and in disfavor of polluting businesses, might also lead states to double down on their international commitments. If this process occurs in a sufficient number of states, the MEA is likely to be amended to include stricter environmental provisions. This argument aligns with research indicating the significant role of domestic lobby groups and distributional conflicts in shaping international environmental commitments (Aklin and Mildenberger 2020; Colgan *et al.* 2021).

A case in point is the 1987 Montreal Protocol on the ozone layer. Its limitations on the production and trade of ozone-depleting substances catalyzed a “fundamental shift in industrial processes [that] would have been inconceivable without international registration” (DeSombre 2000: 60). Some of the same businesses that had lobbied against the protocol when it was first concluded subsequently developed lucrative substitutes for ozone-depleting substances and, by the early 1990s, championed the strengthening of the protocol to expand their market share. This led to a series of adjustments to the original protocol, including to accelerate the freeze and the complete phaseout of ozone-depleting substances (DeSombre 2000: 55).<sup>4</sup>

Another instance is the 2013 Minamata Convention, which imposes trade restrictions on mercury. These restrictions resulted in reduced global mercury demand, decreased production, and the emergence of mercury-free technologies (Sodeno 2023). These industry shifts are prompting European nations to consider more stringent mercury regulations than those stipulated by the Minamata Convention. Similar trends of treaties fostering further cooperation have been observed in other areas, including political rights (Kartal 2014) and economic integration (Down *et al.* 1998). On this basis, we hypothesize the following:

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<sup>4</sup> This acceleration was made easier by the fact that adjustments adopted by a majority of two-thirds of parties are binding on all parties, including those that did not vote in favor of them.

H1: *The more an MEA includes trade provisions, the more likely it is to be amended.*

The second mechanism takes place at the international level. Several trade-related provisions discriminate against states not parties to the MEA.<sup>5</sup> Some of these discriminatory measures are clear and explicit. For instance, the 1989 Basel Convention allows trade in hazardous wastes under certain conditions with other parties but bans trade with non-parties. Other trade provisions might have indirect discriminatory effects. For example, it might be easier for states to legally export alligator leather products or avoid sanctions for illegal ivory trade if they are parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora than if they are not. In this context, businesses in non-party states may prompt their government to join MEAs to counteract such discrimination.

A telling example is the International Convention for the Conservation of Atlantic Tunas (ICCAT), which restricts imports of tuna caught by ships registered in non-member countries. Penalized vessels pressured their governments to join the convention to gain access to the lucrative markets of ICCAT countries (DeSombre 2005). Under such pressure, countries like Belize, Honduras, Panama, Saint Vincent and the Grenadines, and Sierra Leone reformed their fisheries practices and became ICCAT members.

Similarly, the Montreal Protocol prohibits importing ozone-depleting substances from non-member nations. The objective was to “stimulate as many nations as possible to participate in the protocol, by preventing non-participating countries from enjoying competitive advantages and by discouraging the movement of CFC production facilities to such countries” (Benedick 1991: 91). Studies have found that these trade measures created sufficient incentive for several countries relying on ozone-depleting substances to join the protocol (Werksman 1992).<sup>6</sup> Obviously, ICCAT and the Montreal Protocol might not be representative of the hundreds of existing MEAs with trade provisions. This anecdotal evidence nevertheless led us to expect that trade provisions boost membership numbers. Thus, our second hypothesis is the following:

H2: *The more an MEA includes trade provisions, the more parties accede to this MEA following its entry into force.*

These two processes operate independently. It is conceivable that trade provisions mainly impact interest groups within parties to the MEAs, leading to additional rules while having little effect on third parties and not yielding additional accessions. Conversely, the opposite is also possible: a set of trade provisions can attract new accessions to an MEA without necessarily encouraging a higher degree of ambition for the same MEA. What both processes have in common is their increasing returns as trade provisions gradually shift the political economy

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<sup>5</sup> Such discriminatory measures are not necessarily prohibited by World Trade Organization Agreements and might be authorized under GATT Article XX exceptions.

<sup>6</sup> Beron *et al.* (2003) contest the idea that trade provisions made the Montreal Protocol more attractive for accession. This paper does not provide new evidence regarding the Montreal Protocol in particular, but it contributes to this literature by extending the analysis to 654 MEAs.

landscape in favor of MEAs. They favor a form of “sequential” (Down *et al.* 1998), “incremental” (Abbott and Snidal 2004), or “catalytic” (Hale 2020) cooperation.

## Data and Method

We test our two hypotheses on 647 MEAs concluded between 1945 and 2015.<sup>7</sup> We drew the full text of these MEAs, as well as information on their parties and amendments, from the International Environmental Agreements Database Project (IEADB, Mitchell 2002-2024), supplemented by additional searches where necessary. This collection of MEAs is the most exhaustive in this field.

The simplest way to capture the trade-related content of an MEA is to simply count all trade provisions it includes. We then assume that a higher number of trade provisions proxies for a deeper trade regulation. Data on the number of trade provisions included in MEAs come from Morin *et al.* (2023), who identified 48 types of trade-related provisions. They also differentiated MEA trade provisions according to whether they are of a trade-restricting or trade-liberalizing character. *Trade-restrictive* provisions are rules that seek to restrict certain imports or exports. For instance, the 2000 Cartagena Protocol on Biosafety introduces a complex procedure requiring exporters of living modified organisms to obtain the prior informed consent of the importing state, making trade in living modified organisms more burdensome than for other food and agricultural products. Another example is the 1991 Bamako Convention, which prohibits imports of hazardous and radioactive waste.

*Trade-liberalizing* provisions cover rules intended to encourage trade flows. For example, an agreement on fisheries concluded in 1994 between small island states of the South Pacific includes a most favored nation clause: “fishing vessels of the Parties may gain access to the waters within the Arrangement Area on terms and conditions no less favorable than those granted by the Parties to foreign fishing vessels under bilateral and multilateral access arrangements” (article 2(c)). The 2011 Protocol on Sustainable Tourism between East European countries includes several trade-liberalizing provisions aimed at the “harmonization of policies aiming at sustainable tourism planning, development and management in the Carpathians” (article 4).

Among the 48 types of trade provisions, 28 are trade-restrictive and 20 are trade-liberalizing. To better account for the fact that different provisions may have complementary or substituting relationships, we use two indices of trade restriction and trade liberalization. Each index is constructed to range between zero and one, where a higher number indicates a greater level of trade restriction or liberalization, respectively. The formulas for the index creation are listed in Appendix A. MEAs can be trade-restrictive and trade-liberalizing at the same time, so that the two concepts are not mutually exclusive.

For our first hypothesis, the dependent variable corresponds to the number of amendments added to an MEA during its lifetime up until 2015. Amendments are identified with

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<sup>7</sup> Because one of our dependent variables is the number of accessions to an MEA, we drop from the original sample of 651 MEAs the four MEAs that are explicitly closed to accession.

the IEADB's "lineage" variable, which captures additional instruments legally linked to an MEA and, hence, the "evolution of governance efforts by groups of states to address an environmental problem" (Mitchell *et al.* 2020: 105). We exclude protocols to MEAs from this measure of Rule-Making, as we consider protocols as standalone treaties that can be amended over time, just like any other MEA. We analyzed a random sample of 183 amendments and found that most of them clearly improve (60,1%) or likely improve (30,1%) environmental governance, either by increasing environmental protection or by bolstering governing institutions. Only a small fraction of 2.2% of the amendments appear to lessen environmental protection, while 7.7% seem neutral. Nevertheless, all amendments could be seen as a form of institutional adaptation. Even those that reduce environmental protection may be considered more favorable than formally terminating the MEAs or allowing their political marginalization. To be sure, amendments are not the only option available to countries to flesh out the rules of an MEA. Other institutional choices notably include COP decisions and resolutions.<sup>8</sup> However, current data limitations prevent us from including these alternative instruments in a large-N analysis. Still, formal amendments are typically more difficult to negotiate and more binding on the parties and are therefore rarer. We thus have reasons to believe that a positive effect of MEA trade provisions on amendments would likely extend to more accessible rule-making instruments.

For our second hypothesis, the dependent variable corresponds to the number of countries acceding to an MEA. We consider a country's signature of the MEA as an accession if it occurs later than the entry into force of the MEA. When country signature dates are unavailable, we use the ratification date or the date of entry into force for the country. We assume that states that sign an MEA after its entry into force did not participate in its original negotiations.<sup>9</sup>

In both analyses, we control for the duration of the agreements, because a longer existence naturally implies a greater probability of both amendments and accessions.<sup>10</sup> We also control for the general depth of the agreements in all estimations since agreements that include more trade-related provisions are likely to be more ambitious in general. We measure depth as the number of words contained in the agreements. For the estimations, we standardize the number of words and the duration to have mean zero and a standard deviation of one, so that the coefficients for both variables can be interpreted as the association with one standard deviation of depth and duration.<sup>11</sup>

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<sup>8</sup> Another example is the ever more ambitious Nationally Determined Contributions (NDCs) submitted by Parties to the Paris Agreement arguably, which make this MEA dynamic in a "bottom-up" way independent of how many annexes or amendments are added to this agreement.

<sup>9</sup> This is a reasonable assumption. For example, the Bamako Convention was negotiated between 12 African states between 1989 and 1991. All of them had signed (but not necessarily ratified) the convention when it entered into force in 1998. None of the 17 countries that signed the convention at a later stage were part of the original negotiating group.

<sup>10</sup> An alternative approach would be to divide the numbers of amendments and accessions by the duration of the agreements and use these per-year variables as the dependent variables. This yields similar results, and we thus stick to the more directly interpretable aggregate values controlling for duration.

<sup>11</sup> This procedure ensures that all other coefficients can directly be read for an MEA of average depth and duration, which is only relevant for the respective constants.



In robustness tests, we also include control variables on the characteristics of the MEAs and their original members in our estimations. The country-level variables include the average GDP per capita as a proxy for the average development level, the average absolute levels of GDP at the time of the original signature for average, and the combined absolute GDP for aggregate market size of the original members. These GDP-related variables are all in logs of constant 2015 US dollars and the data comes from the World Bank World Development Indicators. Other country-level variables include total populations (World Bank), the average trade share of percentage of merchandise exports and imports in overall GDP (World Bank), the average level of domestic environmental regulation (Yale Environmental Performance Index), and the average level of democracy (Polity IV dataset).

As for the additional controls for MEA characteristics, we control for the MEAs' subject area and the involvement of the United States or the European Union as an original signatory. We also control for whether the MEAs include a funding mechanism, provide technical assistance for developing countries, allow for differential treatment of developing countries, or have a compliance or enforcement mechanism in place, as all of these design features may be correlated with the intensity and direction of trade-regulation and affect the likelihood of amendments and/or accessions. We also include whether MEAs explicitly provide for the adoption of amendments.

We further control for the number of original signatories, which is particularly important for the estimation on accessions for two reasons: more original members could make it more attractive to join an MEA, but more non-members imply more potential new members. Thus, the direction of the expected effect is unclear ex-ante. As the first effect is likely to be particularly important when there are a few original members while the second effect is likely to be particularly relevant when there are several original members, we include the squared term of the number of original members to account for this expected non-linear effect. The number of original members may also influence the negotiation of amendments. The more original members an MEA has, the more politically challenging it might be to reach a consensus for the adoption of an amendment. **Table B 1** in Appendix B lists the summary statistics of all variables used in the estimations.

In both analyses, our independent variable of interest is the time-invariant trade content of MEAs. Therefore, we estimate the relationships in the cross-section. We use the five above-mentioned measures of MEA trade content: the absolute number of trade-related provisions, the number of trade-restrictive provisions, the number of trade-liberalizing provisions, the trade-restrictive index, and the trade-liberalizing index.

Due to the discrete nature of the two dependent variables (amendments and accessions) that show a Poisson distribution, we estimate Poisson regression models in the cross-section. The respective regression equations read as follows:

$$\text{For H1: } \log(E(\text{Amendments} | \text{TradeContent})) = \alpha + \beta * \text{TradeContent} + \gamma * X,$$

$$\text{For H2: } \log(E(\text{Accessions} | \text{TradeContent})) = \alpha + \beta * \text{TradeContent} + \gamma * X,$$

Where *TradeContent* corresponds to the various measures of our independent variable for MEA  $i$ , and  $\mathbf{X}$  is a vector of control variables.  $\beta$  is our estimated coefficient of interest. We use heteroskedasticity-robust standard errors in all estimations.

## Results

We begin by estimating the baseline regressions including only the depth and duration of MEAs for both amendments and accessions as control variables, using different specifications of the explanatory variable of interest, that is, the number of trade provisions and index-based measures of MEA trade content. The results of the baseline estimation for amendments are shown in **Table 1**. In line with hypothesis 1, higher numbers of trade provisions are associated with more amendments (column 1). The results in columns 2 and 3 show whether this effect is primarily driven by restrictive or liberal provisions, either captured by their simple count (column 2) or by the respective index (column 3). For both specifications, the results clearly indicate that the relationship between trade provisions and amendments appears to be driven more by restrictive than by liberal provisions. The control variables display the expected positive relationships.

**Table 1: Baseline estimation for rule-making (amendments)**

	(1) Amendments	(2) Amendments	(3) Amendments
No. Provisions	0.163*** (0.050)		
No. Restrictive		0.206*** (0.042)	
No. Liberalizing		0.061 (0.109)	
Restrictive Index			4.588*** (1.235)
Liberalizing Index			-1.137 (2.545)
Depth	0.169** (0.068)	0.186*** (0.072)	0.201** (0.085)
Duration	0.727*** (0.229)	0.704*** (0.221)	0.708*** (0.231)
Constant	-0.795*** (0.267)	-0.775*** (0.269)	-0.770*** (0.288)
No. Observations	647	647	647

Robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The results of the baseline estimation for accessions are shown in **Table 2**. In line with our second hypothesis, higher numbers of trade provisions are associated with more accessions (column 1). Here again, this effect appears solely driven by restrictive provisions, either captured by their simple count (column 2) or by a restrictiveness index (column 3). Because it is the most precise measure of the trade content of MEAs, we use the indices as explanatory variables in all subsequent estimations.

**Table 2: Baseline estimation for membership (accessions)**

	(1) Accessions	(2) Accessions	(3) Accessions
No. Provisions	0.086* (0.050)		
No. Restrictive		0.140*** (0.047)	
No. Liberalizing		-0.062 (0.111)	
Restrictive Index			2.530** (1.156)
Liberalizing Index			-2.147 (2.038)
Depth	0.167*** (0.054)	0.191*** (0.055)	0.208*** (0.061)
Duration	0.365*** (0.070)	0.339*** (0.069)	0.344*** (0.071)
Constant	1.850*** (0.140)	1.880*** (0.141)	1.898*** (0.146)
No. Observations	647	647	647

Robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

In a first set of extensions of the baseline results, we control for characteristics of the MEAs' original members in our estimations. **Table 3** shows the results when including the additional control variables subsequently in the estimations for amendments (H1). As many of the country data are not available for all countries in the main sample for the respective years, the sample sizes tend to be somewhat smaller in these estimations.

The results show that original members' income level, average, and overall market size within an MEA as well as their size measured by population are associated with more amendments. In addition, higher environmental protection levels in original member countries as measured by the average EPI come with more amendments to the MEAs. We do not observe an effect for democracy levels or trade openness. Most importantly, the effect of trade provisions on subsequent amendments remains unchanged when these country characteristics are controlled for.

**Table 3: Estimations for rule-making including control variables for original members**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Amend	Amend	Amend	Amend	Amend	Amend	Amend
Restrictive index	4.008*** (1.246)	4.038*** (1.205)	3.180*** (1.125)	2.896** (1.128)	4.698*** (1.237)	4.579*** (1.229)	4.054*** (1.193)
Liberalizing index	0.204 (1.828)	0.176 (1.817)	0.223 (1.614)	0.288 (1.675)	-1.086 (2.458)	-1.134 (2.492)	0.273 (1.912)
Av. GDP p.c.	0.305*** (0.094)						
Av. GDP		0.280*** (0.100)					
Total GDP			0.486*** (0.127)				
Total Population				0.560*** (0.128)			
Av. EPI					0.014*** (0.005)		
Av. Polity						0.000 (0.015)	
Av. Trade							0.011 (0.008)
Depth	0.177** (0.080)	0.178** (0.079)	0.079 (0.073)	0.048 (0.075)	0.208** (0.084)	0.196** (0.084)	0.160** (0.081)
Duration	0.506*** (0.102)	0.493*** (0.100)	0.751*** (0.118)	0.668*** (0.106)	0.656*** (0.234)	0.708*** (0.230)	0.634*** (0.181)
Constant	-0.785*** (0.262)	-0.778*** (0.261)	-14.854*** (3.628)	-11.765*** (2.433)	-1.577*** (0.405)	-0.730** (0.303)	-1.302*** (0.329)
No. Observations	633	633	633	638	647	614	595

Robust standard errors in parentheses

\* p&lt;0.10, \*\* p&lt;0.05, \*\*\* p&lt;0.01

**Table 4** depicts the results when including control variables on country characteristics when estimating the correlates of accessions (H2). The same characteristics that influence amendments are also related to more accessions: richer original members (measured by average per capita GDP), greater average and total market, total population size, and higher average EPI are associated with more accessions to MEAs. We do not observe an association with levels of democracy or trade openness. The inclusion of these country-level variables does not qualitatively affect the estimated relationship of later accessions with the restrictive index. Even when controlling for these characteristics, the results indicate that more restrictive MEAs attract more accessions.

**Table 4: Estimations for membership including control variables for original members**

	(1) Accessions	(2) Accessions	(3) Accessions	(4) Accessions	(5) Accessions	(6) Accessions	(7) Accessions
Restrictive index	2.549** (1.191)	2.638** (1.161)	1.576* (0.829)	1.356* (0.806)	2.629** (1.168)	2.502** (1.132)	2.535** (1.171)
Liberalizing index	-1.809 (1.936)	-1.748 (1.889)	-1.783 (1.469)	-1.744 (1.602)	-2.014 (1.970)	-2.156 (1.986)	-2.207 (2.103)
Av. GDP p.c.	0.245*** (0.071)						
Av. GDP		0.289*** (0.063)					
Total GDP			0.902*** (0.085)				
Total Population				0.847*** (0.062)			
Av. EPI					0.012*** (0.004)		
Av. Polity						-0.007 (0.013)	
Av. Trade							0.004 (0.005)
Depth	0.210*** (0.061)	0.212*** (0.060)	0.055 (0.046)	0.016 (0.049)	0.211*** (0.060)	0.203*** (0.060)	0.208*** (0.062)
Duration	0.376*** (0.074)	0.365*** (0.074)	0.864*** (0.091)	0.618*** (0.082)	0.302*** (0.073)	0.339*** (0.071)	0.543*** (0.115)
Constant	1.870*** (0.146)	1.853*** (0.145)	-24.707*** (2.536)	-15.033*** (1.262)	1.223*** (0.279)	1.977*** (0.163)	1.737*** (0.307)
No. Observations	633	633	633	638	647	614	595

Robust standard errors in parentheses

\* p&lt;0.10, \*\* p&lt;0.05, \*\*\* p&lt;0.01

We further control for other characteristics of the MEAs themselves that may be correlated with trade provisions, amendments, and accessions. We start by looking at the subject areas of the respective agreements, as agreements on certain subject areas may likely include

more trade-related provisions. The underlying data identify ten of such subject areas, with the most prevalent being agreements on pollution (140 MEAs), fisheries (108), freshwater (86), oceans (83), and biodiversity (81). The results for both amendments (column 1) and accessions (column 2) are depicted in **Table 5**. They show notable differences between agreements of different subject areas with regard to the number of amendments and accessions they exhibit.<sup>12</sup> The few MEAs on energy (28 MEAs) and security (5 MEAs) appear to be particularly static in terms of rule-making. However, most importantly, the findings on the association of trade-related provisions and dynamism in terms of rule-making and membership are not affected by controlling for the subject area of the MEAs. This implies that even within subject areas, more trade-restrictive provisions increase treaty dynamism.

**Table 5: Estimations on rule-making and membership, controlling for IEA’s subject areas**

	(1) Amendments	(2) Accessions
Restrictive index	3.191*** (1.030)	2.092** (0.981)
Liberalizing index	0.583 (3.406)	-0.688 (1.829)
Pollution	0.128 (0.406)	2.618*** (0.185)
Fish	-1.232*** (0.337)	0.682*** (0.255)
Freshwater	-1.975*** (0.456)	-1.009** (0.473)
Ocean	-1.158** (0.496)	2.282*** (0.319)
Biodiversity	-0.324 (0.455)	1.722*** (0.278)
Agriculture	-1.321*** (0.430)	1.784*** (0.281)
General	-3.100*** (0.798)	0.780** (0.348)
Energy	-17.722*** (0.449)	1.849*** (0.497)
Weapons	-17.100*** (0.705)	2.397*** (0.505)
Others	-1.617** (0.799)	2.493*** (0.327)

<sup>12</sup> Note that the estimated constant in the baseline regressions for amendments is negative, such that most estimated constants for the different subject areas are also negative, and vice versa for accessions. As can be seen when comparing the standard errors, the differences between the subject areas are in many (although not all) cases also statistically significant.

Depth	0.218*	0.151**
	(0.114)	(0.060)
Duration	0.821***	0.459***
	(0.210)	(0.081)
No. Observations	647	647

Robust standard errors in parentheses  
\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

Next, we include further MEA characteristics as control variables. The results for the estimation on rule-making are depicted in **Table 6**. Columns 1 and 2 show that MEAs in which the EU or the US are an original signatory experience more amendments in their lifetime. A funding mechanism is associated with fewer amendments (column 3) and differential treatment for developing countries with more amendments (column 5). We find no statistically significant relationship with provisions related to technical assistance (column 4) or compliance and enforcement mechanisms (column 6). The number of original members is related to the number of amendments, but this effect decreases with the number of original members (column 7). This suggests that the number of parties increases the demand for rule-making, as various concerns can be expressed, but simultaneously makes the supply of rule-making more challenging, as a consensus becomes progressively out of reach. Irrespective of these characteristics, the results on the restrictive index are unchanged in all these estimations: it is associated with more amendments even when considering its relationship to any of these treaty characteristics.

The inclusion of formal amendment procedures in an MEA is not only potentially correlated with trade provisions but may also be an enabling condition for trade provisions to affect amendments in the first place. We therefore not only include it as a control variable but interact this dummy variable with the restrictive and liberalizing index, respectively (column 8 of **Table 6**). The results show that this formal possibility is associated with more amendments, and that the trade-restrictive index is only associated with more amendments if amendment procedures are explicitly provided.

**Table 6: Estimations for rule-making including control variables for treaty characteristics**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Amend	Amend	Amend	Amend	Amend	Amend	Amend	Amend
Restrictive index	4.134***	3.794***	4.906***	4.524***	4.147***	4.605***	3.242***	
	(1.301)	(1.109)	(1.242)	(1.148)	(1.225)	(1.362)	(1.229)	
Liberalizing index	-1.854	0.215	-1.418	-1.159	-1.115	-0.883	-2.314	
	(2.767)	(1.835)	(2.579)	(2.483)	(2.509)	(2.341)	(1.991)	
EU	1.138***							
	(0.415)							
US		1.408***						
		(0.323)						

Funding									-0.656*	
									(0.398)	
Assistance									0.094	
									(0.414)	
Diff. Treat.									1.003**	
									(0.459)	
Enforcement									-0.785	
									(0.989)	
Original Members									0.059***	
									(0.013)	
Orig. Members ^2									-0.000***	
									(0.000)	
RESTRICTIVE INDEX										
--- No Poss. Of Amendment										-1.123
										(2.784)
--- Poss. Of Amendment										2.540**
										(1.165)
LIBERALIZING INDEX										
--- No Poss. Of Amendment										2.643
										(2.319)
--- Poss. Of Amendment										-1.247
										(1.958)
Poss. Of Amendment										2.244***
										(0.443)
Depth	0.166*	0.172**	0.201**	0.197**	0.210***	0.250**	0.297**	0.106		
	(0.096)	(0.070)	(0.084)	(0.091)	(0.081)	(0.121)	(0.128)	(0.081)		
Duration	0.847***	0.617***	0.680***	0.720***	0.752***	0.730***	0.707***	0.853***		
	(0.260)	(0.214)	(0.228)	(0.247)	(0.239)	(0.240)	(0.223)	(0.179)		



Constant	1.009*** (0.386)	1.355*** (0.224)	-0.729** (0.288)	-0.791** (0.351)	0.826*** (0.309)	-0.760** (0.302)	-1.423*** (0.223)	-1.669*** (0.294)
No. Observations	647	647	647	647	647	647	647	647

Robust standard errors in parentheses  
\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

In columns 1 through 7 of **Table 7**, the results of the estimations for accessions with the same treaty-specific controls are reported. We observe more accessions to MEAs that have the EU or the US as an original member (columns 1 and 2), and to those that have funding, technical assistance, or differential treatment mechanisms in place (columns 3 through 5). As it is the case for the adoption of amendments, we see no relationship between compliance or enforcement mechanisms and the attraction of new parties (column 6). The relationships with the number of original parties go in the expected directions: more original members make accessions more likely, but this relationship is shrinking with an increasing number of original members (column 7).<sup>13</sup>

Most relationships presented up to this point are very similar for amendments and accessions. This could support the interpretation that trade-restrictive agreements are generally more dynamic. An alternative interpretation could be that rule-making and membership are simply interlinked, and that more amendments to an agreement also increase the likelihood of accessions. To exclude this interpretation, we include amendments as an additional control variable in the estimation using accessions as the dependent variable. The results are reported in column 8 of **Table 7**. They show that amendments and accessions indeed go together, but that trade-restrictive provisions are associated with more accessions even independent of agreements' dynamism with respect to rule-making.

The results of all estimations including the country- and treaty-specific control variables using the count number of trade-restrictive and trade-liberalizing provisions are reported in **Table C 1** through **Table C 5** in Appendix C. They are qualitatively identical to those reported in the main text, showing that the definition of the restrictive and liberalizing index is not driving the results.

**Table 7: Estimations for membership including control variables for treaty characteristics**

	(1) Access	(2) Access	(3) Access	(4) Access	(5) Access	(6) Access	(7) Access	(8) Access
Restrictive index	2.077* (1.128)	1.925** (0.902)	1.963* (1.105)	2.036* (1.196)	2.224* (1.155)	2.517** (1.184)	1.040* (0.598)	1.951* (1.118)

<sup>13</sup> In this regression, the point estimate for the restrictive index is substantially lower than in all other estimations, despite still being statistically significant and substantial in size. This means that the number of original members explains some part of the association between trade-restrictiveness and accessions. However, firstly, even given the number of original members, trade restrictiveness is still associated with more accessions. Secondly, it is unclear to which extent agreements with an intermediate number of original members that happen to contain more trade-restrictive provisions attract more accessions, or if it is actually their trade-related content that drives the accessions.

Liberalizing index	-3.382 (2.533)	-0.481 (1.388)	-1.988 (2.121)	-2.657 (2.131)	-2.192 (1.997)	-2.116 (2.010)	-3.233** (1.373)	-1.784 (1.806)
EU	0.915*** (0.259)							
US		1.581*** (0.211)						
Funding			0.911*** (0.302)					
Assistance				0.615** (0.312)				
Diff. Treat.					0.682* (0.395)			
Enforcement						-0.128 (0.497)		
Original Members							0.083*** (0.008)	
Orig. Members ^2							-0.000*** (0.000)	
Amendments								0.039*** (0.008)
Depth	0.191*** (0.070)	0.152*** (0.047)	0.212*** (0.062)	0.189*** (0.061)	0.214*** (0.058)	0.216*** (0.076)	0.192*** (0.071)	0.199*** (0.057)
Duration	0.432*** (0.078)	0.246*** (0.070)	0.397*** (0.077)	0.422*** (0.086)	0.365*** (0.074)	0.347*** (0.069)	0.367*** (0.097)	0.234*** (0.071)
Constant	1.752*** (0.169)	1.193*** (0.183)	1.793*** (0.149)	1.760*** (0.166)	1.873*** (0.151)	1.903*** (0.155)	0.628*** (0.165)	1.857*** (0.139)
No. Observations	647	647	647	647	647	647	647	647

Robust standard errors in parentheses

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

Overall, we find strong support for our two hypotheses on rule-making and membership. Both analyses show that a higher trade content in MEAs is associated with increased institutional dynamism. This effect is mostly driven by trade-restrictive provisions. In the case of amendments, this may be explained by the fact that these provisions have more immediate effects or are more economically impactful than trade-liberalizing provisions. Trade-restrictive provisions might be more harmful to polluting firms and generate greater change in the domestic composition of interest groups.

In the case of accessions, one explanation could be that trade-restrictive and trade-liberalizing provisions communicate different signals to non-party countries and that these countries do not react similarly to such signals. Liberalizing provisions favor trade between parties. There is little interest for any state in formalizing a trade-liberalizing concession in a treaty and extending this privilege to all states, including non-parties. Restrictive provisions, for their part, can create similar discriminatory effects against non-parties. Non-parties are likely to face trade measures that are even more restrictive than parties. For example, an MEA might prohibit exports of specific goods to non-parties, while only imposing conditions for exports to other parties. In sum, trade-liberalizing provisions create a positive club good (trade flows increase more among parties than with non-parties) whereas trade-restrictive provisions create a negative club good (trade flows decrease less among parties than with non-parties). In line with behavioral economics findings and the loss aversion argument (Kahneman and Tversky 1979), one possible explanation for our results is that non-party countries (or their domestic interest groups) react more strongly to the potential losses generated by trade-restrictive provisions than to the potential gains generated by trade-liberalizing provisions in MEAs.

## Conclusion

Scholars of global environmental governance disagree on what are the main obstacles to a transition toward decarbonization. It has long been assumed that states are caught in the suboptimal equilibrium of a prisoner's dilemma. According to this well-established view, states are not willing to pay a heavy price for decarbonization if their foreign competitors can free ride on their efforts and enjoy the benefit of a more stable climate without paying their fair share. Nordhaus' (2015) proposal to create climate clubs aims to address this free-rider problem. He argues that a hypothetical agreement imposing trade penalties on non-parties would incentivize reluctant states "to participate in agreements with high levels of abatement" (2015: 1347).

More recently, scholars have pointed out that the prisoner's dilemma has been greatly overestimated as an explanation (Aklin and Midenberger 2020). Instead, the main obstacle to decarbonization might be distributive conflicts between owners of assets that accelerated climate change and owners of assets that are vulnerable to climate change (Colgan *et al.* 2021). If so, the way to accelerate the energy transition is not through the conclusion of climate treaties but through the disruption of domestic political systems that give power to owners of assets that exacerbate climate change.

A midway argument is possible: both domestic and international political economies matter. For example, supporters of the European Union's Carbon Border Adjustment Mechanism (CBAM) argue that it will simultaneously pressure other jurisdictions to introduce carbon pricing schemes and it will create within the European Union favorable political economy conditions to increase European prices on carbon (Cosbey *et al.* 2021). Not only the two explanations for slow decarbonization and related policy proposals are not mutually exclusive, but they can reinforce each other: owners of assets that accelerated climate change can use arguments related to free riding to convincingly make their case and slow down further the transition.

This debate on the value of climate clubs suffers from a lack of empirical studies. Since no climate clubs currently exist, at least not in the form envisioned by Nordhaus (2015), the literature mainly relies on theoretical inquiries, game theory, and agent-based models (e.g., Kemfert 2004; Lessmann *et al.* 2009; Hovi *et al.* 2019). However, MEAs with trade provisions provide analogous institutional setups and might be instructive for the design of climate clubs. Even though climate change is a *sui generis* problem due to its scale, it would be ill-advised to move forward on the creation of climate clubs without looking at the experience of existing MEAs and identifying design elements that are most likely to generate the expected benefits.

This paper provides evidence consistent with the idea that MEAs have consequences both for domestic and international political economies. Our results indicate that MEAs that restrict trade with non-parties change their interest calculation and provide incentives for accession. This first finding is consistent with the free-riding explanation and the proposal of creating clubs to address this problem. Our results also suggest that MEAs with trade provisions can contribute to changing the composition of domestic interest groups and increase support for additional environmental commitments. This second finding is consistent with the idea that state preferences are unstable and can be reoriented by affecting domestic power dynamics. Therefore, it appears that trade-restrictive provisions can dissipate the so-called "ambition/participation dilemma" by favoring institutional expansion over time, both in terms of depth and participation. Although no one should attempt to kill any number of birds by throwing stones at them, treaty negotiators should consider more frequently incorporating trade provisions in MEAs to alter both domestic and foreign interests at the same time.

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## A. Appendix A

For the two indices, we sum the dimensions and divide them by the sum of all weights such that the respective index values are between 0 and 1. We assign a weight of 4 to provisions that we expect to directly and substantially affect trade flows with non-parties, a weight of 3 to provisions that we expect to directly and substantially affect trade flows, a weight of 2 to provisions that we expect to more indirectly affect trade flows, and a weight of 1 to all other (in many cases broader and more general) trade provisions in MEAs.

### A.1 Liberalizing Index

#### Dimension 1.1: Liberal principles

<i>Indicators</i>	<i>Weight</i>	<i>No. of MEAs</i>
General commitment toward liberalized trade	1	120
Environmental measures should not hamper trade	1	19

Sum of the indicators. Score of this dimension between 0 and 2.

#### Dimension 1.2: Non-discrimination in trade

<i>Indicator</i>	<i>Weight</i>	<i>No. of MEAs</i>
Most-favored-nation treatment	3	15
National treatment	3	22
Other references to non-discrimination in trade	1	105

Sum of the indicators. Score of this dimension between 0 and 7.

#### Dimension 1.3: Non-limitation of trade

<i>Indicator</i>	<i>Weight</i>	<i>No. of MEAs</i>
Non-prohibition or non-limitation of importations	3	127
Non-prohibition or non-limitation of exportations	3	69

Sum of the indicators. Score of this dimension between 0 and 6.

#### Dimension 1.4: Promotion of trade

<i>Indicator</i>	<i>Weight</i>	<i>No. of MEAs</i>
Ecotourism	1	24
Trade in environmental goods or services	1	20
Promotion of ecolabels or certifications	1	24
Emissions trading schemes	1	12

Sum of the indicators. Score of this dimension between 0 and 4.

#### Dimension 1.5: Promotion of a liberal market economy

<i>Indicator</i>	<i>Weight</i>	<i>No. of MEAs</i>
Access to natural resources is facilitated	2	323
Liberalize foreign investment	2	43
Restrict subsidies	2	4
Restrict monopolistic practices	2	4
Liberalize public procurement	2	9

Sum of the indicators. Score of this dimension between 0 and 10.

**Dimension 1.6: Acknowledgment of international trade commitments**

<i>Indicator</i>	<i>Weight</i>	<i>No. of MEAs</i>
Cooperation with GATT-WTO	2	1
Reference to GATT-WTO	1	31
Cooperation with another trade institution	2	18
Reference to another trade institution	1	378

Highest indicators. Score of this dimension between 0 and 2.

**A.2 Restrictive Index**

**Dimension 2.1: Restrictive principle**

<i>Indicator</i>	<i>Weight</i>	<i>No. of MEAs</i>
Inappropriateness to relax environmental measures to encourage trade or investment	3	10

Score of this dimension between 0 and 3.

**Dimension 2.2: Import restrictions**

<i>Indicator</i>	<i>Weight</i>	<i>No. of MEAs</i>
Prohibition on import without a permit	3	14
Other import prohibition	3	67
Importer can require information	3	54
Importer can require quarantine	2	49
Other import restriction of general application	3	137
Ad hoc refusal of importations	2	38
Non-tariff duties or import taxes	3	7

Highest indicators. Score of this dimension between 0 and 3.

**Dimension 2.3: Export restrictions**

<i>Indicator</i>	<i>Weight</i>	<i>No. of MEAs</i>
Prohibition to export without a permit	3	26
Other export prohibitions	3	40
Exporter must notify the importer	2	17
Information requirement for exporter	2	121
Other export restrictions of general application	3	123
Ad hoc refusal of exportations	2	20
Export taxes	3	4

Highest indicators. Score of this dimension between 0 and 3.

**Dimension 2.4: Trade with non-members**

<i>Indicator</i>	<i>Weight</i>	<i>No. of MEAs</i>
Regulation of imports from non-parties	4	23
Regulation of exports to non-parties	4	32

Sum of the indicators. Score of this dimension between 0 and 8.

Dimension 2.5: Restriction on economic activities

<i>Indicator</i>	<i>Weight</i>	<i>No. of MEAs</i>
Restrictions on the production of specific goods	2	26
Restrictions on the extraction of specific natural resources	2	618
Restrictions on the selling of specific goods	2	72
Restrictions on the consumption of specific goods	2	226
Restrictions on the transportation of specific products	2	19
Restrictions on construction activities	1	25

Sum of the indicators. Score of this dimension between 0 and 11.

Dimension 2.6: Restrictions on a liberal market economy

<i>Indicator</i>	<i>Weight</i>	<i>No. of MEAs</i>
Access to natural resources is restricted	2	30
Foreign investment is restricted	2	3
Monopolistic practices are authorized	2	1
Public procurement is protected	2	0
Subsidies are authorized	2	1

Sum of the indicators. Score of this dimension between 0 and 10.

## B. Appendix B

**Table B 1: Summary Statistics**

Variable	Obs.	Mean	Std. Dev.	Min	Max
Accessions	647	7.885626	21.8211	0	169
Amendments	647	0.7897991	4.178563	0	69
No. Provisions	647	1.255023	2.073316	0	17
No. Restrictive	647	0.7094281	1.534622	0	11
No. Liberalizing	647	0.5455951	1.094883	0	13
Restrictive Index	647	0.0397763	0.0819864	0	0.6470588
Liberalizing Index	647	0.0248791	0.0570727	0	0.7096774
Number of Words	647	3822.464	5253.09	158	81555
Duration	647	28.17465	16.9552	1	72
Av. (log of) GDP p.c.	633	8.751012	1.189432	5.931106	10.8914
Av. (log of) GDP	633	24.8155	1.712092	19.46321	29.20699
Total GDP (log)	633	28.13425	2.283949	21.88186	32.12574
Total Population (log)	638	19.1241	1.645111	13.19257	22.77502
Av. EPI	647	55.86051	15.60559	27.75	81.15
Av. Polity	614	4.312946	5.552725	-9	10
Av. Trade	595	53.34471	18.47031	12.97354	161.3266
EU	647	0.1452859	0.3526615	0	1
US	647	0.2534776	0.4353385	0	1
Funding	647	0.0850077	0.279109	0	1
Assistance	647	0.2225657	0.4162908	0	1
Diff. Treatment	647	0.0370943	0.1891391	0	1
Enforcement	647	0.049459	0.2169922	0	1
Original Members	647	17.47604	29.20122	3	194
Amendment Possibility	647	0.2194745	0.4142108	0	1

## C. Appendix C

**Table C 1: Estimations for rule-making including control variables for original members (number of provisions)**

	(1) Amendments	(2) Amendments	(3) Amendments	(4) Amendments	(5) Amendments	(6) Amendments	(7) Amendments
No. Restrictive	0.198*** (0.050)	0.197*** (0.048)	0.157*** (0.048)	0.138*** (0.049)	0.218*** (0.042)	0.205*** (0.042)	0.199*** (0.047)
No. Liberalizing	0.086 (0.095)	0.085 (0.095)	0.058 (0.095)	0.067 (0.097)	0.055 (0.107)	0.059 (0.107)	0.089 (0.096)
Av. GDP p.c.	0.326*** (0.093)						

Av. GDP		0.295*** (0.100)					
Total GDP			0.478*** (0.128)				
Total Population				0.550*** (0.131)			
Av. EPI					0.015*** (0.005)		
Av. Polity						0.003 (0.015)	
Av. Trade							0.012 (0.008)
Depth	0.176** (0.071)	0.177** (0.070)	0.081 (0.068)	0.051 (0.068)	0.195*** (0.072)	0.183** (0.072)	0.159** (0.071)
Duration	0.511*** (0.098)	0.496*** (0.097)	0.738*** (0.116)	0.658*** (0.105)	0.648*** (0.224)	0.702*** (0.220)	0.653*** (0.175)
Constant	-0.818*** (0.251)	-0.805*** (0.250)	-14.611*** (3.632)	-11.578*** (2.478)	-1.658*** (0.401)	-0.745*** (0.289)	-1.376*** (0.329)
No. Observations	633	633	633	638	647	614	595

Robust standard errors in parentheses

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table C 2: Estimations for membership including control variables for original members (number of provisions)**

	(1) Accessions	(2) Accessions	(3) Accessions	(4) Accessions	(5) Accessions	(6) Accessions	(7) Accessions
No. Restrictive	0.144*** (0.048)	0.147*** (0.046)	0.091*** (0.033)	0.074** (0.032)	0.149*** (0.047)	0.137*** (0.047)	0.135*** (0.048)
No. Liberalizing	-0.047 (0.105)	-0.047 (0.104)	-0.137 (0.100)	-0.117 (0.103)	-0.059 (0.107)	-0.062 (0.109)	-0.059 (0.115)
Av. GDP p.c.	0.259*** (0.071)						
Av. GDP		0.302*** (0.063)					
Total GDP			0.912*** (0.086)				
Total Population				0.850*** (0.062)			
Av. EPI					0.013*** (0.004)		

Av. Polity						-0.005 (0.013)	
Av. Trade							0.005 (0.005)
Depth	0.195*** (0.055)	0.198*** (0.055)	0.055 (0.043)	0.015 (0.045)	0.196*** (0.055)	0.186*** (0.055)	0.190*** (0.056)
Duration	0.372*** (0.071)	0.359*** (0.072)	0.839*** (0.089)	0.591*** (0.081)	0.295*** (0.071)	0.334*** (0.069)	0.539*** (0.112)
Constant	1.846*** (0.142)	1.831*** (0.140)	-24.955*** (2.578)	-15.069*** (1.266)	1.152*** (0.279)	1.951*** (0.159)	1.698*** (0.305)
No. Observations	633	633	633	638	647	614	595

Robust standard errors in parentheses

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table C 3: Estimations on rule-making and membership, controlling for IEA's subject areas (number or provisions)**

	(1) Amendments	(2) Accessions
No. Restrictive	0.143*** (0.040)	0.114*** (0.043)
No. Liberalizing	0.239 (0.155)	0.015 (0.099)
Pollution	0.045 (0.423)	2.594*** (0.184)
Fish	-1.329*** (0.345)	0.667*** (0.252)
Freshwater	-2.155*** (0.496)	-1.032** (0.473)
Ocean	-1.228** (0.485)	2.272*** (0.311)
Biodiversity	-0.437 (0.461)	1.696*** (0.270)
Agriculture	-1.524*** (0.452)	1.705*** (0.285)
General	-3.258*** (0.805)	0.753** (0.351)
Energy	-17.688*** (1.255)	1.779*** (0.519)
Weapons	-16.287*** (0.634)	2.452*** (0.480)

Others	-1.680*	2.488***
	(0.894)	(0.351)
Depth	0.189**	0.140***
	(0.092)	(0.054)
Duration	0.874***	0.468***
	(0.211)	(0.082)
No. Observations	647	647

Robust standard errors in parentheses  
\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table C 4: Estimations for rule-making including control variables for treaty characteristics (number of provisions)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Amend	Amend	Amend	Amend	Amend	Amend	Amend	Amend
No. Restrictive	0.204***	0.164***	0.213***	0.204***	0.200***	0.218***	0.118**	
	(0.050)	(0.040)	(0.041)	(0.039)	(0.045)	(0.054)	(0.052)	
No. Liberalizing	-0.013	0.105	0.057	0.056	0.048	0.051	-0.018	
	(0.111)	(0.096)	(0.109)	(0.100)	(0.102)	(0.107)	(0.104)	
EU	1.171***							
	(0.406)							
US		1.409***						
		(0.328)						
Funding			-0.523					
			(0.371)					
Assistance				0.091				
				(0.402)				
Diff. Treat.					1.147**			
					(0.470)			
Enforcement						-0.921		
						(0.908)		
Original Members							0.057***	
							(0.014)	

Orig. Members ^2									-	0.000***
										(0.000)
NO. RESTRICTIVE										
--- No Poss. Of Amendment										-0.134
										(0.147)
--- Poss. Of Amendment										0.107**
										(0.045)
NO. LIBERALIZING										
--- No Poss. Of Amendment										0.280**
										(0.117)
--- Poss. Of Amendment										-0.013
										(0.117)
Poss. Of Amendment										2.288***
										(0.439)
Depth	0.148*	0.170***	0.185**	0.183**	0.195***	0.251**	0.274**	0.098		
	(0.080)	(0.064)	(0.072)	(0.077)	(0.070)	(0.105)	(0.134)	(0.077)		
Duration	0.842***	0.617***	0.681***	0.716***	0.754***	0.730***	0.694***	0.850***		
	(0.256)	(0.208)	(0.223)	(0.244)	(0.232)	(0.233)	(0.221)	(0.176)		
Constant	-	-	-	-	-	-	-	-		
	1.024***	1.360***	0.735***	-0.795**	0.857***	0.766***	1.379***	1.688***		
	(0.376)	(0.218)	(0.273)	(0.335)	(0.302)	(0.280)	(0.220)	(0.284)		
No. Observations	647	647	647	647	647	647	647	647		

Robust standard errors in parentheses

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table C 5: Estimations for membership including control variables for treaty characteristics (number of provisions)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Access	Access	Access	Access	Access	Access	Access	Access
No. Restrictive	0.130***	0.105***	0.118**	0.120**	0.133***	0.141***	0.041*	0.110**
	(0.047)	(0.034)	(0.046)	(0.052)	(0.050)	(0.048)	(0.024)	(0.045)
No. Liberalizing	-0.165	-0.030	-0.073	-0.106	-0.074	-0.062	-0.160*	-0.051



	(0.126)	(0.094)	(0.118)	(0.111)	(0.101)	(0.110)	(0.090)	(0.103)
EU	0.960*** (0.238)							
US		1.575*** (0.211)						
Funding			0.916*** (0.298)					
Assistance				0.603** (0.307)				
Diff. Treat.					0.733* (0.394)			
Enforcement						-0.192 (0.441)		
Original Members							0.083*** (0.008)	
Orig. Members ^2							-0.000*** (0.000)	
Amendments								0.039*** (0.008)
Depth	0.167*** (0.062)	0.153*** (0.044)	0.197*** (0.055)	0.172*** (0.056)	0.196*** (0.053)	0.204*** (0.065)	0.179*** (0.067)	0.183*** (0.053)
Duration	0.421*** (0.080)	0.238*** (0.070)	0.392*** (0.076)	0.413*** (0.087)	0.361*** (0.074)	0.344*** (0.068)	0.342*** (0.095)	0.232*** (0.070)
Constant	1.738*** (0.170)	1.201*** (0.181)	1.776*** (0.146)	1.751*** (0.164)	1.849*** (0.150)	1.886*** (0.146)	0.655*** (0.165)	1.839*** (0.136)
No. Observations	647	647	647	647	647	647	647	647

Robust standard errors in parentheses

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01