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Michael ZÜRN

Problematic Social Situations and International Institutions- On the Use of Game Theory in International Politics¹

This paper aims at demonstrating empirically that game theory is useful for explaining international institution building. International institutions do indeed emerge in game-theoretically defined problematic social situations, that is when the outcome of an interaction in absence of an institution would be collectively suboptimal. Moreover, game theory provides a rich set of deductively derived variables that tell us a lot about the likelihood of regime formation in different types of problematic social situations.

At the same time, I will however suggest that adopting a soft version of game theory is more useful than technically more impressive versions. Such a soft version on the one hand takes solution concepts merely as indicators for describing a situation. Like the median and the mean, they summarize the large amount of information present in the formal description of the modelled game. Therefore, the concepts utilized for describing situations may be informed not only by deductive reasoning but also by empirical observations. On the other hand, such a soft version insists that the explanation of concrete historical outcomes is not valid as long as there is no empirical assessment of actors' preferences independent of the outcome to be explained.

The version of game theory that is suggested to be useful for explaining institution building may be called *situation-structural approach*.² Section one of this paper starts out with some general reflections on the use of game theory in international politics. Section two then outlines the essential components of the situation-structural approach that aim at

¹ I am grateful to Duncan Snidal for giving me the opportunity to discuss an earlier version of this paper with members of the PIPES seminar at University of Chicago. My thanks also to Otto Keck and Michael Nichol森 for their valuable comments on this paper.

² See Zürn (1992) for a more extensive elaboration of the situation-structural approach.

binding the concepts of game theory more closely to the international relations concepts under investigation. In section three, different procedures for assessing actor preferences independent of the outcome to be explained are reviewed. Finally, section four very briefly reports on an attempt of applying this approach.

1. Game Theory and International Politics

During the last decade non-cooperative game theory provided for significant insights into international politics. Above all, Axelrod (1984) and Taylor (1987) have demonstrated that a long shadow of the future allows for cooperation between rational actors in a prisoners' dilemma. In doing so, they have pointed to the 'possibility of governance without government' and thus laid ground for a whole research program that may well be called 'rational institutionalism' (Keck 1991). In addition, a number of other factors such as the existence of k-groups or the application of a tit for tat-strategy were shown to be conducive to institution building in prisoners' dilemma-type situations (see e.g. Snidal 1985 and Oye 1986b). By pointing to these factors, game theory provides a powerful set of variables for explaining institution building.

However, in practical terms, it is quite often overlooked that the effect of these factors depend upon the game that is played, that is the type of situation in which they interact. For instance, a long shadow of the future does not always open up an opportunity space for cooperation. To the contrary, a long shadow of the future, for reasons of reputation, hinders cooperation in a chicken game. To be sure, the ability to convincingly distinguish the effects of a given factor along different games demonstrates one decisive strength of game theory -- it provides a set of conditional statements which clearly specify the conditions under which a hypothesis holds or does not hold. At the same time, the example points to the major problem of utilizing game theory in the social sciences -- How do we know whether actors are involved in a prisoners' dilemma or in a chicken game? Unless we have some sort of measure indicating which game is played in the case under investigation, it is difficult to test the two complementary hypotheses and, moreover, impossible to apply them to a single case for explanatory purposes.

To be sure, explaining single historical institutions is not the principal goal of game-theorists. Game-theoretic analyses usually are based on the 'as-if methodology' leading to statements like the following: If rational actors are assumed to play a prisoners' dilemma and if the game is iterated, then there is a 'possibility of cooperation'. The 'as-if methodology' is an important heuristic device. With its help a strong argument can be made about the utility of international institutions in situations corresponding to a pri-

soners' dilemma. Assuming that in international politics at least some situations resemble these games, the so-called functional theory of international regimes explains why regimes, and more broadly international institutions, can arise in international politics *in general* (Keohane 1984). However, such statements do not allow for an *explanation of specific instances* of international regimes.³ One cannot claim to have explained the GATT-regime by pointing to its utility for overcoming the dilemma of international trade and to the long shadow of future accompanying this kind of transaction. One has to identify the constellation of interests in which the GATT-regime was established, or some other measure indicating the type of game that is played, in the first place.

Therefore, this paper is built on the conviction that only after *modelling the historical situation under consideration*, it can be tested whether or not actors have indeed chosen a behavioral option consistent with the theory. The modelling of the historical situation under consideration is a prerequisite for using game theory for explanatory purposes. Certainly, without knowing any game-theoretic solution concepts we lack of hypotheses which can be tested. This is when as-if methodology and deductive solution concepts come in again. A better understanding of social interactions will be dependent upon a parallel and even progress in both of these two fields. Since the deductive game theory is by far more developed, I will focus in this paper on the modelling of historical situations and on testing game-theoretic hypotheses. This leads to what I call the situation-structural approach.

