Multilateral Cooperation in an Iterated Prisoner's Dilemma

ROBERT PAHRE

University of Michigan

There is a remarkable consensus among scholars of international relations that bilateral cooperation is easier to achieve than multilateral cooperation. This essay proposes a formal model to show that this is incorrect, because a multilateral agreement may achieve what an equivalent series of bilateral agreements cannot. The author explores formally several different enforcement mechanisms, suggesting that the argument is robust. Throughout the essay, the author uses examples from the Marshall Plan to illustrate the logic of this result. The argument has implications for other substantive topics, such as most-favored-nation clauses in trade agreements, the theory of hegemonic stability, analysis of the European Economic Community, the politics of linkage, and the study of multilateralist norms.

Multilateral institutions seem increasingly important in the world of the 1990s. Although multilateralism has long played a role in economic affairs, it now attracts more attention as an alternative to bilateral and regional responses to economic troubles. Moreover, the end of the cold war created opportunities for multilateral cooperation in security affairs from Cambodia to Kuwait to Somalia. For these reasons, multilateralism has attracted substantial scholarly attention in recent years (e.g., Bhagwati 1990; Bueno de Mesquita 1990; Keohane 1990; Nogués 1990; Ruggie 1993; Winters 1990).

The existence of multilateral agreements flies in the face of a theoretical consensus that increasing the number of concerned states makes cooperation less likely. The consensus rests on many grounds, including an analysis of privileged groups in collective action (Olson [1965] 1971), the study of

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cooperation in an iterated prisoner's dilemma (Axelrod 1984; Conybeare 1987, 55-56; Martin 1992; Oye 1986a; Taylor 1976), and examination of the risks of opportunistic behavior in contracts (Yarbrough and Yarbrough 1986). Although the literature is not always precise, it seems that multilateral cooperation will be less frequent, fall apart more frequently, and will provide public goods at a lower level than will bilateral cooperation. Grieco (1990) argues that these are core claims of neoliberal institutionalism:

> With a smaller number of partners, neoliberals argue, the range of behavior that must be monitored by each goes down, and this reduces verification costs. . . . the collective-action costs of organizing retaliation against defectors will be lower, and as a result the implicit credibility of small-group threats to punish cheaters will be higher and more effective. (P. 33)

Such arguments lead to straightforward policy advice: cooperation is easier if negotiations are broken into bilateral bargains. When bankers cooperate in the third world debt crisis, Lipson (1986) argues that "the whole point is to break down the large secondary game involving hundreds of banks and considerable opportunities for free-riding, into a series of bilateral games pitting a few small holdouts against major money-center banks" (p. 220, italics deleted). One might also privatize public goods, breaking cooperators into small groups that can monitor behavior and enforce bargains (Oye 1986b, 18-22). Bilateralism may be the best policy even if it is inferior to multilateralism in global welfare terms (Oye 1986c).

This essay argues that no such unambiguous policy is possible. Multilateralism may make cooperation easier than bilateralism, or vice versa, in an iterated prisoner's dilemma (PD). To mention only a few examples, it need not surprise us that the founders of the General Agreement on Tariffs and Trade (GATT), the International Monetary Fund (IMF), the International Bank for Reconstruction and Development (IBRD), the European Economic Community (EEC), or the North Atlantic Treaty Organization (NATO) established multilateral institutions where bilateral agreements were an alternative.

Of course, we should not be willing to prescribe multilateral institutions based on a single formal theory. To make the model's results concrete, I illustrate its logic through the Marshall Plan. I chose this example because multilateralism was Marshall's (1947) sole condition for the European Recovery Program (ERP), and it was written into the law establishing the ERP (see U.S. Senate 1948). Moreover, the Europeans quickly met this condition. Britain and France convened a 16-nation conference in Paris in July to draft a comprehensive recovery scheme and establish the Committee of European

Economic Cooperation (CEEC).[1] As a condition of ERP aid, each recipient signed a bilateral enabling agreement with the United States in which it agreed to be bound by the multilateral agreement of the OEEC.

The importance of multilateralism to the Marshall Plan can give us confidence in the theoretical argument. Marshall insisted on multilateralism even though bilateralism was a plausible alternative and had been the approach taken in 1945-1946. His insistence is especially puzzling because the multilateral framework had little substantive impact on the Marshall Plan because the 16 separate programs were "stapled" into one.[2]

As I will show, the mere belief that these programs were linked can induce multilateralism where unlinked programs would fail. If everyone believes that a series of bargains is linked, then everyone will punish a cheater. This increased sanction may make cheating less likely even though the temptation to cheat goes up as the number of "suckers" increases. In short, certain rational conjectures about enforcement suffice to support multilateralism.[3]

Using illustrations from the Marshall Plan does not mean that I "test" the theory against a single case. Moreover, I do not present a model of the Marshall Plan, but a model of multilateral cooperation with illustrative evidence from the ERP. The evidence shows that when multilateralism is preferred to bilateralism, the relevant conjectures over enforcement were present. Because the model explores those conjectures under which multilateralism is a necessary condition for successful cooperation, illustrations in which the dependent variable (multilateralism) are present provide the proper test for attempting to falsify the argument (Dion 1993). The evidence also shows that a consideration of enforcement problems under various conjectures played a role in the Marshall Plan.

1. The CEEC was renamed the Organization for European Economic Cooperation (OEEC) when it became a permanent organization in April 1948. After the termination of the ERP, it became the Organization for Economic Cooperation and Development (OECD) and is now primarily a data-collection organization.

2. Alan Milward (1984), a leading Marshall revisionist, doubts that the ERP was truly multilateral because the 1947 CEEC reports were "a set of sixteen separate requests for aid, thinly and inadequately disguised as a common European programme and embellished with plentiful but singularly unhelpful statistics" (p. 80). Even so, Milward cannot explain why the United States insisted that the 16 separate aid requests be combined into a "multilateral" request. In contrast, my model shows that even if the ERP was substantively equivalent to 16 separate bilateral programs, the United States could rationally insist on the multilateral framework.

3. Some may think that this emphasis on conjectures is a *deus ex machina* that "solves" the problem without explaining anything. Such an objection overlooks the important role of conjectures in bilateral cooperation. For instance, bilateral tit-for-tat enforcement only makes sense based on conjectures that a given dyad will continue to interact, that behavior today is connected to behavior tomorrow, that defection is voluntary, and so on (cf. Kratochwil 1993, 447). More generally, any strategy in any game is accompanied by a set of conjectures. The proper question is whether a given set of strategies and conjectures is supportable as an equilibrium.

MULTILATERAL INSTITUTIONS AND
MULTILATERAL COLLECTIVE ACTION

It is easy to show the possibility of multilateralism, for the "folk theorem" shows that multilateral cooperation is possible in repeated play if the future is sufficiently valued (see Fudenberg and Maskin 1986; Taylor 1976). Unfortunately, none of the folk theorem work explores whether multilateralism might sometimes be preferred to bilateralism—for instance, whether there exist some discount rates for which bilateral cooperation is possible but multilateral cooperation is not. Multilateralism would also seem unlikely in collective action problems, where small groups allegedly find it easier to achieve collective ends (Olson [1965] 1971; cf. Keohane 1984; Kindleberger 1981; Snidal 1985). Thus the consensus policy recommendation that one should attempt to break multilateral cooperation into bilateral deals may still be good advice, especially because discount rates are unobservable.

The approach here takes the folk theorem insight and looks backward: rather than asking whether a given equilibrium can be supported as an equilibrium, I ask under what conditions a given bilateral equilibrium is not supportable. In less formal terms, I ask why "nominal multilateralism"— defined as cooperation by at least three states (Ruggie 1992; cf. Kahler 1992; Sebenius 1983)—exists where bilateralism is an alternative. This is a puzzle in part because multilateralism is often nominal indeed, the mere bundling of bilateral tariff concessions in the GATT or the stapling together of Marshall aid programs. In such cases, multilateralism is nothing more than a conjecture by each actor that all other actors will treat the bilateral bargains as a part of a multilateral whole.

