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Institutional Solutions for Global Commons Problems

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## **Abstract**

Like individuals facing common pool resource problems, states search for ways to solve collective action problems in the international system without turning to external enforcement. Potential market failure and multiple equilibria are two paradigmatic problems states confront, and each demands specific institutional solutions. Heterogeneity of power and of preference intensities may actually enhance the probability of cooperation, if states are able credibly to link issues. Credible issue linkages are facilitated by certain kinds of domestic and international institutions.

Processes of internationalization, combined with a diffuse international distribution of power, make it difficult or impossible for states to achieve desired outcomes by unilateral action (Keohane and Nye 1977). Thus, states can often benefit from being able to cooperate with one another. Problems of market failure, such as collective action problems and informational asymmetries, and problems of coordination, such as standardization, indicate that states may choose to construct institutions in order to help themselves cooperate more reliably (Keohane 1984). These problems and potential solutions are analogous in many respects to those faced by individuals attempting to utilize common-pool resources (Ostrom 1990). The analogies are particularly strong when we turn our consideration to global commons issues, such as environmental degradation, use of non-territorial ocean resources, or species conservation. This paper examines the kinds of problems states might confront when dealing with the global commons and analyzes the roles institutional structures could play in mitigating such dilemmas.

Students of international cooperation have distinguished two distinct paradigmatic types of cooperation problems: *collaboration* and *coordination* (Snidal 1985a; Stein 1982). Each demands a specific institutional form for effective solution, so that states have incentives to construct arrangements particular to the nature of the cooperation problem they face. The first section of this paper summarizes these considerations of efficient institutions. It goes on to argue that, in practice, the distinction between collaboration and coordination fades when states are involved in long-term, repeated interactions (Krasner 1991). The transformation of collaboration problems into coordination problems implies that institutional solutions to

commons problems will include features for mitigating both, while attempting to separate market failure issues from distributional ones.

Although the concept of sovereignty gives every state equivalent legal status, they nevertheless vary greatly in their capabilities and interests. Such variation introduces heterogeneity into problems of international cooperation, sometimes more substantial heterogeneity than we find in local commons problems. Empirical analyses of common-pool resources seem to find that heterogeneity inhibits efforts to cooperate unless unusual conditions, such as the existence of a privileged group, are met (Libecap 1989; Johnson and Libecap 1982). Indeed, within the scope of individual issues heterogeneity can create conflicts of interest that reduce available gains from cooperation. However, such distributional conflicts arise even in the presence of identical actors. On the other hand, heterogeneity may create opportunities for gains from exchange across issue-areas, thus enhancing the scope and potential of cooperative arrangements. The second section of this paper considers alternative perspectives on the effects of heterogeneity, and suggests that it often leads to issue linkage.

The third section then turns to the question of institutional design in the presence of linked issues. While issue linkage creates room for mutually-advantageous cooperation that states cannot achieve on single issues, it is often difficult to maintain in non-institutionalized environments. Individual actors face temptations to renege on cross-issue deals, hoping to achieve concessions on those issues of most intense interest to themselves and then back down from commitments of more interest to their bargaining partners. Institutions can reduce temptations to renege, thus solidifying issue linkages and encouraging heterogeneous states to cooperate with one another.

On the domestic level, individuals attempting to solve cooperation problems often have the option of turning to the state for solutions and enforcement. However, state intervention has frequently proven inefficient or even destructive of established self-enforcing cooperative solutions. Solutions organized by users themselves result in "horizontal orderings," where patterns of behavior are organized but individuals do not rely heavily on external enforcement or other hierarchical structures. We might expect similar patterns to emerge on the international level, since international politics is a self-help system without the option of external enforcement. Influential analyses have suggested that states cannot afford the luxury of functional differentiation, which would increase aggregate benefits through specialization (Waltz 1979). However, considerations of institutional design suggest a third pattern of cooperation. Solutions to cooperation problems may rely on self-enforcing agreements, but at the same time establish hierarchical patterns of authority and functional differentiation. States may choose to delegate authority to particular subsets of actors or to international organizations. Institutionalized patterns of international cooperation, such as those we see in the European Community (EC) or the United Nations (UN) Security Council, show that states may develop models that go beyond horizontal orderings without relying on external authority.

### **Collaboration and Coordination**

Theorists of international cooperation argue that two distinct types of cooperation problems confront states. States may face dilemmas of market failure, where short-term self-interested behavior leads to suboptimal outcomes. Such problems have been labeled *collaboration* dilemmas.<sup>1</sup> Alternatively, they may have no dominant strategy that leads to

suboptimal outcomes, but disagree on which of multiple efficient equilibria they prefer. This leads to distributional conflict and results in *coordination* dilemmas. As summarized in this section, prior analyses have argued that these two distinct problems create demands for different types of institutional solutions. I go on to argue that in practice, the distinction between these two types of problems fades. When collaboration problems are repeated, they take on characteristics of coordination problems, so effective international institutions are likely to address both market failure and distributional issues. In addition, asking about institutional choice requires that we analyze both the incentives facing individual actors with decisionmaking power and efficiency concerns.