2. Components of the situation-structural approach

The situation-structural approach is based on the simple idea that real-world situations can be modelled in form of a game-theoretic matrix. In order to do this, one first has to identify an interaction pattern with clear enough boundaries so that it can be modelled as being distinct from other interaction patterns. This analytical step is similar to identifying an issue area.⁴ In a second step, the situation can be modelled by specifying three components: (i) the participating actors, whereby the number of actors has to be minimized as far as possible without distorting the real-world situation; (ii) the behavioral options perceived by the players, whereby the number of options has again to be minimized as far as possible but without distorting the real-world situation; (iii) the ordinal preferences

³ The as-if methodology basically aims at predictions. The assumptions employed may even strongly deviate from the real world as long as the general line of the predictions hold. See Friedman (1953).

⁴ Keohane (1984: 61) defines an issue area as "sets of issues that are in fact dealt with in common negotiations and by the same, or closely coordinated, bureaucracies, as opposed to issues that are dealt with separately and in uncoordinated fashion."

over the different possible outcomes of the players. The fundamental hypothesis of the situation-structural approach states that non-hierarchical international institutions arise in situations the structure of which resembles certain kinds of games; that is *non-hierarchical international institutions arise in problematic social situations*.

(1) *The dependent variable*: The dependent variable of the situation-structural approach is the rise of non-hierarchical international institutions. In the international realm and elsewhere, there are alternatives to non-hierarchical international institutions for avoiding collectively suboptimal outcomes in recurring problematic situations.

On the one hand, the work of Axelrod (1984) and Taylor (1987) has proven that even in the absence of governing institutions cooperation in favor of collectively optimal outcomes can be achieved in prisoners' dilemma situations, given that rational actors are involved in an iterative game. *Cooperation without institutions*, in principle, seems to be possible in problematic social situations. However, cooperation without institutions requires a level of rationality on the side of all participants which is not very likely to exist in world politics. For example, the tit for tat-strategy needs a perfect reading of each action in terms of being cooperative or not for being successful in inducing cooperation. Otherwise a non-cooperative deadlock arises ('echo-effect'). Such a perfect reading (or even only an approximation to it) however cannot be expected in the absence of governing institutions.

On the other hand, the traditional recipe for governing problematic social situations in politics has been the '(world)-state'. *Governance*, with or without government, is distinguished from anarchy by the fact that states and other international actors recognize the existence of obligations and feel compelled, for whatever reason, to honor them by their behavior. *Governance* both with and without government refers to purposive systems of rule or normative orders which have to be distinguished from regularities (natural orders) emerging from the unrestricted interactions of self-interested actors in a state of anarchy. *Governance without government* is distinguished from governance by government in that the compellence of rules is not backed up by the threat or use of physical force (the state wielding the legal monopoly of violence); instead, it is the legitimacy of rules and their underlying norms which make international actors comply (see Franck 1990). In other words, governance without government in international relations is based on non-hierarchical institutions involving a stabilized pattern of behavior of a given number of actors in recurring situations. *Non-hierarchical international institutions* are based on a persistent and connected set of rules that defines behavioral roles, shapes activity and expectations, constrains the range of acceptable behavior, and thus governs the relations among the participants (Keohane 1989: 3; Young 1989a: 5). International

regimes can be conceptualized as an issue-area specific form of non-hierarchical international institutions. I follow the well-known definition of international regimes by Krasner (1983: 2) and suggest *operationalizing* it by the existence of rules embodied independently of the actors (explicit rules) *and* by requiring that the behavior of the participating actors be by and large consistent with rules.

Therefore, the situation-structural approach tries to explain voluntarily agreed upon, issue-area specific non-hierarchical institutions established by states and other international actors as being the mainstay of social order in international relations.

After institutions have been established, they can then be used in order to explain the behavior of actors in world politics. Whereas rational choice explanations are well suited for explaining the formation and change of general behavioral patterns, institutions, in turn, are most important in explaining single actions and interactions. Moreover, at a minimum, institutions will not change in lock step with every change in environmental conditions and they will affect outcomes. Institutions thus are not mere epiphenomena reflecting the underlying constellation of interests but they gain their own ontological status once they are established.⁵ This form of 'new institutionalism' aims at resolving the old debate between proponents of the idea that behavior is 'rule-governed' (logic of appropriateness) and advocates of the idea that 'rationality determines behavior' (logic of consequentiality) (see March and Olsen 1989).

(2) *The independent variable: Problematic social situations* can be analytically grasped by employing different game-theoretic solution concepts. First, it has to be pointed out that the utilization of solution concepts in the situation-structural approach serves the development of an empirical theory instead the provision of normative solutions. The solution concepts need not to be the best solution, they are *used merely as indicators for describing a given situation*. Like some statistical measures, they aim at succinctly summarizing some of the information about the real-world situation that went into game model. Although the solution concepts themselves have a fairly intuitive content, they are neither prescriptions about what should happen nor unqualified predictions about what will happen (see also Ryll 1989: 14).

I define *problematical situations* technically as those which consist of a structure corresponding to a 2x2 game with ordinal preferences in which there is at least one focal

⁵ For a similar solution to the agent-structure problem see Carlsnaes (1992).

Pareto-optimal outcome (as indicator for collective rationality)⁶ that is not at the same time a Nash-equilibrium *and* a Maximin-solution (indicators for individual rationality).

This is a relatively broad notion of problematic social situations. In contrast, Raub and Voss (1986: 88) define this concept as non-cooperative games with an inefficient outcome following the Bayesian solution of Harsanyi (1977). This leads to a more restricted number of situations which are considered as socially problematic. Since I believe that the Bayesian solution is not a very useful indicator for empirical theory, the definition suggested here uses *more simple solution concepts* which are less demanding in terms of rationality.

