Coding Treaties: An Example from Nuclear Cooperation

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This note reports on a project to develop a codebook and data set for the analysis of bilateral civilian nuclear power agreements. It briefly provides a rationale for treaty coding projects of this kind, a description of the codebook and of the data set to be used with it, and a general discussion of some of the problems encountered in the development of the codebook.

The marriage of treaties and computers is not new. In quantitative studies of international relations, treaties have been used as indicators or points on measurement scales (Burgess and Lawton, 1972; Azar and Ben-Dak, 1975), as independent variables (e.g., Singer and Small, 1968), and as guides to state interaction patterns (e.g., Holsti and Sullivan, 1969). In the field of international law, computers have been used to store text, to create indices of treaties or documents (e.g., Jackson, 1969; Rohn 1974), to track signatures, ratifications and withdrawals, to develop 'treaty profiles' of different states (e.g., Rohn, 1976) or to illuminate particular points of international law (e.g., Gamble, 1980). With, perhaps, the exception of work based on Rohn (1974), these various uses do not seem to involve a close quantitative analysis of the contents of treaties. Developing a detailed codebook for the analysis of treaty contents would be a daunting task if many different types of treaties are included in the data set. If, however, the researcher's focus is on a clearly defined set of agreements, with a definable set of concerns, problems, and responses, the close analysis of treaty contents through computer-assisted means may be both possible and desirable.

This note reports on the author's efforts to develop a codebook for the detailed computer analysis of the contents of one such defined set of agreements: bilateral interstate civilian nuclear cooperation agreements, with special attention to safeguards and non-proliferation issues. A vast literature has developed in the area of non-proliferation (see Potter, 1982), and in both general and country-specific studies of agreements and policies related to nuclear exports (e.g., Hunt, 1977; Duffy, 1978; Park, 1979; Katz and Marwah, 1982). Here again, a close quantitative examination of treaty contents seems to be absent, although some qualitative studies may exist (e.g., United States Library of Congress, 1976). While this note focuses on nuclear cooperation agreements, I also touch on some general issues regarding the rationale...
for and problems of treaty-coding efforts of this sort, drawing examples from this project.

A Broad Rationale for and Description of the Codebook

The idea of international regimes—sets of ‘principles, norms, rules, and decision-making procedures around which actor expectations converge in a given issue-area’ (Krasner, 1982a: 185)—is a theoretical concept which has attracted increasing attention in the last decade both in studies of specific issues (e.g., Young, 1977) and in more theoretical works (e.g., Ruggie, 1975; Krasner, 1982b). Treaties, whether bilateral or multilateral, while not exhaustive sources or statements of such principles, norms, rules and procedures, may be important components in an international regime. They express in concrete legal terms some of the rules applicable to a given issue-area among a defined set of states at a particular time. Treaties, therefore, may help to define, indicate, and coordinate expectations; in so doing, they also indicate the limits of those expectations in space, time, subject-matter, and rules. Analyzing the contents of treaties, as well as patterns of adherence among states, may thus contribute to an overall understanding of the interactions of states in a regime, and of the functioning and the evolution of that regime.

A number of related issues could be studied in the specific case of nuclear cooperation: the evolution of the treaty practice of specific states, whether nuclear exporters or nuclear recipients; similarities and differences in the treaty practices of different states; the development and nature of supplier–purchaser networks and of the rules applied therein; the general structure of the international market for nuclear goods and services; tensions, contradictions, and clashes within a regime and among competing regimes. Such an analysis might uncover systematic differences in treaty contents among different groups—for example, Non-Proliferation Treaty signatories as opposed to non-signatories, or members of the Nuclear Suppliers Group as opposed to non-members. If these differences are pronounced or suggest the existence of alternative supplier–purchaser networks embodying substantially different rules and membership, such findings could suggest the fragmentation of the existing global regime and the development of a system of competing regimes. The theoretical and the policy significance of such a finding would be considerable. Treaty analysis could help in examining the causes, issues, processes and possible consequences of such a development. Patterns of leadership in a regime could be indicated through the acceptance by others of one actor’s treaty practice as a model—or at least indicate the acceptance of the issues and concerns in one actor’s treaty practice as the primary issues and concerns of a regime. In combination with other data stratification or discrimination patterns in supplier–purchaser relationships could be indicated, or the regime consequences of the diffusion of nuclear technological capabilities could be examined. It might be possible that proliferators could leave clues to or indicators of their behavior in their treaty practices.6

The nuclear treaty coding project focuses on a particular subset of treaties on nuclear-related issues. It excludes, therefore, (a) multilateral treaties, (b) agreements concerned with defense, broad technical cooperation, financial assistance, and with the medical, industrial, or other non-power uses of nuclear technology, and (c) agreements with or between non-state actors. The codebook does not intend to deal with the full network of international nuclear cooperation. The bulk of the codebook consists of six broad categories of content variables, centered on the unifying theme of
the prevention of nuclear proliferation.

1. The items supplied and the broad conditions of their supply: information and technology, hardware, materials, and the quantity and quality supplied, together with broad limitations affecting their transfer.

2. Safeguards: which items are subject to safeguards, as a condition of supply or through contact with safeguarded items, and the general nature of the safeguards applied.

3. Front end movement controls: controls on the movement of nuclear materials through the phases of conversion, enrichment, and fuel fabrication.


5. Retransfer controls: controls over which items may be retransferred to third parties.

6. Renewal and termination provisions: in particular, the treatment of safeguarded items on the termination of a treaty.

In each area, a more detailed list of problems and responses has been developed inductively. Given the complexity of the treaties, a deductive approach would produce a misleadingly simple codebook. A small sample of treaties was examined to develop an initial list of specific variables and responses. This list was then checked against another sample and revised accordingly. The procedure was then repeated until a workable version of the codebook was obtained. The current version of the codebook consists of 307 variables, together with detailed instructions for coders, sections dealing with definitions and related coding conventions, and a variety of appendices (including a detailed worksheet).