Collaboration problems result when the individual pursuit of short-term self-interest by all states leads to suboptimal outcomes. Such outcomes are inefficient in a Pareto sense, so that others exist which would make all players better off. Analysts have typically used the Prisoners' Dilemma game to exemplify this cooperation problem. The paradigmatic "tragedy of the commons" assumes a Prisoners' Dilemma with many players, as do many analyses of the issues involved in use of common-pool resources (Hardin 1968). In such commons problems, each individual confronts a situation in which regardless of the behavior of others the strategy that results in the highest immediate payoff is to behave non-cooperatively, for example by extracting more of a fixed resource base than can be sustained over the long term. These perverse incentives face all actors and can lead to eventual destruction of common-pool resources. Situations characterized by collaboration dilemmas involve potential market failure in that rational self-interested action may leave everyone worse off than they could otherwise be.

Solutions to such problems exist, contrary to the earliest analyses of Prisoners' Dilemma problems. On the domestic level, collaboration problems are often used as justification for state

intervention, on the argument that only centralized, coercive solutions that rely on external enforcement can overcome the inherent intense conflicts of interest (Hardin 1968). More recent analyses, based on extensive field research and experimental evidence, illustrate that individuals can solve local commons problems without external intervention, often to the benefit of all concerned (Ostrom 1990; Ostrom et al. 1993).

On the international level, analysts have never taken seriously the notion that only external enforcement can resolve collaboration problems. A core assumption of dominant models of international relations, one that seems a sound description of reality, is that no central authority exists. Instead, states exist in a condition of anarchy, relying on their own efforts to assure survival and prosperity in a "self-help" system. However, this assumption does not imply that states cannot take actions to mitigate the effects of anarchy. Instead, strategies of reciprocity and far-sighted behavior can sustain cooperation among states without the construction of a central authoritative source of policy guidance and enforcement. The logic of decentralized cooperation in collaboration problems is supported by formal game-theoretic analyses, particularly the well-known folk theorem (Abreu 1988; Friedman 1971), and by computer simulations (Axelrod 1984).

One way of resolving of collaboration dilemmas relies on strategies of reciprocity, such as Tit-for-Tat, in which players reward cooperative behavior and punish deviations from it. However, even if players establish stable patterns of cooperation, temptations to renege remain since they result in immediate gain. These temptations must be offset by the long-run disadvantages of being punished. If a state believes that renegeing will go unobserved or unpunished, the rational decision is to engage in non-cooperative behavior. For this reason, analysts have argued that monitoring and enforcement are central to the successful solution of

collaboration problems, and therefore that international institutions can facilitate cooperation by performing such functions (Keohane 1984; Snidal 1985a). In addition, temptations to renege increase as states lose interest in the future, so that institutions that enhance the value of future behavior relative to the present will encourage cooperation.

These considerations suggest, using a functional logic, that institutions designed to resolve collaboration problems will tend to take on certain general characteristics. Centralized monitoring activities, or at least a central clearinghouse making available information on past patterns of cooperation or defection, will reduce temptations to exploit cooperators in the hope of immediate gain. However, decisions about whether to cooperate or to punish non-cooperators remain decentralized. Under collaboration conditions, states are likely to delegate some monitoring or other information-providing authority to a specified actor or agency, for example as medieval traders relied on the services of the Law Merchant (Milgrom et al. 1989). In international trade regimes where the temptation for surreptitious protection exists, as in the General Agreement on Tariffs and Trade (GATT) or the EC, we see the development of dispute-resolution mechanisms that allow states to publicize and receive judgments on claims of inappropriate protection (Hudec 1990). Members of the regime can then use such information to implement their own strategies of reciprocity. Since temptations to cheat if one believes he can get away with it are high in collaboration dilemmas, states looking to resolve them can be expected to design institutions that provide information that allows them to punish defectors through strategies of specific reciprocity (Keohane 1986).

While patterns of cooperation and punishment continue to be decentralized, perhaps even characterized by a complex pattern of bilateral deals, the concept of a horizontal ordering may not capture all the dynamics of successfully-resolved collaboration problems. International



relations theory understands a horizontal ordering to mean that no hierarchical patterns of authority exist. Waltz has argued that 'Hierarchy entails relations of super- and subordination among a system's parts, and that implies their differentiation' (1979: 93). Delegation of authority, such as that to the UN Security Council, leads to states taking on different functions as some acquire decisionmaking authority. Patterns of delegation and differentiation, rather than external enforcement, characterize the solutions we see to international collaboration dilemmas. States may be willing to delegate monitoring or dispute-resolution authority to a central actor since this will allow them to more efficiently pursue decentralized cooperation by providing additional information about the behavior of others. However, they are not willing to cede sovereignty to the degree necessary to create reliable, rule-bound external enforcement. Thus, while a "statist" solution to collaboration problems is unlikely on the international level, we should expect to see the development of institutions that involve some functional differentiation and delegated authority.

Perhaps we can think in terms of a series of patterns of organization. At one extreme, we may have 'pure' horizontal orderings, with neither hierarchical patterns of authority nor functional differentiation among units. The demands of international collaboration problems suggest such ideal-type solutions are unlikely to be effective, at least when enough states are involved to make monitoring necessary. This suggests a second category, where functional differentiation emerges without hierarchy. For example, states may set up specialized organizations to collect information without giving them decisionmaking authority. This is a "Law Merchant" kind of solution and an example is found in various international human rights regimes, whose major function is to provide information about states' human rights conditions. In the next category, decisionmaking authority is delegated to some states or bodies created by

states, as in the Security Council or dispute-resolution mechanisms found in international trade agreements. Enforcement, however, remains decentralized. While the Security Council can call for economic or military sanctions, such enforcement actions are actually imposed by states, who can and do sometimes choose to disregard Security Council resolution.

In contrast to these dimensions of collaboration problems, coordination problems confront states with different behavioral incentives and thus lead to different expectations about institutional design. Coordination games differ from collaboration in that they lack of incentives to defect from cooperative equilibria. In these situations, short-term incentives do not always lead to equilibria that are suboptimal. Instead, states face a different dilemma in coordination games. The difficulty is that many equilibria exist, often with no obvious criteria for choosing among them.<sup>2</sup> Some states may favor some outcomes while others prefer different equilibria, as in a Battle of the Sexes game. However, once an equilibrium is established no individual state will have, by definition, an incentive for unilateral or surreptitious defection. In coordination games, pursuit of self-interest demands adopting strategies that are consistent with those of others, such as using similar standards for telecommunications equipment or railway gauges. Cooperation problems arise not because states wish to get others to commit to a cooperative equilibrium and then defect from it, but because they disagree on which equilibria they prefer. Punishment strategies are not essential components of equilibria in coordination problems.

A number of authors have suggested that choosing among optimal equilibria constitutes an alternative to considering international cooperation at heart a problem of overcoming potential market failure and avoiding suboptimal outcomes (Krasner 1991; Goldstein 1993). Krasner argues that thinking about choices among efficient equilibria fits better the realist approach to international politics, as it creates an explicit role for the exercise of state power. He

finds that the choice of equilibria is determined by power, with the most powerful state choosing the equilibrium that benefits it the most. Other states then have little choice but to go along with this outcome--"the weak suffer what they must," as Thucydides put it. For example, the dominant position of US firms in some telecommunications markets may have given them the ability to choose standards most to their liking, leaving others to follow along even if this meant incurring high adjustment costs. If international cooperation dilemmas are indeed resolved by the unilateral exercise of power, patterns of cooperation will deviate, once again, from a purely horizontal ordering. Although all states may be formal equals both in international law and international relations theory, the most powerful will in effect take on a hierarchical role through their ability to decide on particular policies and assume that others will follow along.<sup>3</sup>

However, exercise of power is not the only way in which states resolve coordination problems. Other solutions create roles that properly-designed international institutions can fulfill. If conflicts of interest are not intense, institutions may provide a forum for negotiation that allows states to communicate and settle on a specific equilibrium. Game-theoretic models of "cheap talk" illustrate how the mere addition of communication to a sparse action situation can promote cooperation in coordination games with little conflict of interest (Farrell 1987). In this instance, we should expect states to design institutions to maximize the ease of communication. Since states have no incentive to cheat on agreements reached in coordination games, problems of monitoring and enforcement are minimal. These considerations suggest that institutions for such problems will not have as much functional differentiation or delegation of authority as found in collaboration games. Coordination games with minimal conflict of interest may lead to solutions most closely approximating purely horizontal orderings.

Relying solely on negotiation to resolve coordination problems incurs its own costs. In situations involving many actors, the transaction costs associated with multilateral negotiations may be huge (Kahler 1992). For this reason, states may choose to delegate authority for establishing a particular outcome either to a smaller set of actors or create an agent capable of fulfilling this function. Garrett and Weingast (1993) argue that within the EC, the European Court of Justice (ECJ) exercises influence over outcomes precisely by playing such a role. They assume that EC member states face many situations in which they cannot easily differentiate potential solutions from one another on an efficiency basis. Members require a "focal point" to coordinate their expectations, allowing them to converge on outcomes without engaging in costly, time-consuming bargaining on individual issues (Schelling 1980). Although the ECJ has no enforcement authority, if EC members are searching for solutions to coordination dilemmas its decisions can have immense influence by pointing to a particular outcome within the feasible set. In this instance, the institutional solution involves patterns of delegation and functional differentiation, once again moving away from a purely horizontal ordering.

Agents such as the ECJ will be most effective in establishing focal points if they are perceived to be relatively disinterested and above the fray of political bargaining (Burley and Mattli 1993). Their influence derives from being an "objective," unbiased source of potential solutions to coordination games. Because pure coordination games, by definition, have no incentives for states to defect from a cooperative equilibrium, monitoring and enforcement are unnecessary. Thus, there is little reason to expect states to design institutions to perform such functions in coordination games. Instead, they will concentrate on delegating power and constructing incentives in such a way that those who propose solutions to coordination problems do not tend to consistently favor one set of states.

Because collaboration and coordination problems each create unique demands on states confronting them, the analyses summarized above have argued that the design of institutions will differ to reflect these demands. However, a couple of notes of caution should be sounded here: Such an analysis assumes that collaboration and coordination problems can be neatly separated from one another. In fact, the logic of the folk theorem and practical experience with international cooperation suggests that this is not the case when we consider the effects of repeated interactions. The folk theorem shows that when a game such as the Prisoners' Dilemma is repeated, outcomes that guarantee the players at least what they would receive playing their one-shot equilibrium strategies can be sustained, given low discount rates. Repeat play leads to a proliferation of equilibria. In other words, repetition turns every collaboration problem into a coordination problem, where the choice among long-term equilibria can create conflicts of interest or demand negotiation or delegation to coordinate expectations. Even if states agree, for example, to reduce tariffs, the level to which they should be reduced remains a tough bargaining problem for which there may be no obviously most-efficient outcome.