I will show below that this conjecture suffices to induce rational multilateralism. This may come as some surprise, because many researchers agree that rational choice cannot explain multilateralism. For instance, Ruggie (1992) states baldly that "I would think it particularly difficult to formulate any straightforward explanation [of the move to multilateral institutions in the twentieth century] within the currently ascendant logic of instrumental rationality" (p. 584) (cf. Caporaso 1992, 606; Kratochwil 1993; Weber 1992, 637; but Martin 1992).

Others within the rational-choice tradition have argued that we can understand multilateral regimes through the theory of the firm (Keohane 1984, 87-92; Yarbrough and Yarbrough 1986). Although multilateralism per se is a nonissue for economists exploring the creation of firms, this literature is relevant because it seeks to explain why several independent economic actors might find it in their interest to combine into a single firm.

First, there may be efficiency reasons, such as economies of scale, cost complementarities between units, or important transaction costs limiting bilateral contracting. This logic stands behind the EC's Maastricht Treaty, whose "subsidiarity" principle limits EC budgetary intervention to cases where there exist economies of scale or where cross-border externalities are not amenable to simple coordination between governments (Bureau and Champsaur 1992, 89).

Even so, both economies of scale and the reduction of transaction costs could be realized within a framework of bilateral contracts. Legally separate entities can exploit economies of scale through contracts, with pooling arrangements by electrical utilities a good example (Tirole 1988, 20). The same is possible in international relations. In northeast Asia, bilateral treaties sufficed to realize the scale economies available in security production—so scale economies do not suffice to explain European multilateralism.[4]

I am similarly skeptical of the transactions costs argument. To take one example, Keohane (1984, 90) argues that a multilateral regime might have lower total negotiation costs than multiple bilateral contracts (cf. Oye 1986b, 20). On the other hand, multilateralism often raises transaction costs. Transaction costs are high in the "bankers' dilemmas" case of multiple bilateral bargains (Lipson 1986, 223). There is also a clear positive relationship between the number of parties and the length of negotiations in each GATT round, suggesting that multilateralism raises transaction costs (Deardorff and Stern 1992). Similarly, the subsidiarity principle limits EC intervention to issues exhibiting economies of scale because of the decision-making costs of centralized, multilateral policies (Bureau and Champsaur 1992, 89).

Second, a multilateral regime might monitor its members' behavior on behalf of all (Caporaso 1992, 609-10, Keohane 1984; cf. Weingast and Marshall 1988). The logic follows Alchian and Demsetz's (1972) argument that under conditions of team production, a "monitor" may be necessary to reduce shirking. This solution works for a firm because monitors have the power to alter or terminate individual contracts without terminating the team contract. Unfortunately, this approach implies a degree of hierarchical organization we simply do not find in international relations, even if monitoring is important in some international regimes (Yarbrough and Yarbrough 1985; Alt, Calvert, and Humes 1988). I examine a narrow example of such enforcement below.

4. The most important scale economies explanation of European cooperation is that economic and political unity were necessary as a counterweight to the Soviet Union. I agree that the Soviet threat stimulated economic cooperation, but I doubt that it can explain why this cooperation was multilateral instead of bilateral.

In sum, the above approaches tend to fall into two categories. For some, multilateralism is not an issue at all—or at least, it raises no questions different from those that bilateral agreements raise. I will show below that this conclusion may be correct under some restrictive assumptions, but it is not generally true.

A second group of theories treats multilateralism as qualitatively different from bilateralism. Multilateralism occurs where the transaction costs of multilateralism are lower or where economies of scale make bilateralism inefficient. In these theories, the explanation of multilateral cooperation relies on variables different from the explanation of bilateral cooperation. These approaches tend to make the variables of interest into an ad hoc explanation, for they are used only when we do not observe bilateralism. It is preferable on theoretical grounds to bring bilateralism and multilateralism into a single framework, as I do here.

FEASIBLE MULTILATERAL PROVISION OF PUBLIC GOODS

The theories reviewed in the previous section generally impose some additional structure on the problem of cooperation, such as transactions costs, economies of scale, or the existence of a qualitatively different monitor (or hegemon). Here I wish to focus solely on the enforcement problem prior to adding these additional assumptions and avoid imposing such structure a priori.

Of course, some definitions are necessary to formalize our problem. First, I assume that whether a bargain is feasible depends on whether it can be enforced by the metastrategy of grim trigger (GT). This is the strongest possible sanction and enjoys a certain intuitive appeal. In his Senate testimony on the ERP, Allen Dulles (U.S. Senate, 1948) provided a pithy definition of GT: "so long as certain things happen on their side, things are going to happen on our side. Once they stop happening on their side, they are going to stop happening on our side" (p. 616).

I use the standard notation that for each i, R^i is the reward for cooperation, T^i the temptation to defect, P^i the punishment for mutual defection, and $w^i \in (0, 1)$ the discount factor. In these terms,

Definition 1. A bargain is feasible if enforceable by GT; that is, it must satisfy the following condition:

$$w^i > \frac{T^i - R^i}{T^i - P^i}.$$ (1)

Proof. In GT, a player stops cooperating if anyone cheats, so a cheater is deterred if the rewards for cooperation, $R^i + w^i R^i/(1 - w^i)$, exceed the one-time gains from defection plus the subsequent punishment, $T^i + w^i P^i/(1 - w^i)$. Rearranging this inequality gives the condition. QED

For convenience, label the RHS of the above inequality X^i and index X^i_B, X^i_M in the bilateral and multilateral bargains.

To set aside changes in the size of a bargain as an explanation of multilateralism, let us restrict attention to equivalent bargains defined as follows:

Definition 2. A multilateral bargain Q^M is equivalent to a set of bilateral bargains Q^B iff all i make the same concessions in both cases.[5]

Notice that the sole difference between the bargains in this case is conjectural: everyone makes the same concessions, but makes concessions to bilateral partners in one case and to the multilateral community in the other.

Definition 3. Q^M is "necessarily multilateral" if it is feasible $\supset$i and if Q^B is not, that is, iff $\exists i$: $X^i_B \geq w^i \geq X^i_M$ and $\not\exists i$: $X^i_M \geq w^i \geq X^i_B$.
Definition 4. Q^B is "necessarily bilateral" if it is feasible $\supset$i and if Q^M is not, that is, iff $\exists i$: $X^i_M \geq w^i \geq X^i_B$ and $\not\exists i$: $X^i_B \geq w^i \geq X^i_M$.

Because the feasibility conditions depend on a bargain's enforceability, multilateralism can only be necessary if bilateral bargains could not be supported. Any argument that a given bargain was necessarily multilateral therefore requires analysis of the enforcement problem in the alternative bilaterals.

In the ERP, experience showed the United States by 1947 that withdrawal from bilateral bargains was insufficient to elicit compliance. The British suspended sterling convertibility very soon after Marshall's speech, showing that bilateral enforcement of the provisions of the British loan had not been a sufficient deterrent to devaluation. Similarly, bilateral financing of French payments had not given France a sufficient incentive to reject the Monnet Plan. The greater rewards of a multilateral European recovery program would give France an incentive to comply with the American desire to revive German industry, lowering American occupation costs.

5. A comment on notation: I use upper case Q with superscripts B or M to represent a multilateral bargain or package of bilateral bargains, respectively. Where necessary, Q with superscripts may also index the cooperating states i, j, k. Lower case q with subscripts represents concessions by individual states; these contributions sum to upper case Q (no superscripts or subscripts).

If we are to determine when the inequalities in definitions 3 and 4 hold, we must define the payoffs in the bilateral and multilateral bargains. I do this by modeling the provision of a public good. There are several reasons for this choice. First, most discussions of regimes, collective action, and PD explicitly or implicitly refer to public goods. Some issues, such as multilateral regulation of global commons, necessarily involve public goods (see Zacher 1993). Second, public goods present the problem of cooperation in its purest form and therefore highlight the general analytic issues in multilateral cooperation. Finally, it is hard to imagine an explanation of multilateral institutions where the issue area was not at least quasi-public, because any country k would only be interested in joining a multilateral institution with i, j if the bilateral bargain between i and j had some effect on k; any such externalities will share some characteristics of public goods.