The suggested definition of problematic situations is closer to the one proposed by Taylor (1987: 19) according to which "a collective action problem exists where rational individual action can lead to a strictly Pareto-inferior outcome, that is, an outcome which is strictly less preferred by every individual than at least one other outcome." (see also Liebrand 1983: 124) Here, the criteria used for rationality are similar to mine. Yet my definition assumes, in addition, that actors who generate collective solutions under uncertainty are, *ceteris paribus*, more interested in outcomes which are perceived as just and efficient than in those which are perceived as only efficient.⁷ Hence, I use the indicator of focal Pareto-optimum. This leads to the inclusion of situations into the definition which are explicitly excluded by Taylor as "not at all problematic."

The first fundamental hypotheses of the situation-structural approach can now be restated: *Non-hierarchical international institutions emerge only in recurring problematic social situations to approximate collectively desirable outcomes (which are indicated by the focal Pareto-Optimum).*

(3) *Values of the independent variable:* A problematic social situation points to the *necessary* condition for the emergence of an international regime. That leaves the question open, under which conditions the possibility of regime formation is transformed into actuality. A first step towards answering this question requires a classification of games

⁶ The focal Pareto-optimal outcome is assumed to indicate the collectively desirable result towards which actors strive for when they build normative institutions. Out of the larger number of Pareto-optimal outcomes in a non-cooperative game, it is the one which indicates the highest pay-off value when the payoffs of single players are multiplied. Consequently, it excludes the Pareto-optimal outcomes which are unsatisfying from a collective point of view (such as when one party's interests completely succeed in a prisoners' dilemma). This focal Pareto-optimal outcome resembles Nash's bargaining-point for cooperative games.

⁷ See Mikula (1980) for a survey on the respective research in social psychology. Also Young (1989b: 362) points out that the 'veil of uncertainty' often leads rational actors to agree on arrangements that are not only efficient but also 'fair' in that patterns of outcomes generated under such arrangements will be broadly acceptable, regardless of where the participant might be located in such outcomes.

that allows to categorize each situation structure, which was modelled on the basis of a recurring real-world situation, as to which type of problematic social situation it represents -- in case it represents one, at all (see Krasner 1991: 364).

Using the same indicators as for the definition of problematic social situations, all 2x2 games (which do not allow for either mixed strategies or for indifferences in the preferences) can be distinguished according to whether they have none, one, or two *Nash-equilibria*:⁸ Each of these different types of problematic situations is associated with a different dependence on supportive context variable in order to allow for regime formation.

(i) and (ii) Co-ordination games with and without distributional conflict such as 'assurance' (without distributional conflict) and 'battle of sexes' (with distributional conflict).⁹ Here, the formation of an international regime can be expected within a relatively short period of time after the situation has been recognized by the actors without that special requirements have to be fulfilled. In a sense, these situation types come close to being sufficient conditions of regime formation.

(iii) Dilemma games such as the 'prisoners' dilemma'.¹⁰ Here, the situation itself does not augur well for the formation of a regime since it contains powerful incentives for non-cooperation by every actor. Regime formation thus depends on exogenous factors exerting a favorable influence. In a dilemma-type situation, then, an international regime is likely to be established only after a lengthy process of interaction during which exogenous factors must contribute.

(iv) 'Rambo' games. In these situations one actor reaches his/her optimum by refusing to cooperate while the collective outcome might be (and often is) suboptimal.¹¹ Thus regime formation seems to be next to impossible. However, whereas this situation seems unproblematic from the point of view of strict rational choice theory, it is socially unstable since it implies a very uneven distribution of costs and benefits. Thus, the aggrieved actor may well endeavor to transform the situation by creating a cross-issue linkage into a dilemma-type situation.

⁸ For a similar classification see Walliser (1988) who classifies on the basis of the concepts of Pareto-optimum, Stackelberg-equilibrium, and Nash-equilibrium.

⁹ 2 x 2 Coordination games are characterized by having two Nash equilibria. There are those games in which one of the two Nash-equilibria is better for both actors (coordination games without distributional conflict) and those in which each of the Nash-equilibria favors a different player (coordination games with distributional conflict).

¹⁰ These games have one Nash-equilibrium which is collectively suboptimal. The focal Pareto-optimum makes both players better off.

¹¹ These are games having one Nash-equilibrium, whereby the focal Pareto-optimum different from it, makes only one player better off.

In very general terms, the second fundamental hypothesis can now be stated: The relevance of context variables for the formation of international regimes in problematic social situations is (i) very little in situations corresponding to coordination games without distributional conflicts, (ii) little in situations corresponding to coordination games with distribution conflicts, (iii) large in situations corresponding to dilemma games, (iv) very large in situations corresponding to rambo games.

(4) *Context variables*: The number of context variables that can be considered is in principle infinite. Yet the situation-structural approaches utilizes only those context variables which have been suggested as important by the game-theoretic literature. Some of them, however, need first to be translated into categories that are used in the literature on international relations.