Thus, elements of coordination will intrude into collaboration games, and the institutional solutions to coordination problems discussed above are also likely to appear in institutions designed to resolve collaboration problems. Inclusion of both efficiency and distributional considerations in a unified analytical framework can lead to counter-intuitive patterns of state behavior. For example, states may delay immediate mutual gains in hopes of reaching agreement on a long-term pattern of distribution of those gains (Fearon 1993; Grieco 1990; Powell 1991; Snidal 1991). If we were to consider only market failure problems, we would conclude, as have many theories of international cooperation, that shorter time horizons threaten cooperation (Axelrod and Keohane 1986). Pure coordination problems lead to the

opposite conclusion. Here, long time horizons are not necessary to ensure cooperation, since states have no short-term incentive to defect. Instead, threats to cooperation arise from conflicts over which equilibria to adopt. These conflicts intensify as time horizons lengthen (i.e., discount parameters rise), since patterns of distribution established today will hold far into the future. States may then be willing to take the apparently irrational step of defecting from a cooperative outcome in the short term to force movement to a more favorable equilibrium. When we add problems of choosing among equilibria to a collaboration game, as in Fearon (1993), a more complex relationship between discount parameters and the likelihood of cooperation results. Discount parameters must be high enough to make cooperation more valuable than short-term defection, or there are no incentives to cooperate. However, once beyond this threshold, *lower* discount parameters actually encourage timely cooperation, since the incentive to hold out for a better long-term deal drops.

Some international situations, such as choices of standards, may involve little danger of market failure, in which case monitoring is unnecessary. However, situations that demand monitoring for enforcement of cooperation, such as an iterated Prisoners' Dilemma, are also likely to require mechanisms that facilitate choice among equilibria. That is, pure coordination games do not involve potential market failure and therefore do not contain elements central to collaboration games. However, repeated collaboration games will take on characteristics of coordination problems.

A second caution about generalizations of institutional design regards the issue of practical institutional choice. The above analysis has clearly adopted a functional perspective, asking about the most efficient institutional solutions to particular problems. It does not assume that cooperation will necessarily occur, but it does argue that when states do succeed in

cooperating, the solutions they devise will vary in systematic ways. The functional style of analysis has been criticized by many social scientists for a lack of "micro-foundations" that specify why any individual actor would have an incentive to design efficient institutions (Knight 1992). Such criticisms are well-taken. Unless functional arguments also specify a selection mechanism they will have little explanatory leverage. Selection mechanisms may rely on evolutionary considerations or on the incentives of individual actors, who may be constrained by existing sets of rules for institutional choice. Identification of incentives to adopt efficient solutions is necessary if stories about institutional design are to be of positive use in addition to being of normative interest. For example, in situations of very asymmetric power such as hegemony, developing theories of institutional choice will require adopting the perspective of a hegemon and asking under what conditions the hegemon has incentives to adopt efficient institutions (Martin 1992b, 783-89). Contrary to analyses that argue that only distributional concerns are relevant to institutional choice by powerful actors, efficiency considerations may also influence the incentives facing individual actors. A powerful actor with a long time horizon, for example, may find it in his interest to construct efficient institutions (as long as a large share of the benefits accrue to him) rather than maximizing short-term distributional gains.

### **Heterogeneity and Cooperation**

Theories of cooperation often assume, for tractability, that actors have identical interests and capabilities. However, empirical studies typically find substantial heterogeneity. Empirical studies of local commons problems find that introduction of heterogeneity, for example asymmetric interests or skills, reduces the chance that individuals will be able to design adequate

systems of rules (Libecap 1989). Because asymmetries add complexity to the already difficult task of designing rules, according to these findings, they often result in inefficient or otherwise inappropriate management of resources. The problem of heterogeneity as such has received little attention from theorists of international cooperation. However, once we consider asymmetries of power and of preference intensities on different issues, it becomes obvious that heterogeneity has in fact been of great interest in the theoretical and empirical literature, and that some kinds of heterogeneity may have positive effects on the likelihood of cooperation.

One reason that we might expect heterogeneity to impede cooperation is if it increases conflicts of interest (Libecap 1989; Kanbur 1991). However, asymmetry of interest or power does not always imply increased conflict of interest. Problems of distributing the gains of cooperation, for example, arise even when all actors have identical interests. Consider a situation where two individuals are attempting to divide a dollar between themselves. Assume each has an identical utility function, wishing to capture as much of the dollar for himself as possible. This situation maximizes conflict of interest, and illustrates that such conflicts may arise even when individuals are homogeneous. Thus, analysis of the impact of heterogeneity cannot rest on a straightforward argument that conflicts of interest increase as heterogeneity does.

In international relations theory, one prominent type of heterogeneity is the distribution of power. Power may be equally distributed, with all actors in a given issue-area possessing equivalent resources and therefore equivalent ability to influence outcomes. Many students of international politics assume that the end of the Cold War has coincided with movement from a bipolar to a multipolar security structure, with the distribution of power becoming more egalitarian.<sup>4</sup> At the other extreme, power may be concentrated in the hands of one major power,



leading to a condition of unipolarity or hegemony. Structural theories of international cooperation have addressed the question of how the distribution of power--a particular kind of heterogeneity--might affect the patterns of cooperation we see.

Hegemonic stability theory provided an initial and simple statement of how the concentration of power might change the probability that states will manage to cooperate to solve problems of collective action. Kindleberger (1973), studying international monetary relations, drew on theories of public goods to argue that cooperation required a hegemon, with highly concentrated power a necessary (and perhaps sufficient, although this was not clearly specified) condition for international cooperation to produce public goods. The internal logic of his argument was simple. Only a state large enough to appropriate a significant share of the benefits of producing a public good such as international monetary stability would have incentives to perform the functions necessary to assure such stability. Similar analyses applied this logic to other areas of international economic cooperation, such as trade policy (Krasner 1976; Keohane 1980).

These empirical analyses, and later theoretical works, found that hegemonic stability theory generally did not provide a very accurate predictor of the level of international cooperation. In monetary policy, hegemony seemed only to establish the possibility of cooperation, but did not assure it, and indeed contained elements of extreme instability in some periods (Eichengreen 1989). In trade policy, hegemony seemed to have a loose relationship to the extent of openness in the international system, but the cycles of openness and of hegemony were not closely synchronized with one another. As damaging as these empirical findings, theoretical analyses poked many holes in the theory of hegemonic stability. The Kindleberger version relied on the assumption of public goods, and many areas of international cooperation

produce benefits that are excludable or in other ways diverge from the public goods assumption. Other theoretical work found that cooperation could continue even "after hegemony," through the effects of international institutions (Keohane 1984), or as a single country became unable to supply public goods unilaterally, increasing the demand for international cooperation (Snidal 1985b).

Despite these failings of hegemonic stability theory, considering the distribution of power seems essential if we are to understand the problem of institutional choice for international commons problems. To the degree that common-pool resources do suffer from difficulties of non-excludability, some of the original insights regarding the incentives of powerful actors to provide them may be more relevant than in other international settings. Arguments that show the possibility of continuing cooperation in the face of hegemonic decline do not imply that considerations of power are irrelevant to the question of institutional design. On the international level, decisions about the institutions to be adopted are not made through a formalized constitutional process. Instead, they result from bargaining among the major players in an issue-area, so that the interests of the most powerful are sure to have their reflection in the types of institutions chosen. States confronting conditions of instability are unlikely to be interested in constructing efficient institutions or effective systems of monitoring or dispute resolution, looking instead to exert leverage as necessary to extract maximum immediate gains. On the other hand, conditions that allow powerful states to adopt a long time horizon may allow them to develop an interest in delegating power to efficient institutions, bringing the insights of functional theories to bear.

When power is concentrated, we can expect institutional choice to reflect the interests of the most powerful. When it is diffuse, the logic of collective action in the international setting

with a large number of states involved suggests that organizing to construct rules for the management of resources will be difficult. Attempts to solve international environmental problems involving many states, for example, show the difficulties of designing systems of rules in the absence of leadership from a powerful state. In these instances, such as the Law of the Sea process or development of codes to protect endangered species, states attempt to construct rules through long processes of multilateral negotiations. However, adoption of these rules requires that the most powerful states accept them. In some instances, attempts to develop rules are embedded within nested institutions, so that states may overcome collective action problems by adopting the negotiating procedures specified by an umbrella organization such as the United Nations. In any case, consideration of the effects of unequal power suggests that problems of institutional design will not often be solved by a process of horizontal ordering.<sup>5</sup>

Besides heterogeneity in the distribution of power, a common sort of heterogeneity in international negotiations involves differing preference intensities on different issues. Due to varying international economic and political positions, the vagaries of domestic political processes, or a plethora of other reasons, states put different weight on different issues on their mutual agendas. In current negotiations within the EC, for example, the major state actors have different preference intensities. Germany puts high weight on achieving political union, while France puts greater stock in achieving control and stability in the area of monetary policy (Garrett 1993). To greatly simplify a complex situation, it seems that on each dimension taken individually, a high degree of conflict of interest exists. Germany prefers the existing European monetary system, since it gives great power to the Bundesbank, while France prefers creation of a European Central Bank, which would more closely reflect French interests in macroeconomic policy. On the political dimension, Germany prefers rapid development of supranational

policymaking institutions, such as increasing the powers of the European Parliament. France is reluctant to move rapidly toward political union.

However, representatives of these two states with their divergent interests reached a mutually-acceptable deal in the Maastricht treaty. The permissive condition was the different weight each put on the two dimensions. Because Germany felt strongly about political union, it was willing to make compromises on monetary arrangements; the opposite condition held for France. By linking these two issues to one another, a set of mutually-advantageous deals became possible that were not available on any single dimension (Martin 1993b). Similar asymmetries in preference intensities are common in international negotiations. Some states have intense security concerns and so are willing to make concessions on economic issues to assure their security; some have intense interests in environmental protection and so are willing to make economic sacrifices. Asymmetries of preference intensity are built into most models of international bargaining, since without them little scope for agreement would exist. In spatial models, preference intensities are captured by different shapes of indifference curves, indicating the different trade-offs actors are willing to make (Mayer 1992). In this instance, heterogeneity in no way is an impediment to cooperation; indeed, it may be a necessary condition for it.

Asymmetries of preference intensities can lead states to link issues to one another in order to further their own self-interest. Issue linkage thus becomes one of the key elements in understanding international cooperation. Sebenius (1983) and Tollison and Willett (1979) illustrate how issue linkage can create space for mutually-advantageous deals on the international level. The sovereign right of any state to agree to only those international agreements it wishes makes linkage even more valuable than it is in situations where policies are decided by some version of a majority-rule process. When decisions do not require unanimity

for approval, changes in policy are possible even when they are not Pareto-improving. In simple majority-rule situations, for example, just less than 50% of the decisionmaking group may be hurt by a proposal, relative to the status quo, but the proposal may still pass. When unanimity is required, as for most significant international agreements, only proposals that give something to everyone will gain approval, restricting the set of feasible changes to those that are Pareto-improving (Buchanan 1959). In general, a unanimous decisionmaking requirement creates incentives for issue linkage. Within the EC, unanimity requirements have led to extensive use of side-payments during treaty revision negotiations and on other decisions requiring unanimity. On those issues now subject to qualified-majority voting, issue linkage should be less common, since members can move away from the status quo without it.

Although students of international politics often discuss issue linkage and recognize its central role in negotiations, the conditions for its success have not been systematically explored. Oye (1992: ch. 3) moves in this direction by developing a typology of issue linkage, based on the problem states are attempting to solve. *Extortion* occurs when states threaten to take steps costly to themselves if concessions on other issues are not forthcoming. This type of linkage obviously suffers from credibility problems, so that its success is dependent on measures that allow states to make credible commitments to take costly steps. *Exchange* takes place when states agree to forgo benefits on some issues in return for concessions on others, and seems to be the type of linkage assumed in most discussions of international negotiations. Credibility is still a problem, as states continue to have incentives to renege, following the course of action they had intended prior to the negotiation. Finally, states may rely on *explanation*, attempting to create the image of issues being inherently linked to one another. In this instance, linkage may not be the result of a conscious tactical choice by a state, but recognition that actions have effects

on many different dimensions. For example, pledges of exchange-rate stability have impacts on inflation, employment, and other issues so that they cannot easily be separated from one another. Explanation involves making such inherent linkages apparent and intelligible to others. In this case, credibility only emerges as a difficulty if there is some chance that what is being presented as an "inherent" linkage is actually a case of extortion or exchange. The next section discusses the ways in which institutions can lend credibility to linkage.

Research on local commons problems has suggested that heterogeneity creates impediments to cooperation. Work on international cooperation suggests that this insight may not travel well to the international level. Two types of heterogeneity that characterize international politics, power inequalities and asymmetric preference intensities, may actually create opportunities for cooperation. However, we should not overgeneralize to argue that all types of heterogeneity encourage cooperation. Informational asymmetries, for example, may often hinder cooperation. States also differ significantly in the nature of their political systems. Empirical work has shown quite conclusively that democratic states do not go to war with one another, while democracies fight non-democracies frequently (Doyle 1983; Gaubatz 1993). However, it also appears that democracies fight non-democracies at about the same rate at which non-democracies fight one another. This observation suggests that homogeneity is less important than factors that inhere in democracy, such as relatively transparent decisionmaking procedures. The next section considers the relationship between domestic institutions and patterns of cooperation.

### **The Stability of Issue Linkage**

Heterogeneity can create the conditions for international cooperation through the mechanism of issue linkage. However, linkage is usually tenuous. Opportunities proliferate for renegeing on deals cut across issues in the international arena (Keohane 1984: 91). While Germany has made concessions on monetary union in order to achieve progress on political union, for example, this deal may fall apart due to deliberate actions by Germany or other EC governments, failures on the domestic level to ratify the deal, or international economic pressures that change the costs and benefits of agreed policies. Problems of incomplete contracting plague all attempts at international issue linkage, and states must find ways to overcome them if they are to reap its benefits. A central problem in making linkage work to the benefit of all involves making credible commitments to deals with other countries. Here, I consider two sets of factors that influence the credibility of issue linkage: domestic and international institutions.

One way in which the problem of international cooperation typically diverges from that of the local commons is in the "two-level" nature of the cooperation process (Putnam 1988). Agreements may be negotiated among a small number of individuals, but these individuals represent larger constituencies and are constrained to various degrees in the kinds of deals to which they can commit by the pattern of authority existing between them and their constituency. Some have argued that negotiators with great autonomy from their domestic constituency can make commitments to other countries (Moravcsik 1991). Negotiators with little autonomy face the problem of not being able to speak with authority. Any commitments that they make will only go into effect if acceptable to their constituencies after some formal or informal ratification process.<sup>6</sup>

The nature of the ratification process, specifically the level of authority that has been delegated to the chief negotiator, affects the credibility of commitments to link issues in international negotiations. At the simplest level, the greater the authority the greater his short-term credibility, assuming the negotiator himself is trustworthy. Negotiators who do not have to anticipate stringent ratification processes can make concessions to other states without considering in detail the preferences of ratifying bodies such as legislatures. Thus, we might expect that negotiators facing no specified ratification procedure, such as most authoritarian states or majority governments in parliamentary systems with strong party discipline, would have the greatest capacity to make binding commitments. At the other extreme, negotiation of treaties that will require formal ratification with supermajority requirements in the legislature, and that may be subject to legislative amendment, would seem to exaggerate the credibility problem. In between these two extremes, procedures that involve legislative approval but eliminate the possibility of amendments to a negotiated agreement, such as fast-track arrangements for trade negotiations, would apparently establish an intermediate level of credibility. These hypotheses fit with some interpretations of American foreign policy that see congressional involvement as a handicap for the US ability to negotiate effectively with other countries.