The codebook thus allows the large-scale yet fairly detailed comparison of treaties. The comparisons may be conducted longitudinally or cross-sectionally, over a defined subset of states, over a set of specific issues or problems, or by a combination of these. Thus, one could compare, for example, American and British practice with respect to the handling of spent nuclear fuel, in terms of the nature and strictness of their requirements, and changes in those requirements over time or from one set of purchasers to another. One could similarly look for patterns in the agreements signed by a given purchaser: what items has it sought, from whom, and under what conditions of supply? Where possible, the restrictions applied have been rank-ordered in terms of increasing strictness.

**Problems**

A number of problems of data collection, validity, and reliability have been encountered in the coding project.

**Sources and the Data Set**

The data set thus far developed is drawn primarily from the *United Nations Treaty Series*. This is the most widely available and comprehensive English-language source and is a natural starting-point for data collection. It also presents a number of problems. It suffers from significant lags in publication (Tabory, 1982), systematic gaps in coverage due to different registration practices of states (Lillich, 1971), and omissions of texts (Tabory, 1982: 355–358). This state of affairs reflects a broader disorganization of documentation in the field of international law, which has long
been a source of complaint by legal scholars and researchers (e.g., Jackson, 1969: 795–798; Sprudzs, 1971: 10–48; 1972).

The current data set was developed by surveying the published volumes of the United Nations Treaty Series and cross-checking the list of treaties and amendments obtained against Rohn (1974, 1983), Vambery and Vambery (1977), and the International Atomic Energy Agency (1981). The list was then supplemented by a search through the American, British and Canadian treaty series (United States; Great Britain; Parliament; Canada) as well as other listings and calendars of treaties. As of November 1984, the data set consists of approximately 160 original agreements and 140 amendments. A further 200 items (agreements or amendments) are either known or suspected, but the texts have not yet been collected.

Thus, the current data set is neither the full population of relevant treaties nor even a random sample from that population. Instead, it reflects very strongly not only American domination in the area of nuclear cooperation but also American registration practice: 55 per cent of the original treaties are American, as are 80 per cent of the amendments. From cross-checking the data set with the American, British and Canadian treaty series, it seems that the relevant agreements of these states (which together make up the bulk of the data set) are substantially covered. Since the data gaps are systematic rather than random, the data might provide strong evidence for conclusions regarding the treaties of these three states, but not regarding the full population of relevant treaties. Efforts are being made to expand the data set in both period and coverage. These will require constant monitoring of the United Nations Treaty Series, and constant checking of other sources, both public and private, for indications of relevant agreements and for their texts. It is unlikely, however, that the data set could ever be regarded as complete or that some of the country gaps could be completely filled.

A problem of obsolescence arises from the inductive procedure used to develop the codebook. As new treaties are uncovered and added to the data set, it might be necessary to revise the codebook to reflect new problems and new responses to old problems. It is also possible, given the dominance of American treaties in the data set, that the codebook is better suited to American practice than to the practices of other suppliers; the eroding American position in the nuclear cooperation field may thus be a source of future difficulty.

Validity and Reliability

An immediate problem is the assumption that treaties may be a useful guide to state practice and to regimes created in part by treaties. If this assumption is invalid, this would raise questions not only about the project but also about the workings of the regime. Sensitivity to indications of departures from the treaty rules is thus desirable. Another difficulty arises in the interpretation of treaty provisions in the coding. The ambiguities and complexities of treaty language are considerable. For example, definitions of terms may change from one treaty to the next, or vary within treaties. Coding conventions may be adopted, but must be treated as rules of thumb rather than applied mechanically in a way that might distort the meaning of a treaty. Third, the coding deals with treaties and the rules and conditions contained therein but not with actual transactions. The data set is not a guide to sales. A fourth set of problems arises from the interdependent nature of treaty provisions and from amendments to treaties. A mistake in coding one variable in the codebook, if the coder is consistent, may generate further errors later in the coding, either of that treaty text or of
amended versions of that text. One must anticipate that reliability will decline as the number of amended versions of a treaty increases. The provision of coding rules and a detailed worksheet, and the often lengthy discussions of issues, variables, responses, and examples, are attempts to reduce such coding errors and misinterpretations to acceptable levels.

Conclusion

This note has outlined in general terms some problems and possibilities associated with the attempt to code treaty contents for quantitative analysis. The limitations and difficulties of such an undertaking are clear, and are frequently considerable. Both the coding exercise itself and the use made of the resulting data must thus be approached with some caution. It is also clear that the resulting data cannot replace, but rather might supplement, more traditional approaches to treaty analysis. On the other hand, within these limits and mindful of these difficulties, it would also seem possible for the coding and analysis of defined sets of treaties, with defined issues and problems in mind, to make some contribution to the analysis of interstate relations and of international regimes.

Notes

1. For a general review of some computer-based treaty projects, see Sprudzs (1971: 49-61).
3. See also the discussion in Rohn (1974, Vol. 1: XV). As Rohn notes, there is a certain raggedness to such a data set even when dealing with states which conscientiously register their treaties. Thus, it would be wise for an analyst to use a subset of cases, ending perhaps in the early or middle 1970s, even for such states.
4. Sprudzs (1971: 10-48; 1972) provides general guidance for the use and limitations of some of these sources.

References

CANADA (Various dates) Treaty Series. Ottawa, Canada: Queen's Printer for Canada.