Of course, most real-world bargains are only quasi-public. In particular, Marshall aid distributions were anything but public. Still, the ERP had many quasi-public characteristics (see appendix). For instance, Marshall argued that shortages of foreign currency among European countries were especially harmful to world trade:

> The economic effects of this program will extend far beyond the boundaries of the 16 countries involved. It is in one important sense a world recovery program. The delay in European recovery has created a serious problem for many countries which normally supply the European market with raw materials and other commodities. Where Europe's trade with the rest of the world would normally have been balanced by an equivalent exchange of goods and services, the low level of European production and the limited availability of exports has drastically reduced such payment possibilities. (U.S. Senate, 1948, 6-7)

The assumption that states negotiate over public goods implies rejection of one plausible alternative, in which states sanction cheaters by excluding them from any benefits. Such excludable public goods, or club goods, eliminate key theoretical problems: states will not cheat on club good provisions under perfect information and will not join a club if the costs to them outweigh the benefits. Neither free riding nor sanctioning, which many believe to be important problems in international relations, are central to such a game. These characteristics of club goods also mean that multilateralism is a nonissue; if anything, the absence of enforcement problems means that we should never observe bilateralism. In contrast, the public goods approach here retains variation in the dependent variable: both bilateralism and multilateralism occur.

Assume a simple public goods game with each state's utility $U^i = U(m^i, Q)$, where m^i is a basket of private goods and Q is the public good, subject

to a budget constraint $m^i + q^i = B^i$, and $Q = \Sigma q^i$ where q^i is the contribution of each state to the public good. Equilibrium occurs at $\partial U^i/\partial m^i = \partial U^i/\partial Q \; \forall i$, with equilibrium values $m^{i'}$, and so on, and this is unique if Q is a normal good. This level of public goods provision is suboptimal.[6]

States may agree to increase their contributions to the good. In any such agreement, i increases spending on Q by α^i, and others increase theirs by $\Sigma \alpha^i$ $\forall j \neq i$.[7] The variables $(\alpha^i, \alpha^i, \ldots, \alpha^n)$ are exogenous, and fixed—not because this typically characterizes bargaining problems, but because fixed contributions are a necessary part of the definition of equivalence in definition 1.[8] This setup is prisoner's dilemma, with the following payoffs:

$$
\begin{array}{ll}
P^i\!: U^i(m', Q') & R^i\!: U^i(m' - \alpha^i, Q' + \alpha^i + \alpha^j) \\
S^i\!: U^i(m' - \alpha^i, Q' + \alpha^i) & T^i\!: U^i(m', Q' + \alpha^i).
\end{array} \tag{2}
$$

Bargains are evaluated as a choice between contributing the full α^i or zero. No state ever contributes less than the single-shot level $q^{i'}$. In other words,

> Assumption 1. Each i makes the "default conjecture" that no j's contribution will ever be lower than $q^{i'}$.

This rules out free riding on other states' bargains by decreasing one's own contributions only in the existence of bargains among others. I exclude this for tractability, because any $q^i < q^{i'}$ would require analysis of second-order punishment problems. (Furthermore, often $q^{i'} = 0$, so A1 is always true.)

Determining the payoffs in a multilateral bargain is sometimes complicated. To simplify the analysis, consider two polar cases, in which each i makes different assumptions about possible cheating. Specifically:

> Definition 5. Under "asymmetric conjectures," each i assumes that if any j cheats, no other $k \neq j$ cheats; each i also assumes that it can cheat on a given bargain

6. To take but one Pareto-efficient outcome, maximizing the sum of two countries' utilities yields the equilibrium conditions $\partial U^i/\partial m^i = \partial U^i/\partial Q + \partial U^j/\partial Q = \partial U^j/\partial m^j$. By diminishing marginal utility, this joint maximization would provide more Q than does the noncooperative game in the text.

7. Where $q^{i'} = 0 \; \forall i$, the Pareto-optimal outcome in the game here is the same as the Lindahl equilibrium (if one exists). The model is analogous to Guttman's (1987) two-stage matching game, in which each player first chooses a rate at which he or she will match the contributions of others and then chooses an optimal set of contributions. This clearly requires that actors abide by their matching rules and applies better to federal matching programs than to international relations.

8. One may think of α^i as the (here unspecified) solution to the bargaining problem, such as the Nash or Rubinstein solution, the Lindahl equilibrium for public goods provision, and so on. I wish to leave the choice of solution concept open.

Q^{ij} without this affecting the behavior of all $k \neq j$ in the set of bilateral bargains $Q^{i\text{-}j}{}_B = \{Q^{ik}, \dots, Q^{in}\}$.

Definition 6. Under "symmetric conjectures," each i assumes that if any j cheats, all $j \neq i$ cheat.

Definition 5 is the Nash conjecture. Fudenberg and Maskin's (1986) n-person proof of the folk theorem assumes both definition 5 and that if more than one actor defects simultaneously, these defections are ignored by all. I do not wish to be limited to this assumption, largely for empirical reasons, so I will also analyze definition 6. Symmetric conjectures are non-Nash in that all $j \neq i$ simultaneously cheat. (I do not model the coordination game that leads to this defection.)

In a multilateral bargain, the universal use of GT means that all punishment is symmetric, so for simplicity I make the following assumption:

Assumption 2. All actors make symmetric conjectures about multilateral bargains regardless of the conjectures they make in bilateral bargains.

By providing for maximal punishment, assumption 2 may seem to bias our results in favor of multilateralism. However, it also implies a Nash-like assumption over T^i, in that each i evaluates the payoff from defecting as if no one else did; this reduces the likelihood of cooperation by increasing the temptation to defect.

ASYMMETRIC CONJECTURES

Let us begin analysis with the case of asymmetric (Nash) conjectures. Define α^{ij} as the contribution of i in its bilateral contract with j, and α^{ji} as j's contribution in its bilateral contract with i, and $\alpha^i = (\alpha^{ij} + \alpha^{ik} + \dots + \alpha^{in})$, and so on. For simplicity, I examine the three-player game, but the game can be extended to more actors without changing the results. Under asymmetric conjectures, i faces the following set of possible payoffs in the bargain $Q^{ij} \in Q^B$, and deleting superscripts on payoffs:

$$
\begin{aligned}
&P_B: U(m' - \alpha^{ik} \qquad , Q' + \alpha^{ik} + \alpha^{ki} + \alpha^{jk} + \alpha^{kj}) \\
&R_B: U(m' - \alpha^{ij} - \alpha^{ik}, Q' + \Sigma\alpha^i) \\
&T_B: U(m' - \alpha^{ik} \qquad , Q' + \alpha^{ik} + \alpha^{ji} + \alpha^{jk} + \alpha^{ki} + \alpha^{kj}).
\end{aligned}
\tag{3}
$$

Assuming public goods and asymmetric conjectures artificially raises the payoffs in the bilateral bargain, since we must consider the contributions resulting from each state's bargain with k. In bargains over nonpublic goods, bilateral bargains will be much less attractive alternatives than in the analysis

here, so the model here is biased against a finding of multilateralism. The corresponding payoffs from the multilateral bargain Q^M are:

P_M: $U(m', Q')$
R_M: $U(m' - \alpha^i, Q' + \Sigma\alpha^i)$ (4)
T_M: $U(m', Q' + \alpha^j + \alpha^k)$.

By inspection, $T_B < T_M$, $P_B > P_M$, $R_B = R_M$. I assume that $P_B > P_M$ because if the bargain Q^{ik} is rational, i must gain from free riding on Q^{ik} as well. The bargain is necessarily multilateral if any bilateral $Q^{ij} \in Q^B$ is not feasible. After algebraic manipulation, we obtain the following result:

Result 1. Necessary multilateralism may exist if, for a feasible Q^M:

$$\frac{P_B T_M - T_B P_M}{T_M - T_B + P_B - P_M} > R \qquad (5)$$

Proof. Follows from assumption 2, definition 4, and equations 2 through 4. It is easy to verify that this condition may or may not hold. QED[9]

What drives this result is the increased sanction that multilateralization provides, despite the additional dangers of the changes in T^i. In this, it is similar to other models where increasing the severity of the sanction makes cooperation more likely. For instance, medieval merchants formed guilds to help enforce contracts made with market cities (Greif, Milgrom, and Weingast 1990). Lohmann (1992) obtains a similar result in a two-level game, where increased punishment across the two games (domestic and foreign) may support cooperation in both realms that would not be feasible in only one realm.