In a world of complete information, and where leadership turnover was not a variable, such simple statements might in fact hold, and they suggest hypotheses possibly worth testing. However, when we adopt a longer-term view and ask about the credibility of commitments under conditions of incomplete information, these hypotheses seem suspect. Incomplete information about the preferences of either the negotiator, or of groups involved in ratification



and implementation, may produce outcomes strikingly different from what we would expect in a simpler world of common knowledge.

First consider the position of the head of government.<sup>7</sup> If this individual is unconstrained, his negotiating partners are aware of his preferences, preferences are stable, and the negotiator is expected to remain in office for a significant length of time, others should be able to calculate in a straightforward way the chance that he will live up to the deals they negotiate with him. Commitments to linkage should therefore gain credibility, since states will not sign on to deals that they know will be violated. However, all--if any--of these conditions are unlikely to hold. Even heads of government not constrained by formal ratification procedures typically have to satisfy the demands of a "selectorate," and opacity of the identity and interests of the selectorate create constraints of a type difficult to account for in international negotiations. An unconstrained head of government also may be the most difficult to read, from the perspective of knowing his preferences, since he is not chosen through any formal mechanism, and the head of government is usually there on a temporary basis, even in non-democratic systems. Even if the head of government remains in place, if the observation of international commitments takes place at his whim, the stability of his own preferences becomes a matter of grave concern. Taking such factors into account suggests that requiring a formal ratification process, which implies public assent from a broader spectrum of society, may actually enhance the credibility of deals.

Second, consider the problem of the preferences of the ratifying body. As just mentioned, such a body nearly always exists, even if its participation in the ratification process is informal. If these preferences are known, calculation of credibility under alternative ratification procedures may be straightforward, and other states can take account of it during the negotiation

process. However, if other states initially lack information about the ratifying body's preferences (or if perhaps its own government does!), the costs of a formal, open ratification process may in fact reveal valuable information, thus preventing heads of government from committing to deals that they will not be able to implement. Cowhey (1993), for example, argues that the United States has been more successful in committing itself to multilateral arrangements than has Japan because of the open, transparent nature of US domestic approval processes.

Although negotiators often complain about the difficulties of doing their jobs when they are subject to constant public scrutiny, such scrutiny may actually enhance the durability of inherently fragile international deals. Keohane (1984: 95) makes a similar point regarding the relative reliability of states that have transparent decisionmaking processes. A government that has gone through a public procedure of gaining approval of its foreign-policy commitments will bear domestic costs in addition to international ones if it reneges on these commitments. In the area of economic sanctions, for example, such "audience costs" seem to have a positive impact on the credibility of threats and promises and so on the level of cooperation (Martin 1993a). An extremely stringent ratification process, such as one that requires formal legislative approval and allows the legislature to make amendments to international agreements, may constrain the negotiator to the point that he becomes ineffective. However, an intermediate level of stringency, such as fast-track requirements that mandate a formal approval process but eliminate the possibility of amendment, may provide an optimal level of credibility through their role in revealing information.

Domestic institutional features can enhance the credibility of issue linkage. Likewise, the characteristics of international institutions can affect such deals. Arguments about reputational effects as well as empirical evidence suggest that linkage is more credible when it

takes place within an institution than in an uninstitutionalized environment. However, here I wish to go beyond this initial statement to suggest variation in the effects of different types of institutions on credibility. Some institutional characteristics may increase the value of reputation or otherwise enhance the demand for credibility; other characteristics may facilitate efforts of states to establish credible commitments, enhancing the supply of credibility.

Linkage and international institutions are not alternatives to one another. States wishing to influence one another's behavior do not have to choose between relying on issue linkage and on rule-structured interaction. Instead, institutions often incorporate, facilitate, and demand issue linkage. The formalization of strategies of specific reciprocity that many organizations undertake enhances the value of linkage. For example, the GATT incorporates reciprocity by demanding that key trading partners make mutual concessions. Although the GATT deals only with trade issues, the mutual concessions that states make often cover quite diverse areas of traded goods and services. The GATT provides a framework for negotiation of such deals, publicizes their content, provides dispute-settlement mechanisms, and in other ways enhances the reliability of linked concessions by raising the costs of renegeing. In general, institutions that reveal information about preferences and increase the probability of retaliation for defection will allow states to make more credible commitments.

The formal decisionmaking processes of organizations can create demands for linkage even if they do not explicitly formalize reciprocity. In particular, unanimity rules create demands for linkage (Weber and Wiesmeth 1991). Under unanimity, policies can move away from the status quo only if such movement is in the interest of all members of the institution; any proposed policy change will only pass the stringent unanimity approval requirement if it is Pareto-superior to the status quo. Taking issues in isolation, this is an extremely difficult

standard to meet. For example, consider the EC, where treaty revisions continue to require unanimous approval although day-to-day decisions often have only to meet a lower threshold of qualified-majority voting. On any single issue, such as monetary union, change of the status quo will only be approved if this outcome is undesirable from the perspective of all members. Change is thus difficult.

However, the EC deals with many issues. At the Maastricht summit in 1991, for example, two of the major issues on the table were monetary union and political union. When such issues are linked, as they were at Maastricht, the scope for Pareto-improving changes to the status quo increases significantly. As discussed above, asymmetry in the intensity of preferences created scope for a deal. Because all EC members had to approve any changes to the existing Treaty of Rome, linkage was a necessary component of any bargain. While the Maastricht example of linkage is clear and recent, the history of the Community suggests that such cross-issue deals are at the heart of EC policy. Unanimity requirements will, in general, necessitate issue linkage if states wish to change the status quo.

Thus, heterogeneity of preferences interacts with institutional structure to create varying demands for issue linkage. Figure 1 summarizes the expected effects. It shows, in highly simplified form, the probability that adoption of new joint patterns of behavior will involve issue linkage. Heterogeneity of preference intensities combined with unanimity rules generate a high demand for linkage. Of course, attempts to cooperate to move away from the status quo may fail, in which case we will not see successful linkage. This figure summarizes the conditions under which linkage is a necessary component of cooperation.

[Figure 1 about here]

International institutions that rely on consensus for policy change, rather than accepting some form of majority voting, will provide fertile grounds for cooperation as long as they incorporate a number of issues on which participants have different preference intensities. Along a single dimension, consensus requirements are often a recipe for paralysis. However, asymmetric actors can design institutions that create demands for linkage and cover issue-areas that can be profitably linked, thus enhancing the scope for cooperation. We should expect to see less scope for linkage in institutions that rely on majoritarian procedures for decisionmaking, and may therefore expect that heterogeneous actors will be reluctant to commit themselves to cooperate within such a framework.

Issue linkage often creates scope for mutually-advantageous agreements where none would exist on individual issues, providing that states can make credible commitments. Both domestic and international institutions affect the ability of states to make such commitments. On the domestic level, stringent ratification procedures restrict the government's autonomy but may, through revealing information during ratification processes and by making policies difficult to change, actually enhance the credibility of commitments over the long term. On the international level, similar effects of institutions on the symmetry of information enhance credibility, reducing incentives to renege on commitments. Additionally, institutional rules that demand unanimity (or something approaching it) for policy change, rather than relying on majoritarian procedures, increase the demand for issue linkage.

### **Conclusion**

Studies of common-pool resources have shown that individuals do not need to rely on external enforcement to avoid the tragedy of the commons. Strong analogies exist between decentralized patterns of cooperation on the local level and patterns of international cooperation, where no external enforcement agency is generally available. These analogies suggest that patterns of "horizontal ordering" may characterize international attempts to solve commons problems. However, the logic of international cooperation suggests a number of ways in which cooperation may differ from both a statist model and purely horizontal, functionally undifferentiated models. These differences have implications for the design of international institutions intended to deal with global commons problems.

Theorists of international cooperation differentiate between types of cooperation problems, such as collaboration and coordination, that demand specific institutional solutions. However, iteration of interactions tends to make these initially distinct problems converge, so that successful institutions will often deal with both kinds of dilemmas. In either case, states may choose to solve the collective-action problems they face by delegating authority to powerful states or to institutional actors, suggesting one way in which international cooperation will not constitute a horizontal ordering. States may also specialize, or create specialized organizations, so that functional differentiation characterizes cooperative solutions.

Heterogeneity of actors, while found often to be a hindrance to cooperation on the local level, does not always appear to pose such a dilemma on the international level. Concentrated patterns of power may facilitate the solution of public-goods problems. In addition, if heterogeneity takes the form of differing preference intensities on different issues, it creates the potential for mutually-advantageous issue linkage, thus increasing the probability of successful cooperation. However, successful issue linkage requires that states be able to make credible

commitments to one another. International institutions that increase costs of renegeing on deals and domestic institutions such as formal ratification requirements can both help states establish credibility.

Figure 1

		Decisionmaking rule	
		majoritarian	unanimity
Preference intensities	homogeneous	very low	low
	heterogeneous	low	high

Fig. 1. Probability that movement away from status quo will involve issue linkage.



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- <sup>1</sup> Martin (1992a) refers to collaboration problems as *coadjustment* dilemmas.
- <sup>2</sup> The equilibria may or may not be distinguished from one another by efficiency considerations. The following discussion assumes that states are choosing among equilibria that are all Pareto-optimal.
- <sup>3</sup> Such a model of cooperation suffers from the usual difficulties of power analysis, since it may become merely a tautological statement that powerful states determine outcomes because they are powerful, unless the observable components of power are specified in advance.
- <sup>4</sup> However, others see an even more concentrated distribution of international power following the collapse of the Soviet Union, since the United States now has significant power in many areas, including military. See Nye (1990). Wagner (1993) discusses the empirical problem of defining bipolarity during the Cold War.
- <sup>5</sup> A possible exception may arise when just a few states are involved in any given issue-area. In this case, they may overcome collective action problems without sacrificing homogeneity. This is the intuition of Kahler (1992).
- <sup>6</sup> Of course, lack of autonomy may have an offsetting advantage, in giving the negotiator more leverage to demand concessions from his negotiating partners.
- <sup>7</sup> I assume here, for simplicity, that the chief negotiator is appointed by the head of government and accurately reflects his principal's interests, so that the distinction between the chief negotiator and the head of government is not an interesting one.