(i) Oye (1986b: 18-19) employed the old game-theoretic idea asserting that the chances for voluntary cooperation increase as the *number of participants* decreases. Along the same line, it can be argued that the number of actors in an issue area is important for explaining regime formation.

(ii) The modelling of a situation structure with game-theoretic instruments already includes to some extent power relations (Stein 1983: 135). Thus strongly asymmetric power distributions are reflected in asymmetrical preferences. For instance, while a crisis situation between the two superpowers, as with Cuba, probably reflected a chicken-like situation, a similar crisis would certainly correspond to another game if the conflicting parties were the USA and Haiti. In this case, overstepping the brink is the worst result only for Haiti. Power comprehended in this sense, however, is power as 'control over outcomes' instead of 'power over resources' (see Hart 1976b). Therefore, it is possible to consider the *power distribution in terms of resources* as an additional factor. It is plausible to do this, because the modelling of historical situations only leads to assessments about ordinal payoffs. Yet the resources the involved states have at their disposal might be a very good indicator for asymmetries which will be reflected as a difference in cardinal payoffs.

One version of the theory of hegemonic stability, based on public goods theory, states that a strong asymmetry in power promotes the provision of international regimes (Keohane 1980). To the contrary, in his study about common-heritage regimes Wolf (1991) contends that a symmetrical distribution of power makes regime formation difficult. Consistent with both of these results, the situation-structural approach states that an asymmetric power distribution is regime conducive in dilemma-type situations, while symmetry in power distribution is supportive to issue linkage and thus to regime building in rambo-type situations.

(iii) Grieco (1990) has argued that states are not 'utility maximizers' but 'defensive positionalists'. According to this statement, they do not only care about absolute gains in an interaction but also about relative gains over other states. The important debate about relative gains notwithstanding (see Milner 1992), in terms of the situation-structural approach the issue of relative gains is a non-issue. In as far relative gains orientations exist indeed, they are automatically part of the modelled situation which are build on the subjective, real-world preferences of the actors. In other words, by using the situation-structural approach, no need therefore arises for a competitive transformation of games, even if states, in fact, were defensive positionalists.

Nonetheless, I will use the concept of game transformation as a method of accounting for the condition of the overall relationship among the actors in an issue area. In order to account for a very icy *overall relationship* among the actors, such as it was predominant in the East-West relations during the Cold War, the modelled situation should be transformed into the competitive mode.

(iv) The shadow of the future is widely recognized as a means of encouraging voluntary cooperation between self-interested actors in international politics (see Axelrod and Keohane 1986: 232). Considering the definition of 'institutions' as rule-governed behavior in given and recurring situations, it is even tautological to state that a shadow of the future is important for the rise of international regimes. However, it remains important whether a certain situation is recurring frequently and whether the participating actors are involved in parallel situations with each other. Whereas the diachronous iteration depends on the number of iterations expected within a given period of time (*density of recurrence of the situation*), the synchronous iteration is best operationalized by looking at the overall *density of transactions* between the actors active in the issue area to be studied.

(v) Closely related to the issue of iteration is the notion that a certain strategy, such as tit for tat, can either induce international institution building or provide a decentralized mechanism for sanctioning rule violations after a regime is established. While the tit for tat-strategy serves as an important starting point, ensuing research showed that a more friendly and forgiving yet still reciprocal *foreign-policy type* is more conducive to regime formation and maintenance.¹²

¹² See for instance Downs and Rocke (1990). For a more extensive discussion of 'regime-conducive foreign-policy types' see Zürn (1993).

3. *Testing hypotheses*

Developing a set of game-theoretic hypotheses is one thing, the testing of it another. Whereas we are now equipped with a number of hypotheses about the rise of international institutions, the major problem of the situation-structural approach is still not yet solved: Is it possible to avoid the common pitfall of a "circular reasoning from the choices made by actors back to their preferences" (Snidal 1986: 40-1)? To put it differently, is it possible to determine the preferences of actors in a situation without referring to the conflict behavior that shall be explained by these preferences? Or even more provocatively, is it after all possible to test the hypotheses? Using the 'revealed preferences' of actors as an independent variable obviously implies a tautology. The whole exercise of game-theoretic modelling would then be not much more than a mere *ex post* rationalization of a historical case. In order to use a game-theoretic model for explanatory purposes, it is inescapable to assess preferences independent of the conflict behavior that is under investigation. In this section, I will suggest three methods of assessing preferences independent of conflict behavior. In the final section, I will briefly report about a case study in which I applied a combination of two methods.

(1) *Applying theories*: The use of game theory in international politics has been criticized on the basis that it works with given preferences. According to this criticism, the more interesting question of how actors come to have the interests they have, is thus neglected (see e.g. Jervis 1988 or Katzenstein 1990). In fact, there can be little, if any, doubt that a complete and satisfying explanation of regime formation must also involve the issue of interest formation. The problem, however, is that game theorists, as well as other students of international politics, have little to say about interest formation. If we had a reliable theory about the interests which actors adopt under specified conditions, it could be perfectly combined with the situation-structural approach in order to attain a complete social science explanation (see Elster 1985: 3).