The condition in result 1 allows us to specify some conditions under which multilateralism is more likely:

Result 2. As each j's contribution grows smaller relative to that of all k, necessary multilateralism is more likely.
Proof. Redistribute contributions away from j s.t. $-\Delta\alpha^{ji} = \Delta\alpha^{ki}$. This increases P_B and leaves all other payoffs unchanged. It is easily verified that this makes equation 4 more likely to be true. QED

The intuition behind this result is simple: as each of j's contributions go down relative to that of all k, the larger sanction available to all states in a

9. In folk theorem terms, this shows that $\exists \{P_B, P_M, R_B, R_M, T_B, T_M\}$ and $\exists w^i$ s.t. not all bilateral bargains are equilibria while the multilateral bargain is.

multilateral bargain is more likely to be critical. The easiest way to achieve this is by increasing the number of cooperating states, which makes multilateral enforcement, as I have defined it, easier. This result obviously stands in marked contrast with the conventional wisdom that increasing the number of states makes multilateral cooperation more difficult.

Empirically, result 2 helps us understand an otherwise peculiar feature of the ERP. Marshall's offer welcomed all comers—even insignificant or peripheral countries and neutrals—as long as they were European and noncommunist. In this interpretation, a greater number of participants made multilateral enforcement easier.

ASYMMETRIC CONJECTURES
AND ASYMMETRIC ENFORCEMENT

Because an increasing sanction drives the above result, some less-than-total sanction might suffice to support multilateralism. If sufficiently large, a single state's use of GT would suffice. This section formalizes this intuition, making hegemonic-led provision of a multilateral public good a special case of a general theory. Some modeling of hegemonic multilateralism is obviously applicable, since the United States was central to the ERP and other postwar multilateralism; moreover, several authors argue that American exceptionalism helps explain the substance of postwar multilateralism (Burley 1993; Cowhey 1993; Goldstein 1993). Modeling this problem may also contribute to the interest-group argument that patrons such as individuals, foundations, or government agencies may be important stimulants of domestic political action (Hansen 1985; cf. Sandholtz 1993).

To model this, I relax assumption 2, and treat actors asymmetrically. Consider the problem when i is the enforcer, j the potential cheater, and (for simplicity) all $k \neq i,j$ are passive. Specifically:

> Definition 7. Under "asymmetric enforcement," only state i ceases to cooperate if any j cheats; no k ever cheats or uses GT.

Now we wish to know if it is rational for i to punish j for defection. Certainly this will be true if i is at least as well off when punishing j, whether or not j changes his or her behavior. Under this criterion,

> Result 3. Asymmetric enforcement is always rational.
> *Proof.* In the single-shot game, $m^{i'}$ is i's equilibrium choice; k's supraequilibrium contribution α^k reduces $\partial U^i / \partial Q$ below the single-shot equilibrium, so clearly

i would prefer not to contribute α^i. Since k contributes regardless of i's action, i is always willing to punish j. QED

Asymmetric punishment works not just because of i's punishment, but because of the forbearance of all k. The result is similar to Fudenberg and Maskin (1986), where rewarding sanctioners provides enforcement.[10] This forbearance raises serious questions because it eliminates the incentive for i to contribute at all. Clearly, someone must enforce the commitments of the enforcer. Moving beyond the trilateral bargain to consider multiple k, it would be possible for the forbearance of some k to support the enforcement action of other k against i, and for i to enforce the bargain against any k. The forbearance of k when i punishes j is only comprehensible with further structure, such as rules or norms that specify when i's noncontributions are to be labeled *enforcement* and when they are to be labeled *defection*. I will leave the complexities of this problem for future work.

Now consider the feasibility conditions for j, who chooses between a bilateral agreement with i under asymmetric conjectures and a multilateral bargain with asymmetric enforcement.

$$
\begin{aligned}
&P_B: U(m' - \alpha^{jk}, Q' + \alpha^{jk} + \alpha^{ki} + \alpha^{ik} + {}^{kj}) \\
&R_B: U(m' - \alpha^{j}, Q' + \Sigma\alpha^{i}) \\
&T_B: U(m' - \alpha^{jk}, Q' + \alpha^{ij} + \alpha^{jk} + \alpha^{ki} + \alpha^{ik} + \alpha^{kj}) \\
&P_M: U(m' \qquad , Q' + \alpha^{k}) \\
&R_M: U(m' - \alpha^{j}, Q' + \Sigma\alpha^{i}) \\
&T_M: U(m' \qquad , Q' + \alpha^{i} + \alpha^{k}).
\end{aligned}
\tag{6}
$$

Given these payoffs,

Result 4. Necessary multilateralism may exist under asymmetric enforcement.
Proof. Analysis parallels that of result 1, except that $P_B^j \lesseqgtr P_M^j$. Where $P_B^j > P_M^j$, the conditions are the same as (5) in result 1. If $P_B^j < P_M^j$ and if $P_M^j - P_B^j > T_M^j - T_B^j$, then (5) becomes:

$$
\frac{P_B T_M - T_B P_M}{T_M - T_B + P_B - P_M} < R
\tag{7}
$$

Both the denominator and numerator of the LHS are negative, because $P_M^j - P_B^j > T_M^j - T_B^j$ and $P_B^j < T_B^j$, so $(P_M^j - P_B^j)/P_B^j > (T_M^j - T_B^j)/T_B^j$ and $P_M^j/P_B^j > T_M^j/T_B^j$. Therefore, (7) may or may not hold. QED

10. This reward is always available if the interior of the set of payoff vectors is nonempty, which is reasonable enough. However, Fudenberg and Maskin (1986) do not specify how this reward is given, nor by whom. My approach provides a conjectural foundation for answering this question.

Here, selective enforcement can support multilateralism against a rational opponent. We may also want to require that multilateralism be stable against the irrational withdrawal of a single state. This captures involuntary defection by any state due to domestic politics, such as a Communist electoral victory in Italy. (It is analogous to the assumption in some folk theorem proofs that there is an epsilon probability of playing a finitely iterated PD with an irrational player who does not use backward induction to decide to defect on every move.) Let me therefore make the following definition and derive a simple result:

> Definition 9. Q^M is "robustly feasible" if it is feasible and if the multilateral bargains Q^{M-j} are feasible $\forall j$.
>
> Result 5. For all j making sufficiently small contributions α^j to Q^M, Q^M will be robustly feasible.
>
> *Proof.* For any defection by j, there is no change to P^i $\forall i$, $k \neq j$, but Q is reduced by α^j in R^i, S^i, and T^i $\forall i$. By diminishing marginal utility, the resulting marginal losses of utility are $dU_T < dU_R < dU_S$. Consider the two feasibility conditions. Since Q^M is feasible, $(T^i + R^i) < w^i(T^i + P^i)$; eliminating j increases the LHS (after rearranging) by $dU_R + (1 - w^i)dU_T$. The inequality will continue to hold for sufficiently small dU_R and/or large w^i. QED

In short, asymmetric enforcement is more likely to work, in the long run, the smaller the likely target of enforcement. Because under asymmetric conjectures, the size of the sanction drives the conditions for necessary multilateralism, clearly large enforcers of small cheaters will provide especially propitious circumstances for multilateralism. Although intuitive, it is interesting that this may support multilateralism where bilateralism is not feasible—the large enforcer cannot similarly support bilateralism.

By showing that the loss of large cooperators may make a multilateral bargain no longer feasible, the result also captures the fact that cancellation of American aid would have been fatal to the payments union and other forms of cooperation linked to the ERP. Obviously, large countries' threats to depart are also important for other multilateral institutions such as the Law of the Sea.

Once again, it is striking that multilateralism is theoretically robust because the model overstates the difficulties of asymmetric enforcement in a multilateral bargain. In the model, punishment of j also harms all k because i stops contributing to the public good. More typically, an enforcer can target punishment at specific defectors when desired. In the Marshall Plan, a bilateral aid cutoff clearly was possible—although this would harm other Europeans through multiplier effects, the target country would suffer far more and this would make both j's defection and k's forebearance more likely. This

kind of enforcement played a small role in the ERP, most importantly by withholding approval of counterpart allocations. For instance, the United States held up already-approved expenditures in Italy in 1949 to force the government to relax its deflationary policies and to develop a national investment budget; for similar reasons, the United States chose to release French funds on a monthly basis in 1949, as budgetary and tax reforms progressed (Hogan 1987, 206-7). A total suspension of aid was also available in the case of a Communist electoral victory in any recipient.

CONJECTURES AND
ENFORCEMENT IN THE MARSHALL PLAN

The above analysis shows that multilateralism may be necessary under Nash conjectures and that necessary multilateralism may be robust against irrational defection. Even so, it depends on what may seem a peculiar set of conjectures and assumptions about enforcement. In this section, I briefly justify these assumptions by appealing to an empirical illustration, the ERP.

The assumption about the use of GT in a multilateral bargain implies that the United States was willing to stop Marshall aid if any country defected. This is a strong assumption, but not farfetched. In the Marshall Plan, packaging the aid programs created global enforcement, with Congress the potential sanctioner. By voting down an ERP appropriations bill, Congress could cut off all aid in response to whatever violations it deemed worthy of punishment.

Leading congressional figures discussed how to sanction European behavior in the aggregate. When Robert Taft advocated Marshall aid only as a 1-year experiment, Arthur Vandenberg stated that if the Europeans were still cooperating in a year, he hoped that Taft would vote to renew aid; Taft said that he might (Pogue 1987, 250-51). Questions of enforcement also engaged the Senate Foreign Relations Committee at some length, especially Senator Bourke Hickenlooper of Iowa (see his questioning of General Marshall and Ambassador Douglas on January 9, 1948, and John Foster Dulles on January 20, 1948 [U.S. Senate 1948, 83-84, 615-17]).

The executive branch also sought to hold Europeans collectively responsible. European Cooperation Agency (ECA) officials played an important advisory role in the drafting of European requests, giving the State Department an excellent opportunity to threaten Europeans with rejection of ERP aid. State's guidelines to Will Clayton and Jefferson Caffery at the Paris Conference insisted that the Europeans propose a truly multilateral program (Gimbel 1976, 256-62; Mee 1984, 178-85; Wexler 1983; Jones 1955). The

Europeans made various changes to get acceptance of their program, involving payments of Bizone and sterling balances (Milward 1984, 180-89; Mee 1984, 178-85, 195-203).

The American executive was willing to reject the whole package even if a single country was the primary defector. One illuminating example is the planning for the 1949-1950 allocations. Although the working assumption was that aid would be allocated in proportion to recipients' hard currency deficits (Milward 1984, 95), this rule distorted recipients' incentives. Britain's proposal increased its hard currency deficits to 40% of the European total by exaggerating its import needs. In response, the United States rejected the OEEC draft plan in toto, instead of just excluding the British—threatening the drastic metastrategy of GT. The dispute was eventually resolved by fixing aid shares to roughly the previous year's deficits (Milward 1984, 204-7; Hogan 1987, 244-45).

SYMMETRIC CONJECTURES

A different way to strengthen the article's results is to show not empirical applicability, but theoretical robustness. This section does the latter by providing an analysis of multilateralism under symmetric conjectures in both the bilateral and multilateral bargain. Under symmetric conjectures, $P_B^i = P_M^i$, $R_B^i = R_M^i$, $S_B^i = S_M^i$, $T_B^i = T_M^i$ $\forall i$. This implies that:

> Result 6. Under symmetric conjectures, neither necessary multilateralism nor necessary bilateralism exist.
> *Proof.* Since $P_B^i = P_M^i$, $R_B^i = R_M^i$, and $T_B^i = T_M^i$ $\forall i$, $X_i^B = X_i^M$. QED

This result shows when multilateralism is a nonissue, as it is in the theory of the firm. It relies on strong assumptions about the set of bilateral bargains as well as the non-Nash conjecture that if any $j \neq i$ cheats, all j cheat.

With symmetric conjectures, a state evaluates each bilateral bargain on the assumption that all other bilaterals are honored. This assumption is problematic in part because states may negotiate and evaluate bilateral bargains sequentially. Consider the following requirement:

> Definition 10. A bilateral bargain is "individually feasible" if it is feasible in the absence of any other bilateral bargain.

This has substantial empirical referent. In 1947, the State Department was tired of asking Congress for program after program, and Congress was tired

of approving individual programs (Diebold 1988, 433; Kindleberger 1987, 111-12). Senator Walter George (D-Georgia) favored multilateralism in part because "it is the only door through which we can enter into European affairs at all except running the risk of having them slide right back into a simple undertaking between country X over there and ourselves, very much as we are bogged up with Greece at the moment" (U.S. Senate 1948, 175). The individual bilaterals seem trivial, whereas the greater aggregate rewards of multilateralism is its primary attraction.[11]

Individual feasibility means that a state compares the following payoffs:

$$
\begin{array}{ll}
P_B{}^i: U(m' \quad, Q') & P_M{}^i: U(m', Q') \\
R_B{}^i: U(m' - \alpha^{ij}, Q' + \alpha^{ij} + \alpha^{ji}) & R_M{}^i: U(m' - \alpha^i, Q' + \Sigma\alpha^i) \\
T_B{}^i: U(m' \quad, Q' + \alpha^{ji}) & T_M{}^i: U(m', Q' + \alpha^j + \alpha^k).
\end{array} \tag{8}
$$

By inspection, $P_B{}^i = P_M{}^i$, $R_B{}^i < R_M{}^i$, $T_B{}^i < T_M{}^i$. Now,

> Result 7. Under symmetric conjectures with individually feasible bargains, necessary multilateralism exists if the following condition is satisfied for any bilateral $Q^{ij} \in Q^B$:
>
> $$ R_B{}^i T_M{}^i - R_M{}^i T_B{}^i < P^i(R_B{}^i - R_M{}^i + T_M{}^i - T_B{}^i). \tag{9} $$

Proof. Proof follows directly, and the inequality may or may not hold. QED

Here, it is the greater rewards of multilateralism that drive the result. These rewards suffice to draw countries into a multilateral agreement despite the greater temptation to defect.

Interestingly, increasing the value of the single-shot status quo (P^i) makes multilateralism more likely. This formalizes the intuition that bilateralism is likely during economic crisis (low P^i) and highlights the implication that multilateralism is more likely during times of economic improvement. From this standpoint, it is not surprising that the 1940s and 1950s were the heyday of multilateralism because even when substantial bottlenecks limited eco-

---

11. These quotations might suggest that the transaction costs of multiple ratifications were critical in the choice of multilateralism. I reject this suggestion for two reasons. First, the transactions costs of multilateral bargaining may be more than those of bilateral bargaining. Multilateralization has a significant ratification cost in that senators who oppose aid to one country (Greece, for instance) might vote against the entire bill. Second, the decision to introduce an omnibus aid appropriations bill does not depend on multilateral negotiations over the aid allocations and therefore cannot explain Marshall's condition. Short-term relief to Austria, France, and Italy was combined into a single Interim European Aid Program, without any multilateralization.

nomic growth, the European economy grew rapidly (see Milward 1984).[12] This result is also consistent with histories of monetary coordination in the 1930s (e.g., Oye 1986c) that focus on the unilateralism and bilateralism of the worst years of the depression and argue that the multilateralism of the Tripartite Agreement was only possible as conditions improved after 1936-1937.

OTHER APPLICATIONS OF THE RESULTS

The above model explored the enforcement grounds for multilateralism. I used the Marshall Plan as an illustration of the enforcement issues at work, choosing the ERP because Marshall had made multilateralism a condition for American aid. Although the theoretical analysis does not pretend to explain the nonenforcement aspects of the Marshall Plan, I recognize that the negotiation history of the EPR points out some weaknesses in the theory. The most important weakness is that the model takes the contributions of each state (α^i, etc.) as exogenous, whereas these are likely to be the subject of negotiation. This is an important obstacle to multilateralism, because it is probably more difficult to solicit concessions in multilateral negotiations than in bilateral negotiations.

In the Marshall Plan, contribution levels were a game between the United States and the Europeans. Each European country wanted as much aid as possible, and was happy to sign off on everyone else's aid requests; the United States wanted to avoid duplication and reduce the total aid package. Kennan (1967, 337) argues that this negotiation problem was an important reason for the ERP's multilateralism, because the United States hoped to use the OEEC to force the Europeans to inspect one another's aid requests.[13] Representative John M. Vorys (Ohio) made a similar argument against bilateralism:

12. The crisis of 1946-1947 was, more accurately, a slowdown in growth (Milward 1984, chap. 1). The only crisis was an acute payments imbalance and some bottlenecks in specific raw materials or semimanufactured goods, especially the British problem in moving coal during the harsh weather of February 1947.

13. There were two reasons to believe this might work. The first was informational asymmetries, because the Europeans probably knew more about one another than the United States knew about them. Thus the Europeans could serve as a better check on one another than could any American agency. Second, a multilateral organization creates better incentives because aid appears scarce once the United States announces a budget. In contrast, bilateral aid appears abundant to each country because any increase has implications only for third parties. If this was the motive for the OEEC, it failed—as Milward (1984) has more than amply argued (see, also, Mee 1984). For my argument, it is important to note that the failure of the Americans' bargaining technique did not cause the United States to break the multilateral bargain into bilateral agreements. Therefore, this issue cannot explain multilateralism; more precisely, the bargaining problem was not a necessary condition for a multilateral bargain.

> Our experience in [bilateral] settlements under lend-lease makes me hope that this [multilateralism] will have a different type of result in the long run. I do not see where we get by having so many different agreements and by having each of 16 countries seeking a little different or a little better terms than the other country gets. (U.S. House of Representatives 1948, 607)

With this limitation in mind, let me now turn to other applications of the model. If the approach here is to be useful, it should apply to a variety of multilateral institutions. To this end, a few additional illustrations follow.

Most-favored-nation clauses. One important example of multilateralism is the GATT, or in earlier periods, networks of bilateral commercial treaties linked by MFN clauses. With MFN, tariff concessions granted to one state are a public good because they are available to all others within the MFN system.

Because trade policy negotiations between large countries resemble PD (Conybeare 1984, 1987; Riezman 1982; but, see Kroll 1993), this multilateralization is a puzzle for others. By this reasoning, MFN must be Pareto-inferior to bilateral tariff agreements because it substitutes an undersupplied public good for an efficiently supplied private good. As Conybeare (1987) argues, "[t]he MFN rule introduces a public good problem of excludability, or inability to punish defection, and prevents the game from evolving into cooperation" (p. 55). The model here shows that this pessimism is unwarranted. MFN treaties, like other multilateral bargains, might be preferred to a series of bilateral bargains.

Of course, the MFN system immediately raises modeling questions. Although tariff concessions under MFN are "public," nonuniversal MFN is not a public good. Customs unions and free trade areas, both important in the GATT regime, also have nonpublic internal tariffs, and such discrimination should be brought directly into the model (see Baldwin and Lage 1971; Bhagwati 1990; Kennan and Riezman 1990).

Moreover, there remains substantial bilateralism, even within the GATT. Much of this bilateralism is designed to solve bargaining problems associated with the making of multilateral concessions (Bhagwati 1990; Caplin and Krishna 1988; Ludema 1990), a problem also found in the Marshall Plan. Early GATT rounds used a "bid and offer" system to maximize concessions among the principal suppliers and buyers of each good. The GATT still bundles multiple concessions into bargaining rounds to encourage cross-sector concessions (Winters 1990; Baldwin and Lage 1971).

Although GATT is self-enforcing, as is the model here, it relies on a legalistic definition of defection. It also prescribes a legalistic enforcement mechanism, strictly proportional punishment in bilateral tit-for-tat. Because

this limits punishment, cooperation can continue despite small defections—but cheaters may be insufficiently deterred. The "chicken war" between the EEC and the United States in the 1960s showed that GATT enforcement may impose costs on defectors without deterring defection; in addition, a defector may retaliate against "inappropriate" punishment, magnifying any conflict (see Conybeare 1987). Alternative metastrategies, such as "two tits for a tat," might be more effective, but modeling this is best left for future work.

Theory of hegemonic stability. Many hegemonic-stability theorists argue that multilateral institutions, like other regimes regulating international economic relations, are more likely if there exists a single dominant state, a hegemon. Some also argue that hegemons may supply public goods (Keohane 1984; Kindleberger 1981; Lake 1988; Snidal 1985). The model here does not go this far: all states contribute to the public good. Even so, I showed that asymmetric enforcement could support necessary multilateralism. A large state or hegemon is a prime candidate for such an enforcement role. Still, this implies only that hegemony is a sufficient condition for multilateralism, and not a necessary one (cf. Snidal 1985).

The European Economic Community. If the conventional wisdom on multilateralism were correct, the continual expansion of the EEC would be quite a puzzle. In contrast, the model here shows that expansion could make enforcement easier, making deeper cooperation possible. In this interpretation, the Single European Act (SEA), the Maastricht Treaty, and enlargement go together despite the common view that expansion makes integration more difficult.

The model here may also illuminate the consensual norm for EEC decision making and the importance of unanimity, even where it is not formally required. If more states agree to a given decision, then there are more states that are willing to sanction defectors. The unanimity norm strengthens enforcement.

On the other hand, the model implies that states would always welcome additional contributors—which is simply not true. The reluctance of the EEC to welcome new members in Eastern Europe is but one example of a group that does not seek unconditional expansion. Clearly, one important reason groups do not welcome all comers is that they do not provide public goods. Moreover, when a mix of public and nonpublic goods is provided, distributional issues begin to outweigh joint gains. Clearly, distributional questions have been important for the UK since membership, and they were important issues in the Mediterranean expansion, among others.

The EEC also raises questions for modeling enforcement. States do not enforce EC bargains by expelling members; almost no one suggested expel-

ling the Danes from the Treaty of Rome for not having ratified Maastricht. Second, EEC decision-making processes are complex, whereas those of the model are not. A purely contractual model might suffice to capture decisions in which Luxemburg compromise vetoes are important threats, but this does not characterize day-to-day decisions.

Debt "crisis." One striking characteristic of the lending packages that banks and others have put together for borrower governments in default has been the large number of participants in each package. Lipson (1986) shows how the banks break each package into a hierarchy of small-group bargains, with large banks generally acting as enforcers of smaller banks. This suggests that banker multilateralism has depended on a complex form of asymmetric enforcement.

Other enforcement mechanisms hold debtors to their payment commitments. Using multinational lending consortia increases the sanctions against default: debtor assets may be attached through court action in most or all industrial countries (Bulow and Rogoff 1989). Repayment promises are enforced by cross-default clauses that establish the potential for symmetric enforcement. Under a cross-default clause, a single bank may declare a sovereign loan in default and establish a priority of claim, which may cause an entire debt package to unravel (Lipson, 1986, 215-16). The model here connects these techniques to a more general theory, helping further illuminate the reasons behind these large-number bargains.

Linkage. Linkage across issues, like multilateral enforcement, is essentially a matter of conjectures. An actor conjectures that two issues are linked, so that cheating in one issue area leads to retaliation in both. This raises the costs of cheating in any one issue. This may or may not make cooperation easier, a conclusion consistent with other analyses of the topic (McGinnis 1986; Sebenius 1983; Stein 1980; Tollison and Willett 1979).

The question of linkage raises the interesting question of how actors establish the conjecture that two issues are linked. To take the most well-known case, Henry Kissinger never got the Soviets to agree to link Vietnam to arms control and other issues (see Isaacson 1992). Analysis of this problem may require a model with incomplete information in which nations signal their willingness to link issues.

Norms. Another source of these conjectures is an institution or one of its norms. For instance, a multilateral institution might create the norm that cheating by one state should be interpreted by other states in the light of a

common set of conjectures, whether symmetric or asymmetric. Keohane (1984) provides a good example of such conjectures:

> Under GATT rules . . . retaliation against such behavior [discriminatory trade arrangements] is justified. . . . No longer does a specific discriminatory agreement constitute merely a particular act without general significance; on the contrary, it becomes a "violation of the GATT" with serious implications for a large number of other issues. (Pp. 89-90)

Other norms relevant to the model here are Ruggie's (1992, 567) examples of qualitative multilateralism, which includes collective security and the MFN norm, in both of which states act as if the good provided is in fact public. Here, both the enforcement conjectures and the assumption that states negotiate over the public good stem from institutional norms. Of course, because qualitative multilateralism must rest on prior, nominally multilateral bargains, the choice-theoretic model of multilateralism here is logically prior to exploring whether multilateralist norms play an important independent role. The choice-theoretic model here may also be useful for policy purposes, providing a framework within which we can explore whether a given set of would-be norms is both internally consistent and consistent with the rational choice of strategies by states.

CONCLUSIONS

The above shows that there are many paths to multilateralism, and that multilateralism often will be feasible where equivalent bilaterals are not. The results are robust against substantial variation in the assumptions of the model, so there is reason to believe that the strong assumptions in some variations of the model are not critical to the result.

Even so, the theoretical analysis here required taking many details into account for a full specification of multilateralism within a formal model. These include each state's conjectures about one another, assumptions about the nature of punishment strategies, and so on. Nonformal arguments have considered only some of these details at once.

The variety of plausible assumptions and multiple models makes one point clear: analysis of multilateralism should be clear about the assumptions being made over defection and sanctions before making a claim that either multilateral or bilateral solutions are necessary in a given policy area. The choice among these various assumptions is largely situation dependent.

Throughout, I have focused on the most pristine case of multilateralism, the voluntary supply of public goods within an indefinitely iterated PD. This

is not meant to be the sole or even the most useful case of multilateralism. Although I argued that none of these other conditions discussed in the literature are necessary for multilateralism, I cannot rule out the possibility that some of these other variables may be sufficient causes for multilateralism.

The theory here also has clear policy implications. Clearly we can make no simple recommendation in favor of either bilateral or multilateral approaches to international cooperation. Yet, through careful analysis of a given problem, we should make recommendations in context, specifying clearly the rules, conjectures, or norms appropriate to the preferred solution.

APPENDIX
International Cooperation, Public Goods, and the Marshall Plan

The assumption that international cooperation typically concerns public goods has been widely analyzed and criticized in the literature (see Conybeare 1984; Ruggie 1972; Snidal 1985). Most real-world compromises include some gains accruing to specific parties and some gains that are truly public. For instance, a trade agreement between the United States and the EC reducing agricultural export subsidies would have identifiable beneficiaries in each country, as well as providing essentially public benefits to the world in the form of a less-distorted market for agricultural products. Because public goods are part of such bargains, modeling public good provision is often useful to highlight the analytical problems of international cooperation.

Even though the centerpiece of the ERP was American grants to individual European countries, the core analytical issue remains because the ERP also provided semipublic goods. Specifically, the problems of each national recovery plan highlighted the externalities of each country's policies on the others (Cleveland-Moore-Kindleberger Memorandum in Kindleberger [1987, 10-11]). For instance, to save Germany's foreign exchange, the United States and British occupation authorities used Hamburg and Bremen for imports instead of lower-cost Dutch and Belgian ports; loosening the Bizone's currency constraint would benefit not only German consumers, but Benelux as well. To take a different example, many countries' plans involved capital investments that duplicated those elsewhere, and this overcapacity would affect the profitability of all. Eliminating such inefficiencies created positive externalities—hence they included quasi-public goods.

Some of these externalities were nonexcludable, so that modeling them as club goods would be inappropriate. For instance, the allies were unable to exclude Germany from the benefits of European cooperation, and Europeanwide recovery was difficult without substantial German growth. For these reasons, German participation was essential, and the State Department repeatedly insisted on the nonexcludability of the Germans (Gimbel 1976; but, Kindleberger 1987, 157; Pollard 1985, 305; Warner 1977, 290).

A final issue concerning the fit between model and reality is the assumption that each country makes contributions to the public good—in this case, European-wide recovery. Obviously, the United States made the major fiscal contributions, but each European country also made important concessions. Primary among these contributions is a reduction in each state's autonomy, a partial grant of sovereignty. The sovereignty issue was Molotov's primary objection to a joint program, and Bevin and Bidault had to accept explicitly the sovereignty costs of the ERP at their conference with him in Paris (Mee 1984, 131-33). The sovereignty loss is seen in the American requirements that recipients be open to direct American investment and that at least 50% of Marshall goods be shipped on American vessels.

The United States also demanded concessions in security policy, insisting on reduced trade with Eastern Europe. This was an especially important concession for Sweden because of a significant trade with the East and its political neutrality. The Swedes ultimately agreed not to export any ERP goods to Eastern Europe and agreed to receive copies of the 1-A list of proscribed items "for their own use" in trade negotiations with Eastern Europe (Lundestad 1980, 139).

One widely criticized concession was the establishment of counterpart funds (Arkes, 1972, 292-94; Lundestad 1980, 151-54; Pollard 1985, 160; Hogan 1987, 152-53). Recipients deposited in a counterpart fund local currency equal to the grant assistance received. These funds could be used only with American consent; Congress reserved 5% of the total for the expenses of U.S. embassies and, in practice, as a slush fund for congressional junkets (Kindleberger 1987, 113).

In short, the Europeans made substantial contributions to the ERP. Because they agreed to policies that they would not otherwise have followed, there were potential problems of compliance and enforcement, as follows from any iterated prisoner's dilemma. The approach of the model is a reasonable simplification of the actual situation.

REFERENCES

Alchian, A., and H. Demsetz. 1972. Production, information costs, and economic organization. *American Economic Review* 62:777-95.

Alt, J. E., R. L. Calvert, and B. D. Humes. 1988. Reputation and hegemonic stability: A game-theoretic analysis. *American Political Science Review* 82:445-66.

Arkes, H. 1972. *Bureaucracy, the Marshall Plan, and the national interest.* Princeton, NJ: Princeton University Press.

Axelrod, R. 1984. *The evolution of cooperation.* New York: Basic Books.

Baldwin, R. E., and G. M. Lage. 1971. A multilateral model of trade-balancing tariff concession. *Review of Economics and Statistics* 53:237-44.

Bhagwati, J. 1990. Departures from multilateralism: Regionalism and aggressive unilateralism. *Economic Journal* 100:1304-17.

Bueno de Mesquita, B. 1990. Multilateral negotiations: A spatial analysis of the Arab-Israeli dispute. *International Organization* 44:310-40.

Bulow, J., and K. Rogoff. 1989. A constant recontracting model of sovereign debt. *Journal of Political Economy* 97:155-78.

Bureau, D., and P. Champsaur. 1992. Fiscal federalism and European economic integration. *American Economic Review Papers and Proceedings* 82:88-92.

Burley, A. 1993. Regulating the world: Multilateralism, international law, and the projection of the New Deal regulatory state. In *Multilateralism matters: The theory and practice of an institutional form*, edited by J. G. Ruggie, 125-56. New York: Columbia University Press.

Caplin, A., and K. Krishna. 1988. Tariffs and the most-favored nation clause: A game-theoretical approach. *Seoul Journal of Economics* 3:267-89.

Caporaso, J. A. 1992. International relations theory and multilateralism: The search for foundations. *International Organization* 46:598-632.

Conybeare, J.A.C. 1984. Public goods, prisoners' dilemmas, and the international political economy. *International Studies Quarterly* 28:5-22.

———. 1987. *Trade wars: The theory and practice of international commercial rivalry*. New York: Columbia University Press.

Cowhey, P. F. 1993. Elect locally—Order globally: Domestic politics and multilateral cooperation. In *Multilateralism matters: The theory and practice of an institutional form*, edited by J. G. Ruggie, 157-200. New York: Columbia University Press.

