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LINKAGE POLITICS

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Abstract

I extend the basic repeated Prisoners' Dilemma to allow for the linkage of punishment strategies across issues (issue linkage) as well as decentralized third-party enforcement (player linkage). I then synthesize the concepts of issue and player linkage to develop the notion of domestic-international linkage, which allows for the linkage of trigger strategy punishments across games played over different issues by different sets of players. In a two-level game, domestic and international cooperation may be reinforced by a punishment linkage: a defection in the domestic game may trigger a breakdown of international cooperation, and vice versa. I also examine the conditions under which the incentives to cooperate are stronger at the domestic level than at the international level, and vice versa. In this case domestic-international linkage allows for the credibility surplus to spill over to the level with the credibility deficit. Finally, I provide conditions under which governments are better off delinking domestic and international issues.

Linkage Politics

Susanne Lohmann*

1 Introduction

Consider the following three, apparently quite disparate, examples. First, the member states of the European Community are scrambling to join the future European Monetary Union. Their efforts are driven in part by the understanding that monetary integration will increase the prospects for progress on other, nonmonetary, dimensions of European integration. Second, with the breakdown of established alliances in the post Cold War period there is a revived interest in systems of collective security. Such systems rely on all members of a community of states to punish any member state that acts aggressively against another. Third, in countries as diverse as Italy and Mexico, domestic political reform and economic liberalization have gone hand in hand with an opening toward international trade and foreign investment, as well as their integration into the international community of states. At the same time, Japan's involvement in international trade has fed international pressures on Japan to open its domestic economy to foreign goods and investment, creating domestic pressures for the reform of its party and electoral systems.

These examples have a common theme: linkage. In the first example, the prospects for cooperation depend on the linkage of issue dimensions; in the second example, on linkages across players; in the third example, on linkages between domestic and international levels of play. In each case, linkage is established by the players' beliefs that cooperative behavior in one setting influences the prospects for cooperation in other settings characterized by different issues, players, or levels of play.

It is well-known that cooperation may emerge in a Prisoners' Dilemma game if the players interact repeatedly and indefinitely over an infinite time horizon and their discount factors

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are sufficiently high (Friedman, 1971). Starting out with a simple repeated Prisoners' Dilemma game, I provide a model of issue linkage, in which trigger strategy punishments are linked across issues, and a model of player linkage, or decentralized third-party enforcement. I then synthesize these two models to develop the concept of domestic-international linkage, which allows for the linkage of punishment strategies across two-level domestic-international games. Specifically, a defection at one level triggers a breakdown of cooperation at the other level. I show that a credible commitment to cooperate at the domestic level has the potential to spill over to the international level, and vice versa. Linkage may thus improve the prospects for cooperation. I also provide conditions under which governments are better off delinking domestic and international issues, namely when linkage undermines cooperation.

My theory is related to three distinct literatures in international relations: the literature on linkage politics; on collective security; and on two-level, or nested, games of domestic politics and international cooperation.

The literature on linkage politics is based on the assumption that governments trade off achieving objectives on different dimensions (Rosenau, 1969; Keohane and Nye, 1977). By tying together issues that are not necessarily related in any functional sense, governments can improve their lot by making concessions on issues they care little about in exchange for concessions on issues that are politically or economically of greater importance (Tollison and Willett, 1979; Sebenius, 1983; Alt and Eichengreen, 1989).¹

This quid-pro-quo theory implies that linkage is more likely to be observed between states that differ with respect to their issue positions or the relative salience of various issues. In contrast, my theory of linkage politics does not require states to be dissimilar (indeed, they may be identical), consistent with the observation that mutually beneficial international exchange is more typical of countries that are similar.

Eichengreen and Frieden (1993) criticize the traditional linkage argument for failing to address the problem of credibility. Governments must not only be able to make a credible commitment on each issue dimension but also a credible commitment to link the dimensions. The linkage argument unravels if one government anticipates that once it has fulfilled its side of the

¹ Stein (1980) expands the traditional theory with his proposal that linkage may serve as a commitment mechanism in a Prisoner's Dilemma game. Morrow (1992) adds an informational dimension; in his model linkage offers may function as signals of resolve.

deal, the other government will renege. Credible linkages may arise in the context of international regimes or institutions whose purpose it is to cluster issues and allow for side-payments to occur across issues (Keohane, 1984; Martin, 1993b). Even then, the question remains why governments can credibly commit to international regimes or institutions that implement quid-pro-quo linkages when they cannot commit directly to engage in mutually beneficial exchange. The concept of linkage developed in this paper deals explicitly with the credibility issue in an integrated fashion.

The literature on collective security has as its starting point the Wilsonian ideal of a community of states that live in peace with each other. Their peaceful coexistence is threatened by the possibility that one state might go to war against another. This threat can be contained if there is a common understanding that the members of the community will combine their resources to punish an aggressor. The concept of collective security rejects the notion of alliances:

The world is conceived not as a we-group and a they-group of nations, engaged in competitive power relations, but as an integral we-group in which danger may be posed by “one of us” and must be met by “all the rest of us.” (Claude, 1962: 114)

The mixed, and often quite disappointing, performance of historical systems of collective security such as the League of Nations or the United Nations has shaped the academic critique of the collective security concept (Kupchan and Kupchan, 1991; Betts, 1992; see also Downs, 1994, and references therein). Two criticisms stand out. First, the threat directed at potential aggressors fails to deter aggressive acts when it is not credible. As noted above, this paper explicitly addresses the credibility of such threats. