

# Flexibility provisions in multilateral environmental treaties

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**Abstract** In international politics, intergovernmental treaties provide the rules of the game. In this paper, we investigate the rules under which the contents of treaties may be changed, such as rules for adoption and entry into force and rules for dispute resolution. In the first part of the paper, we describe how frequently these rules are used in practice and how they are typically combined, based on 400 treaties and supplementary agreements from the field of international environmental law. Using correspondence analysis, we show that treaty provisions can be represented by a two-dimensional property space. The detected underlying dimensions express varying degrees of institutionalisation and flexibility, respectively. In the second part of the paper, we place amendment rules into the framework of a formal model in the incomplete contracts tradition. It is shown that there exists a trade-off between the risk of too little flexibility, which leads to frequent inefficient breach of the treaty, and the danger that the binding nature of the treaty and hence, the level of commitment by treaty members, is being undermined if the treaty can be amended too easily.

**Keywords** Flexibility · Incomplete contracting · Quantitative treaty analysis

## Introduction

In international politics, intergovernmental treaties provide the rules of the game. Together with customary international law, they establish the legal framework

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within which agreements on substance are created and implemented. At the center of this paper are the procedures by which existing treaties can be amended. While a legal basis for amendment and modification is provided by customary law as well as by the Vienna Convention on the Law of Treaties, many treaties contain their own rules by which amendments are facilitated. The diversity of amendment rules is high. In particular, subordinate texts to the treaties such as technical annexes or protocols are often subject to different, and easier, amendment rules. Moreover, formal amendment rules are often complemented by dispute settlement procedures, which allow for treaty adjustment short of explicit changes to the treaty texts.

The object of this paper is twofold. First, we seek to establish a better empirical knowledge on treaty amendment procedures, which is insufficient to date. The only other study in this respect is Koremenos (2004). Using a data set of 400 multilateral environmental treaties and supplementary agreements, we assess how frequently certain types of amendments rules are used and how they are typically combined. In comparison to Koremenos, who sampled bilateral and multilateral treaties from different areas of intergovernmental cooperation, our approach to data collection yields a much more homogenous data base which allows to analyse amendment rules in greater detail. While our empirical analysis is descriptive, there are important insights to be gained when the complexity of rules is reduced systematically to a few underlying dimensions. In particular, it emerges that the variety of amendment procedures can be reduced to two dimensions. One is the degree to which amendment rules are explicitly contained in the treaties. The other may be interpreted as a flexibility dimension. Other properties of treaty provisions appear to carry little empirical weight.

Building on this result, in the second part of the paper we address treaty-makers' choice of flexibility. Using a contract theoretic model, we establish the existence of a trade-off between treaty flexibility and commitment to the treaty. It is shown that under certain circumstances, more restrictive provisions for renegotiation such as ratification requirements give parties a reason to rely on the treaty as concluded and, therefore, enhance the incentive to make relation-specific investments. On the other hand, they induce more frequent breach. The trade-off depends on a number of parameters such as the number of parties to the treaty and the importance of irreversible investments, which can potentially explain the different degrees of flexibility found in the empirical analysis.

The model highlights a particular trade-off while abstracting from others. In Koremenos (2001), flexibility is explained as a means to reduce the risk of an agreement producing unexpected policy results. In Rosendorff and Milner (2001), escape clauses are modelled as devices that allow countries to deviate from an agreement under the influence of a temporary shock while maintaining cooperation in the long run. We also do not deny that other theories apart from rational choice may offer a useful framework for analysing treaty renegotiation.<sup>1</sup> However, we argue that the potential of contract theory for the explanation of treaty design has so far remained unexploited. In this respect, our contribution may be seen as a first step to the development of more specific hypotheses, which may then be tested on the basis of treaty text data.

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<sup>1</sup> Studies assessing the relative merits of these theories include, for instance, Raustiala (2001) and Thompson (2002).

## Legal aspects of treaty amendment

### Basic provisions of the Vienna Convention on the law of treaties

Standard textbooks of international law such as Ipsen (1999), Bowett (1982), and Schermers and Blokker (1995) confine themselves to exposing and interpreting the provisions of the Vienna Convention on the Law of Treaties of 1969. According to Article 39 of the Convention, treaties can be amended by the contracting parties. Unless the treaty provides otherwise, the rules for amendment are the same as the rules for conclusion and entry into force of the original treaty. This means that, apart from treaties adopted at international conferences, amendments are subject to the consent of all contracting parties. In particular, no state can be bound by an amendment to which it has not given its consent (Article 40).

The amendment of a treaty has to be distinguished from a modification as stipulated by Article 41 of the Vienna Convention. Modification means the change of treaty provisions as agreed upon only by a subset of treaty members, while amendment designates a change of the treaty by all its members (Ipsen, 1999, p. 136). There are a number of conditions connected to treaty modifications which do not apply in the case of treaty amendment. In particular, the position of non-members to inter-se agreements must not be called in question (Article 41.1 (b) (i) of the Convention). In reality, however, the distinction between modification and amendment is often unclear.<sup>2</sup>

A further distinction is sometimes made between amendment and revision. If only parts of an existing treaty are changed, the term “amendment” is now accepted, whereas the substantial and encompassing change of a treaty is usually termed as a “treaty revision” (Ipsen, 1999, p. 136). Nevertheless, since it is difficult in practice to draw a clear line between amendment and revision, the Vienna Convention only uses the term “amendment”.

As the development of the treaty by ongoing interpretation is concerned, article 31 of the Vienna Convention refers explicitly to the interpretation of treaties, but is silent as to the interpretation of treaties by arbitration tribunals or other international institutions. Article 66 (a) provides for two different ways of dispute resolution: arbitration (which requires the consent of the parties) and the invocation of the International Court of Justice. Concerning the application of Part V of the Vienna Convention itself, Article 66 (b) provides for a conciliation commission which may issue a non-binding recommendation for the settlement of disputes between contracting parties.

<sup>2</sup> With reference to constitutional treaties (i.e. treaties setting up an international organisation or an international regime), Amerasinghe (1996) points out that the application of Article 40 would be particularly problematic if only a subset of the original treaty members declare themselves bound by an amendment. In this case, the constitution may be unworkable due to conflicting provisions applying between different groups of members. He suggests that amendment should be only possible “if all the members agree to the amendment” or that [...] those members who refuse to agree to the amendment either cease to be members or must act as if bound by the amendment” (p. 411). The latter possibility, however, would be incompatible with the consensus principle inherent in the Vienna Convention, since a group of treaty members could confront the minority with a “take it or leave it”-threat not foreseen at the time the original treaty was concluded.

## Provisions of individual treaties

If a treaty does not contain explicit procedures for amendment, the provisions of the Vienna Convention provide the rules (Article 40). In this sense, the Convention provides the default rules for treaty amendment. However, as our empirical analysis will show, many multilateral treaties deviate from the rules of the Vienna Convention.

Despite the existence of a series of case studies (Bowman, 1995; Gold, 1973; Schwelb, 1954; Zacklin, 1968), little work has been done on the existing varieties of provisions and the frequency of their use. Only Amerasinghe's (1996, pp. 405–423) study on constitutional treaties provides a systematic presentation and preliminary typology of amendment provisions and their application. Accordingly, most international treaties of constitutional character have provisions for their adjustment.<sup>3</sup> Some treaties require the investiture of an intergovernmental conference.<sup>4</sup> Others stipulate less formal different amendment procedures.

Based on these facts, Amerasinghe classifies amendment provisions according to several criteria, such as the substance of the amendment or the majority required for the adoption of amendments as well as the provisions for their entry into force. In this context, he distinguishes between a one-step and a two-step procedure for amendment according to whether adoption by the representative organ of the institution (such as a general assembly) is sufficient to bring the amendment into force, or whether there is a separate ratification stage (Amerasinghe, 1996, p. 412).

According to Amerasinghe, there is a clear link between the choice of the one-step or two-step procedure and the majority required for the adoption of an amendment. (Qualified) majority decision-making is typically used together with a ratification requirement. Otherwise, the combination of qualified majority voting and the one-step procedure would entail a large loss of control for national actors. If the (qualified) majority rule is in place, the additional step of ratification is required to allow countries the freedom to decide whether to be bound by the amendment. Moreover, it may be argued that formal ratification increases the commitment of members to amendments not agreed unanimously.

Amerasinghe also points to differences in the provisions concerning members dissenting with the amendment. Several treaties stipulate that dissenting members must cease to be members of the treaty as amended. Alternatively, dissenting members can be allowed to withdraw voluntarily. Apart from the formal change of treaty provisions, Amerasinghe also covers other flexibility devices. However, despite providing interesting and new insights, Amerasinghe's typology and his analytical conclusions are, in our view, preliminary and tentative. In particular, the stages within the process of amendment, such as initiation, adoption, possible ratification by treaty members and, finally, the legal entry into force should be distinguished more systematically, since the overall flexibility of the treaty is jointly determined by the combination of the provisions at all of these stages.

<sup>3</sup> Exceptions are the OECD, the International Telecommunications Union, and, the NATO.

<sup>4</sup> E.g., the founding treaties of the EC, cf. Article 96 of the ECSC, Article 236 of the EEC treaty, Article 204 of the Euratom Treaty.

## Empirical analysis of flexibility provisions

Distinguishing patterns in the choice of contractual provisions as well as finding a representation that reduces the complexity of different rules are the main objects of this section. The questions driving the exploratory data analysis are the following:

- What is the proportion of multilateral environmental treaties actually having explicit flexibility provisions? Are there different provisions within treaty systems, such as differences between the main text and treaty annexes?
- How is flexibility achieved and which types of provisions (e.g. on treaty duration, adoption, ratification, third party conflict resolution) can be found?
- Which combinations of provisions are typically used? Which combinations do not occur? Do combinations of provisions for adoption, entry into force and dispute resolution reinforce or counteract each other in the degree of adaptability they provide? Can we detect a latent pattern behind the combination of flexibility provisions?
- Are there changes in flexibility over time?

Our data collection contains multilateral environmental treaties concluded after the Second World War. Our strategy is to sample “important” environmental treaties containing non-negligible obligations. In judging whether a treaty is important, we rely on expert judgements. The criterion is inclusion of the treaty in the collection of Burhenne (n.d.). Burhenne groups treaties into a number of subject categories. Since the number of treaties in the Burhenne collection is very large, we restricted the sample to the following subject categories which form the core of international environmental concerns: air; atmosphere, climate and outer space; environmental conservation (general); hazardous substances; natural resources and conservation; non-renewable resources and mining; seawater quality and pollution; and water quality and pollution. These represent eight of a total of 35 subject categories.<sup>5</sup> Many treaties, however, are classified in more than one subject grouping. Therefore, most overarching environmental treaties dealing with more than one environmental problem are represented in our data.

We use all treaties contained in these subject groups from Burhenne’s treaty collection, as well as all supplementary agreements such as protocols, annexes or appendices. We excluded, however, a small number of treaties listed in the subject categories chosen from the Burhenne collection but not primarily environmental treaties, such as the Treaty on European Union of 1992 (Maastricht treaty). The number of treaty texts in our sample is 400. Of these, all but 35 texts were obtained from internet sources and are thus machine readable. The others were taken from the United Nations Treaty Collection (UNTS) or, in case they are not included there, directly from the Burhenne collection.

An entry in the data set consists of a treaty text or supplementary text which is subject to a certain amendment procedure. This means that texts are not classified according to the provisions they contain, but according to the provisions by which they are affected. Thus, if the amendment procedure of an appendix to a treaty is contained in the main text of the treaty, information is taken from the main text. In 13 cases, parts of a text were subject to a different amendment procedure than other parts of the treaty. In this case, parts with different procedures form separate entries in the data set.

<sup>5</sup> Many of the subject categories not used in the sample contain only very few treaties.

**Table 1** Categories of treaty texts

	Treaties	Treaty parts	Protocols	Level 1 suppl. texts	Level 2 suppl. texts
Number of texts	102	13	40	221	24
Amendment provisions differ from those of superordinate text (in %)	–	100	35.0	29.7	16.7

Given that the data base consists of treaties, protocols, annexes and the like, there is a hierarchy of texts. Of all texts, 102 are separate treaties and 298 are supplementary texts to these treaties. We distinguish between (1) main texts, (2) parts of the main text to which different procedures apply, (3) protocols (explicitly named in this way),<sup>6</sup> (4) level 1 supplementary texts (i.e., annexes or appendixes to treaties or protocols) and (5) level 2 supplementary texts (i.e., appendixes to annexes). Supplementary texts may be adopted at the same time or later than the superordinate text. The number of texts in each category of texts can be seen from Table 1.

The contents analysis of the texts was based on a keyword search of terms relating to flexibility provisions.<sup>7</sup> The passages containing the legal provisions were then classified according to a code book. Based on the existing literature as well as on the treaties themselves, we distinguish between a number of institutional varieties: whether or not amendments are explicitly dealt with; explicit definition of treaty duration; explicit reference to holding revision conferences; rules for adoption and entry into force of amendments; existence of different rules for different parts of the treaty; provisions regarding non-ratifiers of amendments; opt-out provisions; and provisions for third-party interpretation by tribunals or other institutions. The code book containing the definition of the different flexibility devices is reproduced in the appendix to this paper.

### Univariate analysis

With respect to a number of variables, we find that the environmental treaties of our sample are quite similar. First, all of the treaties or supplementary texts are, either explicitly or implicitly, unlimited in duration. This is a striking difference of our data base to the one used by Koremenos (2004), who finds that many treaties are concluded for a fixed period. The explanation is that Koremenos also samples bilateral treaties and treaties concluded earlier than 1945, where these provisions are far more likely to occur. Second, only 11.2% of the texts in our data base specify a date for

<sup>6</sup> The distinction between a main treaty and a protocol is often considered to be arbitrary by international lawyers and has no legal consequences (Ipsen, 1999, p. 98). Usually, however, protocols explicitly refer to a treaty already established. They may borrow their amendment provisions from this treaty, which is why we use a separate category for protocols.

<sup>7</sup> Keywords referring directly to amendments were the following: *amendment, modification, alteration, change, revision* and its different lexicographical modifications. As keywords referring to arbitration, we used *arbitration, tribunal, judicial, mediation, dispute, settlement, conciliation*. We also looked in the wider area of flexibility provisions using the keywords *contracting out, opt-out, annulment, termination, suspension, renunciation, withdrawal, termination of membership, escape clause, inter-se*. We used a coding procedure whereby an international law student coded each case. After an initial instruction period, the coding proved to be reliable and were only checked randomly by the authors.

**Table 2** Provisions for adoption (percent of all texts)

	Treaties	Treaty parts	Protocols	Level 1 suppl. texts	Level 2 suppl. texts
1. Unanimity	15.7	23.1	10.0	13.1	.0
2. Consensus	11.8	15.4	22.5	29.0	37.5
3. Qualified majority	33.3	53.8	42.5	41.2	58.3
4. Not specified	39.2	7.7	25.0	16.7	4.1

possible revision in advance. Third, 82.5% of all treaties do not mention the original members of the treaty or limit the treaty to a particular group of countries. Fourth, only 28 texts explicitly mention the position of signatories which do not accept an amendment. In 21 of these cases, a provision is included stipulating that these members must leave the treaty altogether.<sup>8</sup> Hence, exclusion is rarely used as a threat in order to facilitate amendment or to ensure the uniformity of treaty texts. Finally, only 13 texts limit the scope of the arbitration procedures to particular designated parts of the agreement. We, therefore, limit the following investigation to three kinds of provisions where the variation observed in the sample is greatest: the adoption of amendments, their entry into force, and procedures for dispute settlement.

Next, we investigate whether supplementary texts deviate in their flexibility provisions from superordinate texts. If supplementary texts only reproduced the governance structure of the main treaty texts, it would be reasonable to limit the empirical analysis to the latter. However, we observe from Table 1 that supplementary texts quite frequently contain amendment procedures which differ from the amendment procedures of the superordinate text. This is most evident in the case of protocols, of which more than a third have provisions which differ from those of the main treaty text. Sometimes, however, this reflects the fact that the protocol is, in fact, a new treaty, such as the Protocol on Environmental Protection to the Antarctic Treaty of 1991, which was adopted over 30 years after the original treaty, or the Montreal Protocol on Substances that Deplete the Ozone Layer. Others, such as the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources of 1980 are more closely associated to the original treaty. Hence, there is more heterogeneity in this group of texts than in the others.

In our data, we find a huge number of institutional variants concerning flexibility provisions for adoption, entry into force and dispute settlement. We aggregate the institutional options into the broader categories shown in Tables 2–5. From the first column of Table 2, we observe that a third of all main treaty texts allow for (qualified) majority decision-making on amendments. In all but nine cases, this means qualified majority voting by majorities of either two-thirds or three-quarters. About one out of four treaties explicitly grants veto power to each member state, with the consensus rule as a softer form of unanimity. Almost 40% of treaties do not mention flexibility provisions at all or leave the amendment rule unspecified. Here, the Vienna Convention as a fallback provides the rules for amendment, which means

<sup>8</sup> These are mainly treaties establishing international organisations or regimes, such as the Antarctic Treaty or the Convention on the International Consultative Maritime Organisation. Hence, we find support for Amerasinghe's notion (mentioned earlier) that it is essential for constitutional treaties to ensure that the same treaty applies to all member states.

**Table 3** Provisions for entry into force

	Treaties	Treaty parts	Protocols	Level 1 suppl. texts	Level 2 suppl. texts
1. All have to ratify	6.9	15.4	10.0	8.6	.0
2. A qualified majority has to ratify	44.1	46.2	60.0	40.7	12.5
3. No ratification, but objection is possible	2.9	15.4	2.5	17.2	70.8
4. No separate ratification procedure	6.9	15.4	2.5	16.7	12.5
5. Not specified	39.2	7.7	25.0	16.7	4.2

**Table 4** Provisions for arbitration

	Treaties	Treaty parts	Protocols	Level 1 suppl. texts	Level 2 suppl. texts
1. Binding arbitration	26.5	53.8	37.5	48.9	62.5
2. Non-binding arbitration	19.6	23.1	27.5	29.9	25.0
3. No arbitration	53.9	23.1	35.0	21.3	12.5

**Table 5** Most frequent combinations of flexibility provisions

Rank	Adoption	Entry into force	Arbitration	No. of cases
1	Not specified	Not specified	No arbitration	60
2	Majority	A majority ratifies	Binding	58
3	Consensus	A majority ratifies	Binding	31
4	Consensus	A majority ratifies	No arbitration	23
5	Majority	If no objections	Binding	20
6	Not specified	Not specified	Binding	19
7	Consensus	If no objections	Non-binding	18
8	Majority	One-step	Binding	17
9	Consensus	All ratify	Non-Binding	15
10	Majority	If no objections	No arbitration	14
11	Consensus	A majority ratifies	Non-Binding	13
12	Unanimity	All ratify	No arbitration	10
13	Unanimity	A majority ratifies	No arbitration	10
14	Not specified	Not specified	Non-binding	10
15	Consensus	One-step	Binding	10

unanimous decision-making.<sup>9</sup> As far as supplementary texts are concerned, a higher proportion of these allow for qualified majority decision-making. Another interesting finding is that supplementary texts more often contain specific amendment procedures than treaties.

Concerning provisions for entry into force (Table 3), only few multilateral treaties require all parties to ratify amendments. In all other cases, either ratification of a qualified majority of member states is sufficient for entry into force or entry into force of amendments does not require formal ratification. The third row contains those cases where the treaty enters into force automatically unless a specified number or proportion of member states raises objections. Ratification is more often used for main treaty texts and protocols, while automatic entry into force is a provision most often found in supplementary texts. In particular, the simplified

<sup>9</sup> However, in cases of conflict the explicit definition of unanimous renegotiations may result in lower transaction costs as compared to treaties amended in accordance with the Vienna Convention.



procedure whereby an amendment enters into force unless objections are raised almost becomes the norm for level 2 supplementary texts. The fourth row contains cases where the treaty enters into force without further conditions.<sup>10</sup> This corresponds to Amerasinghe's one-step procedure. Overall, only a small proportion of sample texts contain such a provision. Again, the absence of a specification for entry into force means that the provisions of the Vienna Convention apply.

With regard to the provisions for dispute resolution (Table 4), we distinguish between tribunals issuing binding decisions and bodies giving recommendations only. If a treaty contains both kinds of provisions, we code it as having binding arbitration. We observe that more than half of the treaties do not provide for institutions for dispute settlement at all. On the other hand, supplementary texts show more stringent dispute settlement procedures as compared to main treaty texts, more than half of them having binding arbitration.

### Bivariate and multivariate analysis

In the following table, we describe the most frequent combinations of flexibility provisions. This gives a first impression on whether provisions in one category, such as adoption provisions, are complemented by provisions in another, i.e. entry into force or arbitration procedures. As an empirical basis, we consider the full sample of 400 treaty and agreement texts.

The combination used most frequently consists in the absence of rules in all three types of provisions we consider. This mainly concerns treaties adopted from the 1950s to the 1970s. In most cases where a qualified majority is sufficient for adoption, we also find provisions for binding arbitration (lines 2, 5 and 8). However, there is also a considerable number of cases where binding arbitration goes together with consensus or the fallback provisions (lines 3, 6 and 15) (Table 5).

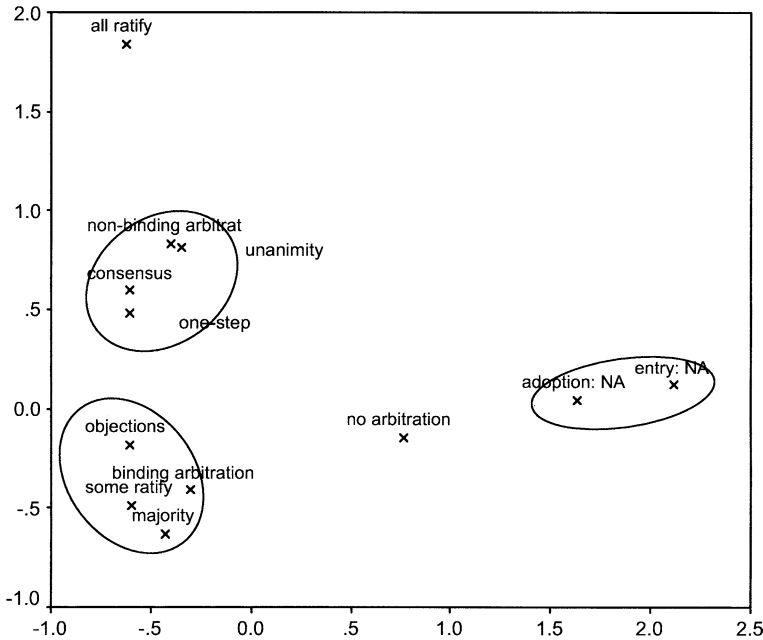
Amerasinghe's (1996, p. 413) conjecture according to which a qualified majority rule at the adoption stage necessitates a further ratification stage is contradicted by 17 texts which combine qualified majority voting with the one-step procedure (line 8). These cases appear to be particularly interesting because here, a majority of treaty members make decisions which become, without further conditions, binding on all states. However, the one-step category comprises also the possibility that states can individually object to an amendment, with the consequence that the amendment does not become binding on them, but without calling into question the legal entry into force of the amendment.<sup>11</sup> We found only one case among those included in line 8 where such an opt-out provision was not included.<sup>12</sup> The most restrictive amendment procedure from the table is contained in line 12 (unanimity, all members have to ratify, no arbitration).

In the next step, we apply correspondence analysis to describe more completely the combined application of different flexibility provisions. The aim is to recover the latent dimensionality of the data. We are interested in whether the variety of flexibility provisions and their combinations are reducible to a common underlying

<sup>10</sup> In some cases, the amendment enters into force only for those states which do not object to being bound by the amended treaty. In others, no objections are admissible.

<sup>11</sup> See Appendix.

<sup>12</sup> Statutes of the International Union for Conservation of Nature and Natural Resources (as amended), 1948.



**Fig. 1** Correspondence analysis of flexibility provisions—all texts

property space. Correspondence analysis is an exploratory method for finding out lower-dimensional mappings of discrete data tables (Blasius, 2001). The institutional provisions contained in Tables 2–4 are entered as nominal, rather than ordinal, categories in order to preclude any arrangement of the data that should be the result of the dimension reducing technique. We use bivariate correspondence analysis of a composed table. The column variable is the procedure for adoption of amendments, which is regarded as the central variable of interest since it determines whether all parties have given their consent to amendments. The rows are formed by the procedures for entry into force and for arbitration. We display combined biplots, i.e. row and column points are in a single map. Standardisation is symmetrical.<sup>13</sup> It is important to keep in mind that even with a symmetrical standardisation one cannot, in contrast to the use of Euclidean distance metric in factor analysis, exactly interpret distances between row and column points, respectively, as similarities. However, it is possible to draw conclusions from the clustering of variable values, because row points that are close to each other can be interpreted as being similar as compared to the distribution of cases across the columns.

Turning to the results shown in Fig. 1, we conclude from the Eigenvalues that two dimensions are sufficient to explain the variation in flexibility provisions. The first and second dimensions together explain 71% of the inertia. The dimensions of the graph have a clear *prima facie* interpretation. The *x*-dimension can be viewed as the degree of explicit institutionalisation. Provisions to the left of the graph are institutionalised options, while the absence of explicit provisions is located at the right. The *y*-dimension, by contrast, can be interpreted as indicating the degree of flexibility in decision-making.

<sup>13</sup> Standardising only on rows and columns, respectively, led to identical results.

The institutionalisation dimension extends from the implicit default solution for adoption on one pole (contributing the most to the inertia of this dimension) to the group of explicit provisions on the other. The absence of provisions for adoption or entry into force renders a treaty even less institutionalised than a treaty which does not include a procedure for dispute settlement. The second dimension extends from the requirement that an amendment must be ratified by all treaty members to the majoritarian amendment rules. The requirement for all contracting parties to ratify amendments is ranked as least flexible. With some distance, the adoption of an amendment by unanimity or by consensus is also identified as a requirement inhibiting flexibility. Binding dispute settlement has the same coordinate in the *y*-dimension as the majoritarian amendment provisions. Overall, the provisions for arbitration fit remarkably well into the two dimensions. Treaties without amendment procedures have a low degree of institutionalisation, while the bindingness or otherwise of the arbitral judgement determines the position in the flexibility dimension. A tribunal issuing binding judgements contributes to treaty flexibility, since the scope for the further development of the contractual obligations by third-party interpretation is enhanced. In this way, parties to the treaty may avoid the more cumbersome alternative to jointly agree on modifications and incorporate them as explicit amendments.

One-step procedures (without an independent procedure for coming into force) are located at an intermediate degree of flexibility. One might argue that the absence of any ratification stage is the most flexible provision for entry into force. In practice, however, one-step procedures are frequently combined with the consensus requirement at the adoption stage. Here, there could be another dimension at work: both consensus and the one-step procedure could be chosen for treaties which are not particularly important in terms of member states interests. For these treaties, it may be optimal to minimise the costs of coming to an agreement.

In a further step, we introduce two groups of passive variables, the year of adoption of the text and the position of text in the hierarchy defined in Table 1. Passive variables can be located in the same dimensions as the flexibility provision, while they do not influence the coordinates of the active variables.

Figure 2 shows the location of texts at different hierarchy stages in the institutionalisation and flexibility dimensions. The positions of the different flexibility provisions are the same as in the previous figures, with “a” designating an adoption procedure, “e” a procedure for entry into force and “t” a rule on arbitration. We observe that main treaty texts are found to be less institutionalised than supplementary texts. This may be implied by the construction of the data: if a treaty contains amendment procedures, they usually extend to appendixes and annexes, too. More interesting are the differences in the flexibility dimension. If the treaty contains parts subject to different amendment procedures, these articles contain more flexible provisions. Supplementary texts on the first hierarchy level are not different from the main treaty texts with respect to flexibility. However, supplementary texts at the second hierarchy level do possess more flexible provisions.

Taking the year of adoption as a passive variable (Fig. 3), we note that the degree of institutionalisation has increased over time, albeit this development seems to have come to an end in the 1980s. In the flexibility dimension, there is a marked change between treaties adopted in the 1970s and treaties adopted after 1990. Treaties adopted earlier show a much higher degree of flexibility, being positioned at the same *y*-coordinate as the majoritarian provisions for adoption and entry into force.

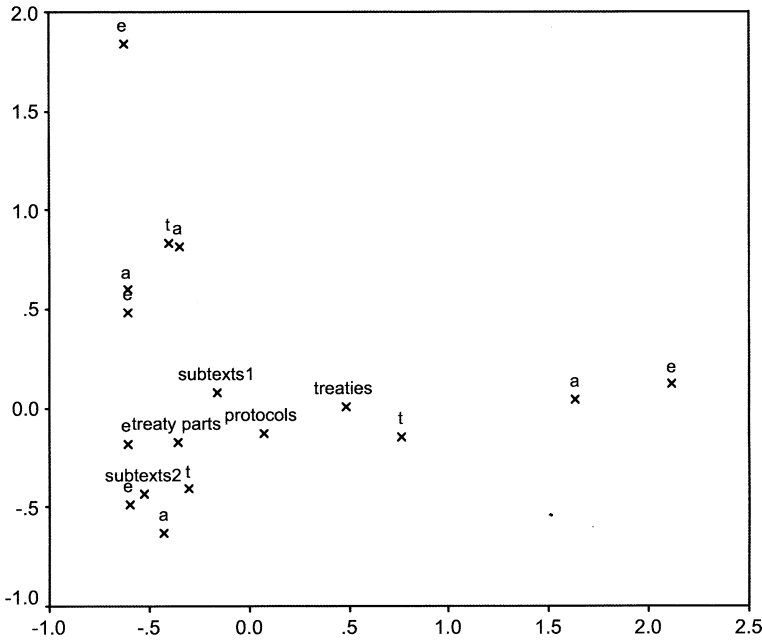


Fig. 2 Text hierarchy used as passive variable—all texts

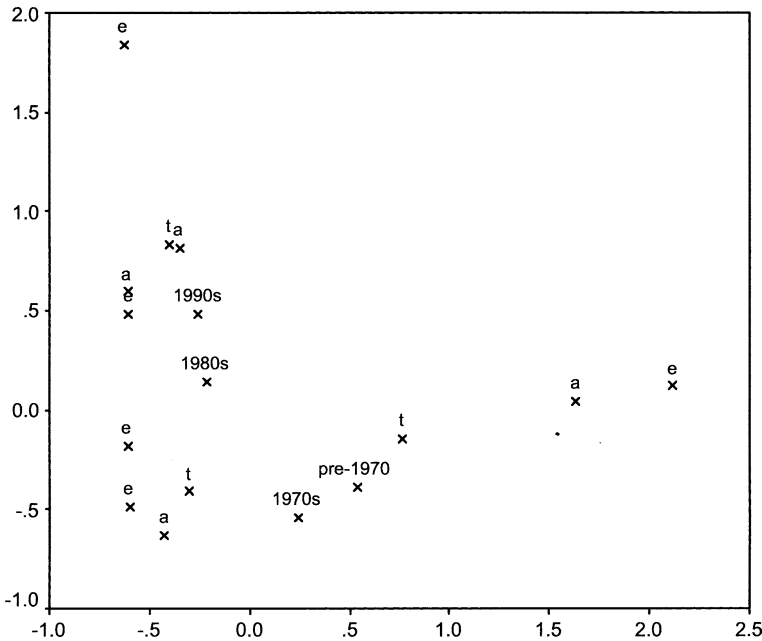


Fig. 3 Date of adoption used as passive variable—all texts

By contrast, treaties from the 1990s are positioned at the same flexibility coordinate as the consensus rule. Any model accounting for the choice of flexibility provisions must be able to explain this dramatic change in the choice of rules over time.

Summing up, according to our interpretation of the data, there are two latent dimensions behind the manifold treaty procedures on amendment and arbitration found in multilateral environmental treaties: institutionalisation and flexibility. At a given level of institutionalisation, different rules for adoption and entry into forces of amendments and arbitration rules are used predominantly to achieve a certain level of flexibility. This is not self-evident *ex ante* since these provisions might also be designed separately and used in pursuance of other goals. For instance, the ratification requirement may be chosen to delineate exactly which obligations apply to each of the parties. Arbitration procedures may be used not only to achieve flexibility but also to create institutions which may be valuable in other contexts. However, while it is conceivable that provisions for arbitration and explicit amendment serve a variety of goals and are used independently from each other, our multivariate analysis suggests an alternative view. As a consequence, for a theoretical explanation of the choice of these procedures we can concentrate on their effects on treaty flexibility without bothering too much about the separate mechanics of each of them.

### **A contract theoretic interpretation of renegotiation clauses in multilateral treaties**

This section presents a stylised model of treaty flexibility. Central to the model are the notions of, first, irreversibility of decisions made in reliance on the treaty and, second, the need to adjust the treaty as new information arrives. These give rise to a trade-off between two goods: treaty flexibility and bindingness. Concerning irreversibility, we assume that some investment costs must be incurred individually by the treaty partners before the treaty becomes effective. These costs are sunk in the sense that they cannot be recovered if the treaty fails to become effective. In international environmental law, sunk investment costs are often an important characteristic of the decision problem. An example, mentioned by Raustiala (2001, p. 480ff), is the International Convention for the Prevention of Pollution of the Sea by Oil of 1954 (OILPOL), superseded in 1973 by the International Convention for the Prevention of pollution from Ships (MARPOL). The main instrument of the 1954 treaty was to put limits on the discharge of oil by ocean-going tankers. By contrast, the MARPOL convention introduced certain minimum standards on the equipment of tankers, in particular the requirement for segregated ballast tanks such that ballast water should no longer be carried in, and discharged from, cargo oil tanks. The requirement of the OILPOL convention did not necessarily give rise to sunk costs, because it left open how the reduction was to be achieved. By contrast, the provisions of the MARPOL convention require shipowners to equip new tankers with costly new technology. Shipowners cannot recover these costs in case the convention is withdrawn or not adhered to by other parties to the treaty.

The model builds on basic features of a problem first studied by Shavell (1980) and extended to the renegotiation case by Rogerson (1984). While these authors concentrated on the bilateral seller–buyer relationship, we consider the multilateral case where there is perfect symmetry *ex ante*. Furthermore, we assume that the treaty is self-enforcing: all countries expect to derive positive benefits from participating in a given level of activities. Shavell (1980) and Rogerson (1984) studied a situation in which various legal remedies to breach of contract can be used,

such as damage rules or specific performance. These legal rules are not feasible in international law because of the lack of central enforcement power.

Analogously, we assume that it is not feasible to sign contracts on investment levels, although countries can observe each other's level of investment. In the example of the MARPOL convention, states cannot credibly promise to equip a certain number of tankers with segregated ballast tanks. This is important because it gives rise to incomplete contracts as in the papers of Shavell and Rogerson. A further important assumption in the following is that no party can commit not to renegotiate. This assumption introduces a hold-up problem as in the studies by Grout (1984), Klein, Crawford, and Alchian (1978), Williamson (1985) and many others. Consequently, if any party can improve their position by renegotiating in accordance with the rules laid down in the treaty, the other parties will not be able to credibly turn down an offer to renegotiate when faced with the threat that the treaty will not be fulfilled. It is at this point that costs of renegotiation, such as costs of information gathering, direct costs of attending negotiations, costs due to the involvement of various domestic actors and others, become important. These costs, which result from different rules for amendment as studied in the empirical part of this paper, determine the incentives to renegotiate and, thus, have a major impact on the trade-off between reliance and flexibility.

### The model

Let  $N$  be a given set of parties to the treaty. Parties are identical in all respects at the time of treaty conclusion. The treaty deals with the production of an excludable collective good. Production is a zero–one decision, i.e. the volume of the collective good is not a choice variable. We assume that the good needs the participation of all parties in order to be produced. Hence, if at least one party chooses to leave the treaty, no party will be able to benefit from the good. The model could be generalised to allow for some benefits if participation remains below  $N$ . However, the additional degree of realism would considerably add to the complexity of the model. All parties are assumed to be risk-neutral and have the following utility functions (dropping the subscripts for countries):

$$U = \begin{cases} Y + H - p(r) - r & \text{if the treaty is performed} \\ Y + H - p(r) - b - r & \text{if the treaty is renegotiated.} \\ Y - r & \text{if the treaty is breached} \end{cases}$$

where  $Y$  is income,  $H$  is the benefit from the treaty,  $p$  is a contribution to be paid,  $b$  are costs of renegotiation, and  $r$  is an investment influencing the amount of income that must be spent fulfillment of the treaty. Investments are sunk, so they cannot be recovered should the treaty fail to be applied. They influence only the utility of the party investing. The latter assumption is made because if investments had spill-over effects to other parties, this would give rise to a collective action problem which would substantially complicate the discussion. The contribution  $p$  can consist, for instance, in costly abatement. With the investment variable, we model the fact that there are often different ways to comply with treaties. For instance, to comply with the MARPOL convention, separate ballast tanks can be built into tankers. Alternatively, the tanker fleet may simply be kept in the ports. The latter option may be more expensive than the former in terms of foregone income, but using the

former, the country risks making an investment which does not pay off (if other nations do not keep to the treaty).

We assume that there are decreasing returns to investment and the investment function is concave:

$$p'(r_i) < 0, p''(r_i) > 0$$

Moreover, we consider the net value function in the following:

$$V(r_i) = H - p(r_i)$$

(using the same notation as Rogerson, 1984; Shavell, 1980) where, from the assumptions above,  $V'(r_i) > 0$  and  $V''(r_i) < 0$ . It will be assumed that  $V(r_i) - r_i$  eventually reaches a global maximum, so there is an optimal value of  $r_i$  if the party can be sure that the treaty is fulfilled.

The complete sequence of events is described in Fig. 4. The treaty concluded at  $t_1$ , stipulates that the collective good will be produced and parties pay a contribution  $p$  fixed in the treaty at time  $t_6$ . Since all parties are in the same position at the time of treaty conclusion, the contribution will be assumed to be equal for all parties without explicitly specifying how an agreement on  $p$  is made. If the good is not produced, the parties will not have to pay their contributions.

At time  $t_2$ , each party incurs sunk investment costs  $r$  influencing the net benefit from the treaty. At time  $t_3$ , a contingency  $\epsilon$  hits one of the parties. The distribution of  $\epsilon$  is given by a symmetric and single-peaked density function  $f(\epsilon)$ , with  $E(\epsilon) = 0$ . The shock enters the valuation function of this party linearly, i.e. the ex-post valuation function net of investment costs  $r$  is

$$V_i(r_i, \epsilon) = V(r_i) - D_i \epsilon$$

where  $D_i = 1$  if party  $i$  is hit by the shock and  $D_i = 0$  otherwise. Ex ante, the probability that each party is hit is the same for all parties. It simplifies the analysis if

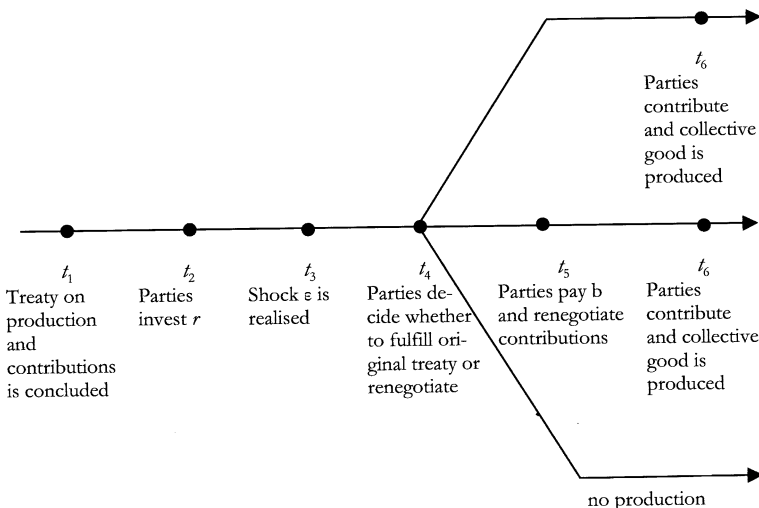


Fig. 4 Time sequence for the model

we assume that the shock hits only one of the parties. Moreover, these “local shocks” are perhaps more frequent than shocks affecting all parties.

After the shock has occurred, three outcomes are possible. First, contributions are made as foreseen in the treaty and the good is produced. Second, the treaty is renegotiated. In our context, this means that the parties renegotiate over contributions or transfer payments to redistribute *ex-post* utility. Third, the treaty may fail to be fulfilled. If at least one party does not contribute, the good will not be produced and each party realises a loss of  $-r_i$ . In this latter case, there are no damages to be paid by any party. The fall-back position in renegotiations is, therefore, always the case where the good is not produced and all parties lose their individual investments  $r$ .

Pareto-optimal breach and investment

We first characterise the Pareto optimum with respect to the optimal fulfillment (or breach) of the treaty and the optimal investment decisions. The optimum can easily be derived from the sum of social benefits and costs. The optimal breach decision implies that the good is produced if there is a net social benefit from it. The optimal breach set (Shavell, 1980), i.e., the set of  $\epsilon$  such that the contract is not performed in optimum, is therefore

$$B^* = \left\{ \epsilon \mid \epsilon > \sum_j V_j(r_j) \right\}. \tag{1}$$

Optimal investment, given optimal termination of the contract, can be derived by maximising the sum of benefits and costs:

$$\begin{aligned} \max_{r_i} \quad & \Pr\left(\epsilon < \sum_j V_j(r_j)\right) \left[ \sum_j V_j(r_j) - E\left(\epsilon \mid \epsilon < \sum_j V_j(r_j)\right) \right] - \sum_j r_j \\ & = F\left(\sum_j V_j(r_j)\right) \left[ \sum_j V_j(r_j) - \int_{-\infty}^{\sum_j V_j(r_j)} \epsilon f\left(\epsilon \mid \epsilon < \sum_j V_j(r_j)\right) d\epsilon \right] - \sum_j r_j \end{aligned}$$

The  $N$  first-order conditions for this problem imply that each party invests equal amounts:

$$V'_i(r_i) = V'(r) \Leftrightarrow r_i = r \quad \forall_i$$

and that optimal investment determined by

$$F(N \cdot V(r^*))V'(r^*) = 1. \tag{2}$$

where the  $*$  denotes the Pareto-optimal solution.

Infinitely costly renegotiations

We now consider the case where, due to a lack of communication between the parties, no renegotiations take place. Since there is strategic interaction in the choice of investment levels, a solution concept for the resulting game is required. In our case, subgame perfect Nash equilibrium is the solution concept and backwards induction is used to find the equilibrium.



At stage  $t_6$ , each party chooses individually whether to keep or break the treaty, given the investments made earlier. Under the assumptions of the model, parties not affected by the shock receive a positive net utility and always keep to the treaty. The party receiving the shock, in the following denoted as party  $i$ , keeps to the treaty only if the benefits including shock  $\epsilon$  are positive. The breach set is then

$$\hat{B} = \{\epsilon | \epsilon > V_i(r_i)\}.$$

It is obvious that the treaty will be breached more often than in the Pareto optimum. This is because a party lit by a shock neglects the benefits from the treaty for the other parties in its breach decisions, i.e. it neglects a positive externality. To determine investment expenditures, the expected utility of each party must be maximised:

$$\begin{aligned} \max_{r_i} \quad & \frac{1}{N} \Pr(\epsilon < V_i(r_i)) [V_i(r_i) - E(\epsilon | \epsilon < V_i(r_i))] \\ & + \frac{1}{N} \sum_{j \neq i} \Pr(\epsilon < V_j(r_j)) V_i(r_i) - \sum_j r_j \end{aligned}$$

The first-order conditions determine optimal investments for party  $i$  given investments of all other parties:

$$\frac{1}{N} F(V_i(r_i)) V'_i(r_i) + \frac{1}{N} \sum_{j \neq i} F(V_j(r_j)) V'_j(r_i) = 1 \tag{3}$$

Optimal investment of party  $i$  depends on the investment decisions made by all other parties to the treaty. At  $t_2$ , levels of investment are chosen simultaneously. The first-order conditions (3) form a set of reaction functions which jointly give optimal investment. Given the symmetry of the model ex ante, one may combine the reaction functions using  $r_i = r_j = r \forall_{i,j}$ , yielding:

$$F(V(\hat{r})) V'(\hat{r}) = 1 \tag{4}$$

Comparing (4) with (2) and recalling the diminishing returns in  $V(r)$ , one notes that investment is smaller than in the case of no renegotiations:  $\hat{r} < r^*$ . Hence, the solution of the no-renegotiation game is not Pareto-optimal both with respect to the breach as well as the reliance decision.

### Renegotiations with zero costs

If renegotiations are costless, we need to specify what each party receives in case of renegotiations. For the time being, we assume that an amendment to the treaty requires the consent of all parties (for other rules, see Sect. 4.6). Since parties are not differentiated, we assume that each party has the same bargaining power in the renegotiation game. Then, the surplus will be shared so that each party receives  $1/N$  of the common surplus:

$$V_i(r_1, \dots, r_N) = \frac{1}{N} \left[ \sum_j V_j(r_j) - \epsilon \right] \tag{5}$$

When will renegotiations occur? Since parties cannot commit not to renegotiate, a sufficient condition for renegotiations to occur is that at least one party is better off in the renegotiated outcome than under the original treaty. It follows that, unless  $\epsilon = 0$ , the treaty will always be amended through renegotiations, even if the original treaty would be performed in the absence of renegotiations.

Equation 5, by allocating each party the same share of the common surplus, implies that the breach decision coincides with the Pareto-optimal rule. Maximising expected payoffs with respect to  $r_1$  and combining the  $N$  first-order conditions leads to the following condition for investment:

$$\frac{1}{N} F(N \cdot V(\tilde{r})) V'(\tilde{r}) = 1 \quad (6)$$

**Proposition 1** *Under costless renegotiations (i) the breach decision follows the Pareto-optimal rule (ii) investments are lower than in the Pareto-optimal case (iii) investments are lower than in the case without renegotiations.*

Result (ii), the well-known hold-up problem, is established by comparison of (6) and (2). Result (iii) is obtained by dividing (6) by (4). No renegotiations lead to higher investments ( $\hat{r} \geq \tilde{r}$ ) under the following condition:

$$F(N \cdot V(\tilde{r})) \leq N \cdot F(V(\hat{r})) \quad (7)$$

Since the density function is assumed symmetric around zero,  $F(V(\hat{r})) > 0.5$  and condition (7) holds with necessity. Hence, the disincentive to invest brought about by the hold-up problem dominates the disincentive to invest due to inefficient breach. Judging the relative efficiency of the two cases, however, the investment disincentive must be set against the advantage of increased flexibility, which reduces ex-post inefficient breach. Which of these Pareto-dominates depends on the shape of the net value function  $V(r)$ . The less elastic it is with respect to  $r$ , the less important the aspect of investment becomes and the less beneficial renegotiations are. If, in the extreme,  $V'(\hat{r}) = 0$ , investment is irrelevant and the prevention of inefficient breach is the only purpose of renegotiation rules.

#### Renegotiations with positive but finite costs

In the following, we assume that costs of  $b$  units are incurred by all members of the treaty in case of renegotiation. This case is an intermediary case to costless and infinitely costly renegotiation. A difference is, however, that in the intermediary case, some renegotiation costs arise. This fact prevents the outcome from simply being a linear combination of the two polar cases discussed earlier.

**Proposition 2** *(i) Higher costs of renegotiation induce more inefficient breach. (ii) There is an upper limit for  $b$  beyond which an increase in renegotiation costs is always a Pareto improvement, (iii) Below this limit, higher costs of renegotiation increase investment if the number of parties to the treaty is large but may decrease investment for a small number of parties.*

The proof of the proposition is available on request from the authors. The intuition for result (ii) is that, from a certain level of costs, breach is more attractive than renegotiations if  $\epsilon$  is large. Therefore, there are no renegotiations in this area. Hence, renegotiations occur only if  $\epsilon$  is low. Since there is no effect of renegotiation on

breach, finite costs of renegotiation can only diminish the incentive to invest. Hence, it is preferable if renegotiations are impossible.

From result (iii), the intuition that positive but finite costs of renegotiation provide incentives intermediate between the cases of zero and infinite costs is confirmed for a high number of participants. It can be shown that if the number of participants exceeds five, the effect of costs on investment is always positive. Below that level, the likelihood of being hit by the shock is relatively large. This exacerbates incentives to under-invest arising from the fact that the likelihood of bearing a high  $\epsilon$  alone (without renegotiations) increases with the level of investment. These disincentive effects can be shown to be proportional to  $b$ . In these cases, lowering renegotiation costs is always a Pareto improvement. For a high number of participants, however, the model shows that renegotiation rules may help to manage the trade-off between hold-up and inefficient breach.

Whether this increases ex ante utility for governments is not clear if  $b$  is a pure welfare cost. To include them in the decision problem and solve for the optimal  $b$ , one would need a more specific model. The opposite case, where  $b$  is not a welfare cost and does not have to be considered in the choice of Pareto-optimal renegotiation rules, may arise if  $b$  is a transfer payment made to a third party in the case of renegotiation (see Schwartz & Watson, 2004).

As an example for a real-world institution influencing  $b$ , consider the ratification requirement. Putting every minor amendment in international treaties on the agenda of parliaments clearly is a procedure causing a high level of administrative costs. By contrast, if amendments can enter into force if no party objects, this leads to much lower costs of renegotiation. At the adoption stage, a consensus requirement causes lower costs of renegotiation than unanimity, because in the latter case, all parties must become active in some way, e.g. by sending diplomats to a meeting. Arbitration rules save costs of renegotiation because the decision is delegated to a body consisting only of a small number of individuals. All of these institutions have the same impact in the model, namely to shift the cost parameter  $b$ . Therefore, it is not surprising that they can be ranked in a single dimension, as correspondence analysis implies. The choice of amendment provisions and, hence, costs of renegotiation is motivated by the importance of sunk investment costs. The more important this aspect, the less flexibility a treaty should provide in order to maximise investments.

Can this prediction be corroborated by evidence from the treaties we have studied empirically? A complete answer is beyond the scope of this paper. Consider instead the most restrictive amendment procedure from Table 5 (unanimity, all members have to ratify, no arbitration). This rule applies to the following three treaties, including their supplementary texts: the Agreed Measures for the Conservation of Antarctic Fauna and Flora of 1964, the Agreement for Cooperation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances of 1983 and the Cooperation Agreement for the Protection of the Coasts and Waters of the North-East Atlantic Against Pollution of 1990. According to our theory, these should be treaties where sunk costs are particularly important. While this is not obvious in the first case, the other two treaties do contain provision which require member states to undertake irreversible investments. The Agreement of 1983 calls on states to set up techniques to monitor oil pollution. The Cooperation Agreement of 1990 requires states to set up and maintain in operation equipment in order to be able to deal with discharges of hydrocarbons or other harmful substances. These investments lose much of their value if treaties fail to be effective.

There is also a rationale for the use of more costly procedures in later years, found from Fig. 4. Given that environmental treaties adopted later contain more substantive and less symbolic content (Congleton, 1992), this finding accords well with our theory. From the logic of our model, the more restrictive rules contained in the treaties of the 1990s served to protect the irreversible decisions required by the treaties adopted during this decade, while negotiators had to be less apprehensive concerning the dangers of renegotiation in earlier periods since decisions could more easily be reversed. In our interpretation, consensus served as a safeguard to strengthen parties' reliance in the treaty.

## Conclusions

In this paper, we have analysed flexibility provisions in multilateral environmental treaties and described their application in real world settings. Coming from a contract theory perspective, we have stressed that the flexibility provisions included in international treaties have economic significance. The advantage of additional flexibility is that treaties can more easily be adapted to changes in preferences or new scientific knowledge. The disadvantage is that, by introducing qualified majority rules for amendment and the like, countries risk the loss of their irreversible investments into the treaty relationship. Therefore, they may be reluctant to enter large-scale international commitments.

Clearly, there are important aspects not included in the model. For instance, we have assumed that actors are risk-neutral. If, by contrast, actors' preferences imply risk-aversion, the choice of consensus instead of qualified majority rule could also be motivated by the desire to protect against collective decisions contrary to one's interests. Integrating these aspects into a more general model could be an interesting task for further research.

In our exploratory empirical analysis, we have looked at 400 multilateral treaties and supplementary texts from the area of international environmental politics. We note that there are remarkable differences in the provisions for adoption and entry into force of amendments, as well as in the existence and use of third-party arbitration. Using correspondence analysis, we show that the provisions can be represented in two dimensions: one is the degree of explicit institutionalisation, the other is the degree of flexibility in collective decision making. Furthermore, it is shown that flexibility rules complement each other. Treaties which have more flexible amendment rules are also more likely to have binding arbitration procedures.

Our empirical results mainly serve to establish some quantitative knowledge on flexibility rules, which has so far not been established in the literature, while a precise statistical test of our economic hypotheses must be left to further research. Another avenue for further research could be to extend the universe of treaties investigated. Restricting the analysis to treaties dealing with a particular subject-matter, environmental problems, left us with considerable variation in some provisions for renegotiation. However, treaties were quite similar in other respects, such as the duration or the provisions concerning members not ratifying amendments. Our guess is that this may have to do with the economic character of the good provided by the treaty. Techniques such as loglinear modelling or hierarchical logistic regression models (Thurner, 2000) might be used for the statistical explanation of negotiators' choice of provisions, distinguishing between goods-induced, structure induced and

institutionally induced factors. Finally, a third interesting topic for further analysis may concern the path dependence of the institutions under consideration.

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## Appendix

### Appendix 1 Code book used for coding flexibility provisions

Code	Definition	Row number (tabs. 3–5)	Notation
1. Provisions mentioning the number of parties to the treaty			
AX	Explicit mentioning of $X$ contracting parties		
BX	Explicit mentioning of $X$ contracting parties, if accession of further parties is arranged for in the treaty		
0	Contracting parties are not mentioned in the treaty		
2. Provisions specifying limited duration or revision			
CX	Revision possible on request in $X$ years at the earliest		
RX	Revision scheduled in $X$ years		
BX	Treaty is limited in duration ( $X$ years)		
AX	Amendments are not permitted until expiration of $X$ years		
0	No revision or limitation in duration of the treaty		
3. Existence of amendment provisions			
1	Yes		
2	Only in the form of a revision		
0	No		
4. Provisions for adoption <sup>a</sup>			
X	Majority requirement for approval: $X$ percent	3	Qualified majority
B	Consensus	2	Consensus
C	Unanimity	1	Unanimity
D	Other or combinations		
E	No provisions for adoption	4	Not specified
F	Adoption according to the statute of an international organisation		
G	No amendments	4	Not specified
5. Provisions for entry into force			
Xa	After ratification of $X$ percent of the signatories; then in force for all states which have ratified	2	A majority ratifies
Xb	After ratification of $X$ percent of the signatories; then in force for all states, except those that object explicitly	2	A majority ratifies
Ya	After ratification of $Y$ signatories; then in force for all states which have ratified	2	A majority ratifies

**Appendix 1** continued

Code	Definition	Row number (tabs. 3–5)	Notation
Yb	After ratification of <i>Y</i> signatories; then in force for all states, except those that explicitly object	2	A majority ratifies
A	Enters into force for all members without separate ratification	4	No separate procedure
B	Enters into force for all members without separate ratification unless a minimum number of states objects	3	No ratification, but objection is possible
C	Enters into force for all members without ratification except for those that explicitly object	4	No separate procedure
D	Enters only into force if all parties ratify	1	All ratify
E	Other rules		
F	According to the statute of an international organisation		
G	Not mentioned	5	Not specified
G	Not mentioned	5	No amendments
H	Enters into force for all members without ratification except for those objecting explicitly, unless a minimum number of states object	3	No ratification, but objection is possible
I	Enters into force for all ratifying states, without the necessity of a minimum number		
6. Outcome for parties not ratifying the amendment			
0	Not mentioned		
1	Remain bound by the original treaty		
2	Possibly have to leave the treaty		
7. Arbitration procedure <sup>b</sup>			
A	Permanent arbitration tribunal		
B	Other (e.g. ad-hoc) arbitration tribunal		
C	Conciliation or mediation commission		
D	International Court of Justice		
E	Arbitration institutions of an International Organisation or another treaty		
F	Others, explicitly mentioned		
G	Others, not explicitly mentioned		
H	No institutions for arbitration		
I	Convention of the member states		
8. Legal liability of the outcome of dispute resolution			
A	Final and binding	1	
B	Recommendation	2	
C	No dispute resolution	3	
9. Scope of dispute resolution procedure			
A	Whole treaty		
B	Limited		
C	Not applicable		

<sup>a</sup>If a treaty includes different provisions for differentiated groups of participants, only the most restrictive provision is taken into account for the coding

<sup>b</sup>Multiple entries are possible during the coding procedure, for the aggregation only the arbitration procedure with the highest degree of institutionalisation is considered

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