Deardorff, A., and R. Stern. 1992. Multilateral trade negotiations and preferential trading arrangements. Discussion Paper No. 344, University of Michigan, Institute of Public Policy Studies.

Diebold, W., Jr. 1988. The Marshall Plan in retrospect: A review of recent scholarship. *Journal of International Affairs* 41:421-35.

Dion, D. 1993. Selection bias and the comparative case study revisited. Typescript. University of Michigan.

Fudenberg, D., and E. Maskin. 1986. The folk theorem in repeated games with discounting or with incomplete information. *Econometrica* 54:533-54.

Gimbel, J. 1976. *The origins of the Marshall Plan*. Stanford, CA: Stanford University Press.

Goldstein, J. 1993. Creating the GATT rules: Politics, institutions, and American policy. In *Multilateralism matters: The theory and practice of an institutional form*, edited by J. G. Ruggie, 201-33. New York: Columbia University Press.

Greif, A., P. Milgrom, and B. Weingast. 1990. The merchant guild as a nexus of contracts. Working Paper in Political Science #P-90-9, Hoover Institution, Stanford University.

Grieco, J. M. 1990. *Cooperation among nations: Europe, America, and non-tariff barriers to trade*. Ithaca, NY: Cornell University Press.

Guttman, J. M. 1987. A non-Cournot model of voluntary collective action. *Economica* 54:1-19.

Hansen, J. M. 1985. The political economy of group membership. *American Political Science Review* 79:79-96.

Hogan, M. J. 1987. *The Marshall Plan: America, Britain, and the reconstruction of western Europe, 1947-1952*. Cambridge: Cambridge University Press.

Isaacson, W. 1992. *Kissinger: A biography*. New York: Simon & Schuster.

Jones, J. M. 1955. *The fifteen weeks (February 21-June 5, 1947): An inside account of the genesis of the Marshall Plan*. New York: Viking.

Kahler, M. 1992. Multilateralism with small and large numbers. *International Organization* 46:681-708.

Kennan, G. F. 1967. *Memoirs, 1925-1950*. New York: Pantheon.

Kennan, J., and R. Riezman. 1990. Optimal tariff equilibria with customs unions. *Canadian Journal of Economics* 23:70-83.

Keohane, R. O. 1984. *After hegemony: Discord in the world political economy*. Princeton, NJ: Princeton University Press.

———. 1990. Multilateralism: An agenda for research. *International Journal* 45:731-64.

Kindleberger, C. P. 1981. Dominance and leadership in the international economy. *International Studies Quarterly* 25:242-54.

———. 1987. *Marshall Plan days*. Boston: Allen and Unwin.

Kratochwil, R. 1993. Norms versus numbers: Multilateralism and the rationalist and reflexivist approaches to institutions—A unilateral plea for communicative rationality. In *Multilateralism matters: The theory and practice of an institutional form*, edited by J. G. Ruggie, 443-74. New York: Columbia University Press.

Kroll, J. 1993. Avenues of commerce. Typescript.

Lake, D. A. 1988. *Power, protection, and free trade: International sources of U.S. commercial strategy, 1887-1939*. Ithaca, NY: Cornell University Press.

Lipson, C. 1986. Bankers' dilemmas: Private cooperation in rescheduling sovereign debts. In *Cooperation under anarchy*, edited by K. A. Oye, 200-25. Princeton, NJ: Princeton University Press.

Lohmann, S. 1992. Electoral cycles and international policy cooperation. *European Economic Review* 36:1-19.

Ludema, R. 1990. International trade bargaining and the most-favored nation clause. *Economics and Politics* 3.

Lundestad, G. 1980. *America, Scandinavia, and the cold war 1945-1949*. New York: Columbia University Press.

Marshall, G. C. 1947. Address at the commencement exercises of Harvard University, 5 June 1947. Reprinted in C. L. Mee, Jr. 1984. *The Marshall Plan: The launching of the Pax Americana*. New York: Simon & Schuster.

Martin, L. L. 1992. Interests, power, and multilateralism. *International Organization* 46:765-92.

McGinnis, M. D. 1986. Issue linkage and the evolution of international cooperation. *Journal of Conflict Resolution* 30:141-70.

Mee, C. L., Jr. 1984. *The Marshall Plan: The launching of the Pax Americana*. New York: Simon & Schuster.

Milward, A. S. 1984. *The reconstruction of western Europe, 1945-51*. Berkeley: University of California Press.

Nogués, J. 1990. The choice between unilateral and multilateral trade liberalization strategy. *World Economy* 13:15-26.

Olson, M. [1965] 1971. *The logic of collective action*. Cambridge, MA: Harvard University Press.

Oye, K. A., ed. 1986a. *Cooperation under anarchy*. Princeton, NJ: Princeton University Press.

———. 1986b. Explaining cooperation under anarchy: Hypotheses and strategies. In *Cooperation under anarchy*, edited by K. A. Oye, 1-24. Princeton, NJ: Princeton University Press.

———. 1986c. The sterling-dollar-franc triangle: Monetary diplomacy, 1929-1937. In *Cooperation under anarchy*, edited by K. A. Oye, 173-99. Princeton, NJ: Princeton University Press.

Pogue, F. C. 1987. *George C. Marshall: Statesman, 1945-1959*. New York: Penguin.

Pollard, R. A. 1985. *Economic security and the origins of the cold war, 1945-1950*. New York: Columbia University Press.

Riezman, R. 1982. Tariff retaliation from a strategic viewpoint. *Southern Economic Journal* 48:583-93.

Ruggie, J. G. 1972. Collective goods and future international collaboration. *American Political Science Review* 66:874-93.

————. 1992. Multilateralism: The anatomy of an institution. *International Organization* 46:561-98.

————, ed. 1993. *Multilateralism matters: The theory and practice of an institutional form.* New York: Columbia University Press.

Sandholtz, W. 1993. Institutions and collective action: The new telecommunications in western Europe. *World Politics* 45:242-70.

Sebenius, J. K. 1983. Negotiation arithmetic: Adding and subtracting issues and parties. *International Organization* 37:281-316.

Snidal, D. 1985. The limits of hegemonic stability theory. *International Organization* 39:579-614.

Stein, A. A. 1980. The politics of linkage. *World Politics* 33:62-81.

Taylor, M. 1976. *Anarchy and cooperation.* London: Wiley.

Tirole, J. 1988. *The theory of industrial organization.* Cambridge: MIT Press.

Tollison, R. D., and T. D. Willett. 1979. An economic theory of mutually advantageous issue linkages in international organization. *International Organization* 33:425-59.

U.S. House of Representatives. 1947-1948. *Hearings before the Foreign Affairs Committee.* 80th Congress. Washington, DC: U.S. Government Printing Office.

U.S. Senate. 1948. *Hearings before the Foreign Relations Committee.* 80th Congress. Washington, DC: U.S. Government Printing Office.

Warner, G. 1977. Review of *The origins of the Marshall Plan* by J. Gimbel. *International Affairs* 53:289-90.

Weber, S. 1992. Shaping the postwar balance of power: Multilateralism in NATO. *International Organization* 46:633-80.

Weingast, B. R., and W. J. Marshall. 1988. The industrial organization of Congress; Or, why legislatures, like firms, are not organized as markets. *Journal of Political Economy* 96:132-63.

Wexler, I. 1983. *The Marshall Plan revisited: The European recovery program in economic perspective.* Westport, CT: Greenwood.

Winters, L. A. 1990. The road to Uruguay. *Economic Journal* 100:1288-1303.

Yarbrough, B. V., and R. M. Yarbrough. 1985. Free trade, hegemony, and the theory of agency. *Kyklos* 38:348-64.

————. 1986. Reciprocity, bilateralism, and economic "hostages": Self-enforcing agreements in international trade. *International Studies Quarterly* 30:7-21.

Zacher, M. W. 1993. Multilateral organizations and the institution of multilateralism: The development of regimes for nonterrestrial space. In *Multilateralism matters: The theory and practice of an institutional form,* edited by J. G. Ruggie, 443-74. New York: Columbia University Press.