The most important actors in world politics are governments or states. I am following Krasner's (1978) definition of state as the highest executives in the foreign policy establishment which are to some extent detached from societal pressures. In spite of overwhelming counterevidence, some scholars still assume that all state actors' preferences can be derived in every situation from some sort of fundamental interest or motivation (Waltz 1979). In contrast, I contend that interests vary from actor to actor and from issue area to issue area. The answer to the question of what motivations drive international politics, is neither power nor plenty - it is both and more.

This is not to say that preferences can be only determined on a case by case basis. Without doubt, there is a need for developing and testing theories about the conditions under which certain preferences prevail over others. However, such a theory could only consist of *conditional hypotheses* about actors' preferences dependent upon the issue area as well as upon knowledge, values and domestic interests. While some of these hypotheses might be of near-universal validity, most of them would be time and space specific (Scharpf 1989: 44-5).

Although there is still a long way to go, some important contributions have to be mentioned. For instance, Aggarval (1989) derives several hypotheses about Mexico's weighing of different goals (avoiding a declaration of bankruptcy; avoiding austerity policies; maintaining the reputation of being a reliable creditor) in international debt crises from three variables (overall power; issue-area power; stability of ruling coalition). Similarly, Schwarzer has developed conditional hypotheses about actors' interests in international environmental policy by referring to, in addition to some specific domestic interests, the relationship between pollution import and pollution export. After combining these hypotheses with game-theoretic concepts, both Aggarval and Schwarzer offer a convincing explanations of conflict behavior in the issue areas under investigation.

The mentioned efforts notwithstanding, the current state of the art is not so that one can work with given conditional hypotheses about preferences. Even if we already had reliable conditional hypotheses about actors' interests in some issue areas, there will be others where the assessment of interests is extraordinarily difficult. This is especially true in cases where the issue area is far away from the economic sphere (as human rights or issues of political status). While some issue areas, for instance international economic relations, are characterized by a common goal orientation (welfare) and by a relative widespread consensus about cause-and-effect relationships, others such as the issue area 'human rights' lack both of these features. Obviously, it is much easier to develop hypotheses about actor preferences in a given situation in the former than in the latter case. Moreover, if the case under consideration involves issue-linkage across issue areas, the additional difficulty arises that different goals, which are essentially unrelated to each other, have to be weighed.

In short, there are issue areas in which the hypotheses about actors' preferences are not yet available and will not be available in the near future. For such cases, one has to rely on more descriptive methods of preference assessment.

(2) *Using documents*: The most obvious procedure for the assessment of preferences is the classical method used by historians, that is, the study of documents and memoirs in addition to interviewing decision-makers. The goal of such a procedure is to find out

what kind of interests the decision makers had expressed *before* the conflict behavior under consideration has been carried out.

To be sure, politicians generally act strategically in the public realm. Consequently, they sometimes deceive and express their opinion ambiguously in public. Documents recording internal discussions between decision-makers which preceded relevant decisions in the issue area would therefore be the best material available. But even if such 'first-class' documents are at the analysts disposal, there remains a certain degree of interpretational freedom regarding contradictory and ambiguous statements.

There are two procedures for *explicating the assessment of preferences* of actors. One possibility is to identify the general goals of an actor in the issue area under investigation in the first place in order to weigh them or to bring them in a rank order. This exercise results in an *interest profile* which then can be used in order to derive preferences in a given situation. For instance, after we have brought the aforementioned goals of Mexican policies when confronted with a debt crisis in a rank order, conceivable negotiation outcomes in a specific situation most often can be, by method of deduction, brought in a order of preferences, too.

Another, and complementary, possibility of reducing biases would be the use of *formalized methods* for evaluating documents. For example, Axelrod (1976) has introduced a procedure called 'cognitive mapping' that is able to gain more reliable information about the interests and cognitions of the decision makers. A somewhat less complicated procedure which could be utilized for assessing preference orderings is what George (1969) has called 'operational codes'. Both procedures maintain, to a large extent, the advantages of the historical method (providing for descriptive richness, being very comprehensible, and being applicable to most cases) and reduce to some extent its major weakness (subjective judgement). Yet these more sophisticated methods bring into the open two further disadvantages of using documents. First, it obviously depends upon the availability of relevant material and, second, it tends to be a very time-consuming process.

(3) *Asking experts*: The three weaknesses of using document research can be challenged most directly through the implementation of a standardized questionnaire designed for distinct issue-area experts and decision makers. It substitutes the subjective judgement of the analyst through the judgments of experts and decision makers 'neutral' to the ideas that guide the research. Moreover, this method does not depend upon the availability of relevant documents and, finally, it is less time-consuming than its alternatives.

One might object, however, that a decision-maker, or even a highly ranked expert, would answer the questionnaire as if it were nothing more than another public statement.

Accordingly, the answers to the questionnaire would be invalid. However, the risk of invalid answers is already minimized, to some extent, by using the averages of different answers. Moreover, the validity of the responses could be increased by asking indirect questions about preferences.¹³

Nevertheless, historical research remains important. It is needed, to some extent, in order to find out who the experts are and, more importantly, in order to ask the appropriate questions. The questionnaire then, may be seen, as the ideal complement to the historical method - at least as long as there is no satisfying theory about actors' interests. Furthermore, the combination of these two methods can also be used to develop and test conditional hypotheses about 'who has when which interests'.

4. An illustration: the evolution of the intra-German trade regime

So far I have argued that game theory is a useful instrument for explaining the emergence of international institutions, if two requirements are fulfilled: First, a soft version of rational choice is utilized, and secondly, the preferences of the actors are assessed independently of the conflict behavior to be explained. Consequently, I unfolded the situation-structural approach that is believed to meet these requirements. In the remainder, I briefly report the results of a study about the evolution of the intra-German trade regime to illustrate that the empirical application of the situation-structural approach is feasible and potentially effective in explaining regime formation. For this study, I used a combination of the historical method and the questionnaire method to assess actor preferences.¹⁴

(1) The dependent variable: Although the Potsdam Agreement of August 1945 provided for the maintenance of Germany as 'a single economic unit', from 1947 on, at the latest, a dramatic process of economic disintegration arose in Germany as part and parcel of the Cold War. Although the latter-day GDR was economically slightly more developed than most of West Germany, the consequences of the rapidly dissolving German economic unity were for this region of a far more serious nature than for the Western zones. The

¹³ See for example Hart (1976a) who developed a complicated questionnaire asking for the 'goal structures' of different states participating in the conference on the law of sea. Also Coleman's (1973) concept of a control- and interest matrix can be used to determine actors' preferences in an issue area through an questionnaire without asking directly for it.

¹⁴ See Zürn (1990) for a study based on the use of documents only. This older article was written independent of the knowledge about the results of the questionnaire. Only later, I have send a questionnaire to ten experts and decision-makers in East- and West-Germany. Although the return rate was low (40%), the results can be seen as sufficiently valid for such an illustrative study (for a complete account of this study see Zürn (1992: chap. 3).

Eastern producers of industrial goods were dependent upon the West German market, and, even more severe, the delivery of raw materials from West Germany was urgently needed in order to maintain production. In contrast, West Germany was, without difficulty, able to replace the imports previously obtained from East Germany with goods from Western countries and to export its excess raw materials to those same countries.

The West attempted to exploit this situation when, in June 1948, after a separate currency reform in the Western zones, the Eastern side imposed the Berlin blockade. The blockade was responded to, among other things, with the banning of interzonal trade. It was hoped that the strategically unfavorable situation of Berlin inside the SBZ could be neutralized through Eastern German economic dependence. Yet the GDR was not willing to concede such a linkage.

Thus, since 1949, discussions in the issue area of intra-German trade have focused essentially on two issues: (i) the extent of linking intra-German trade to political questions concerning Berlin; (ii) the extent and durability of intra-German trade. Whereas the Western side tried to keep the trade at a low level and to assure access to Berlin, the Eastern side aimed at reducing Western access to Berlin and at increasing the reliability and the level of trade.

Although the two German states in 1951 signed the Intra-German-trade agreement ('Berliner Abkommen'), *uncooperative conflict behavior prevailed until the mid of the 1960s*. The signing of this agreement did not coincide with the establishment of the intra-German-trade regime, since the management of the two principal issues remained unregulated. The Federal Republic made no commitment to either engage in or to guarantee long-term trade, furthermore she insisted, against the will of the GDR, upon procedures which resulted in keeping turnover in intra-German trade significantly below its potential maximum. In addition, conflict over the extent of the political manipulation of trade remained largely unregulated. While the GDR committed herself neither to free civilian transit to and from West Berlin, nor to free travel between the two Germanies, the Western side insisted upon an extensive linkage without specifying the extent of the political concessions it demanded.

This changed only after the *intra-German trade regime came into existence in the mid 1960s*. The decisive step was taken in a cabinet session of the Erhard administration in March 1966. It was decided that intra-German trade would no longer be suspended, unless the transport of goods (not persons!) between the FRG and West Berlin (not between the two German states!) was stopped by the Eastern side. Thus, the West German government made a commitment to limit the extent of linking intra-German trade to political questions concerning Berlin. This sort of junction was already acknowledged by the GDR in 1960, when the GDR signed a Secret Protocol in order to terminate a

trade boycott that the FRG announced in September 1960 as response to minor GDR provocations on the border.¹⁵

As a result, the *intra-German-trade regime* came into existence. It was grounded on the twin principles that, on the one hand, intra-German trade is granted the special status of quasi-domestic trade (exempted from all forms off tariffs) and, on the other, intra-German trade is subject to the primacy of East-West politics (e.g. the CoCom restrictions apply to intra-German trade, too).

(2) *Modelling the situation structure*: For the purposes of modelling the situation, the *actors* in this issue area may be reduced to two, that is the GDR and the FRG. The possible responses of the two actors can be outlined roughly as follows: The *Federal Republic* perceived three *options*: (i) to make a clear and binding statement in favor of extensive and long-term trade; (ii) to engage in trade, on the basis of *ad hoc* agreements, but, at the same time, to use it as an instrument for other goals; and (iii) to engage only in minimal trade with the GDR or to refuse all forms of trade.

The *GDR* saw also three *options*: (i) to make a clear and binding statement in favor of *free civilian passage* (including persons and goods) to and from West Berlin; (ii) to make a clear and binding statement in favor of the *free transit of goods* to and from West Berlin; and (iii) to give no such guarantees and, instead, to implement a policy of interrupting the free access to West Berlin arbitrarily.

The *preferences over the conceivable outcomes on the side of the FRG government* can be derived from the following *interest profile*:¹⁶ (i) the Federal Republic, above all, wanted to achieve the most extensive and most firmly guaranteed access to West Berlin possible; (ii) the Federal Republic wanted to demonstrate the notion of national unity through intra-German trade, and thus preferred *ceteris paribus* guaranteed trade over no trade; (iii) the West-German decision-makers did not want to lend any support to the SED leadership leading to a *ceteris paribus* preference of *ad hoc* trade over guaranteed trade.¹⁷

¹⁵ The Secret Protocol was not known so far. I also did not see the protocol but found three references in the documents which leave no doubt about the existence of the protocol.

¹⁶ This interest profile is derived from the utilization of the historical method and in turn determines the preference ordering. Put differently, this profile serves as an intermediary step between the empirical account and the preference ordering of the nine possible outcomes of the 2 (actors) x 3 (options) game given in Matrix 1.

¹⁷ During the 1950s and the early 1960s the order of guidelines two and three in the interest profile was reversed. Thus the situation changed slightly over time. However, for the illustrative purposes intended here, this can be, as many other details, neglected, since the type of problematic situation remained the same.

The *preference ordering* for the GDR emerges from the following *order of guidelines*: (i) any outcome which implied a binding commitment to free civilian access (persons and goods) to Berlin had to be avoided; (ii) secondary to the first point, the GDR wanted to enter in a trade relationship with the Federal Republic which was as extensive and long-lasting as possible; (iii) all other things being equal, the GDR preferred a commitment regarding the free transport of goods only to a commitment to free civilian transit in general.

The combination of options and preferences yields the 2 actors x 3 options game indicated in Matrix 1.

Matrix 1: The issue area 'intra-German trade' in the mid sixties: historical method

FRG	Guarantees trade	Allows for <i>Ad hoc</i> trade	Allows for no trade
GDR Interrupts access arbitrarily	9,2 P	7,3 M,N	5,1
Guarantees free transit of goods	8,5 P+	6,6 P	4,4
Guarantees free civilian access	3,8 P	2,9 P	1,7

The modelled situation structure corresponds to a dilemma-type game. There is only one Nash-equilibrium (N) that is, at the same time, the only Maximin-solution (M) but clearly a Pareto-inferior outcome. There also is only one focal Pareto-outcome (P+) indicating a solution consisting of the GDR guarantee for free transit of goods in exchange to the FRG guarantee for durable trade. According to the hypotheses of the situation-structural approach, the formation of a regime is possible in such a situation, yet it requires supportive context variables.

Matrix 1 results from an intensive research using documents and interviews with representatives of the West German administration. In contrast, Matrix 2 is based on the 'average response' from East and West German intra-German-trade experts to a standardized questionnaire.

Matrix 2: The issue area 'intra-German trade' in the mid sixties: questionnaire method

GDR	FRG	Guarantees trade	Allows for <i>Ad hoc</i> trade	Allows for no trade
	Interrupts access arbitrarily	8,1 P	7,3 M,N	3,2
	Guarantees free transit of goods	9,6 P+	5.5,7	2,4
	Guarantees free civilian access	5.5,8 P	4,9 P	1,5

The matrix differs only in details from matrix 2. The most important difference is that according to the experts the focal Pareto-optimal outcome is also the most preferred one for the GDR. This contradicts the results of my research. However, both modelled situation structures correspond to a problematic situation of the dilemma-type in which 'Interrupts access arbitrarily/ allows for *ad hoc* trade' is the natural outcome (Nash-equilibrium and Maximin-solution) and where 'Guarantees transit of goods/ guarantees trade' is the focal Pareto-optimal outcome. To put it differently, both methods for assessing preferences led essentially to the same result. This can be taken as an indication for the reliability of both procedures. At least tentatively, I therefore conclude that it is possible to assess preference orderings independent of the conflict behavior in question. This is a first significant result of this study about intra-German trade.

Moreover, a closer look at the modelled situation structure reveals that both actors aimed at a goal the attainment of which was entirely dependent upon concessions from the other side. This is due to the fact that the above-outlined game ultimately depends on two rambo games (a formal representation is not necessary). Although the FRG hoped for free access to West Berlin, she was dependent upon the GDR's willingness to cooperate. The GDR, on the other hand, was in this respect able to attain her optimum unilaterally. However, in the question of trade precisely the opposite constellation prevailed. In this predicament, both actors tried to exploit their advantages to obtain the desired concessions from the other side; this resulted in the linking of intra-German trade and free access to West Berlin and, subsequently, in the creation of a dilemma-type situation. Thus, the transformation of two inverse rambo-type situations into one dilemma-type situation was the crucial precondition for the formation of the intra-German trade regime. This finding confirms the broad definition of problematic situations which includes situations corresponding to rambo games as necessary condition for regime formation.

(3) *Explaining the formation of the intra-German-trade regime:* So far, I did, however, not provide a complete explanation of the intra-German trade regime. According to the hypotheses of the situation-structural approach, regime formation in dilemma-type situations is a demanding task which takes time and needs supportive context variables. In fact, the process of regime formation was protracted. Yet in order to provide a truly convincing explanation, it has to be shown that the context variables turned more supportive in the early 1960s.

(i) The *number of actors* did not change over time. In both periods, during the 1950s and the 1960s, there were essentially only two actors, thus forming a clearly supportive variable for regime formation in situations corresponding to dilemma games.¹⁸

(ii) The *power distribution* among the two actors also did, by and large, not vary over time. In terms of both, control over overall power resources and control over economic resources (issue-area specific) the FRG constantly hold a two to one superiority.¹⁹ This constitutes clearly an asymmetrical power distribution which is supportive of regime formation in dilemma-type situations. At the same time, it is not a dominance relationship which virtually would have excluded the linkage of two inverse rambo-type situations.

(iii) The *overall relationship* was certainly less icy in the 1960s than in the 1950s. More moderate rhetoric began to prevail two or three years after the Berlin wall was erected. Although this change in the overall relationship might have contributed somewhat to regime formation, it does not constitute a very important context variable in situations corresponding to dilemma games (see Snidal 1991).

(iv) The extension of the shadow of the future in intra-German trade relations represented apparently a very important change. Trade between two states is usually seen as an interaction with a *high density of recurrence and with a long time horizon*. However, this does not hold, if the political system of one of the two trading partners is considered as unstable and as being doomed to failure. Almost all decision-makers in West Germany during the 1950s hoped that the SED-dominated system of the GDR would break down within a short period of time. Yet this belief changed in the early 1960s when a stabilization of the GDR took place. As it became more obvious that the GDR con-

¹⁸ Both actors were, to some extent, restricted by the bloc leaders. Whereas the GDR was not allowed to impose a prolonged full scale blockade, the FRG had to comply with CoCom restrictions. However, it seems more plausible to conceptualize these restrictions as absence of those behavioral options instead of introducing additional actors.

¹⁹ The data is displayed in Zürn (1992: 299-300). The power relationship in terms of control over outcomes was according to the responses to the questionnaire about 1:0.8 in favor of the FRG.

stituted a stable state for a long time to come, the shadow of the future grew considerably, thus turning this variable much more supportive for regime formation. Simultaneously, the improvement of the overall relationship increased the *interaction density* between the two states slightly. Therefore, the growth of synchronous iteration might have supported regime formation, too.

(v) Finally, the *foreign policy strategy* of the FRG clearly changed in the early 1960s. Whereas the FRG pursued in the 1950s a policy that, at best, constituted a very strict tit for tat-strategy, it became more 'nice and forgiving' in the beginning of the 1960s. During the 1950s the FRG asked for far-reaching and, to some extent, unspecified concessions from the GDR for the maintenance and expansion of intra-German trade. Only after Ludwig Erhard succeeded Konrad Adenauer as chancellor, the FRG began to provide unilateral offers for cooperation in intra-German trade that specified clearly the now much more moderate concessions which were expected from the GDR.

To sum up this review of the context variables in the issue area intra-German trade, it can be stated that they were, by and large, supportive and thus allowed for regime formation in a dilemma-situation. The most decisive deviation from the 1950s occurred through the extended shadow of the future and the adoption of a more friendly foreign policy strategy on the side of the FRG. This eventually led to the formation of an international regime.

In summary, the issue area of intra-German trade at the beginning of the 1950s was dominated by a situation corresponding to two rambo-type games favoring, at one point, the GDR and, at another, the FRG. This allowed for a linkage which was constructive insofar as a more regime-conducive situation of the dilemma-type was thereby created. These results of the modelling on the basis of traditional historical research were additionally corroborated by the responses to a questionnaire which was sent to experts in the issue area. Yet it was not until the mid-1960s that an international regime was established. This occurred only when the context conditions turned to be more supportive.

5. Conclusion

In this paper, I aimed at applying the situation-structural approach. This approach consists of a set of hypotheses derived from game theory. Yet it utilizes a soft version of rational choice theory which considers situations as socially problematic that are excluded by stricter versions of rational choice theory, and it explicitly addresses the issue of preference assessment independent of the conflict behavior to be explained. The results of the illustrative study about the formation of the intra-German trade regime demonstrated that

the broad definition of problematic social situations, including those situations that resemble rambo games, is indeed necessary to understand institution building adequately. The results of the study are consistent with most of the hypotheses of the situation-structural approach. Furthermore, the study showed that the assessment of actor preferences independent of the actual conflict is not only desirable but also feasible.

Of course, a lot remains to be done. I just want to emphasize three fields of further work that seem to be especially urgent. First of all, the approach still utilizes the assumption of unitary actors in world politics. Yet, if governments act in their interest (and not in a whatsoever defined national interest), it would be necessary to ask not only for international but also for societal restrictions of their behavior. This points to the need of incorporating the concept of two-level games into the situation-structural approach (see e.g. Putnam 1988). Second, conditional hypotheses about actors' preference are desperately needed for a more elegant and readily available application of the approach. Third, more formalized procedures for identifying the relevant actors and their perceived behavioral options have to be developed (see e.g. Ostrom 1990: 58).

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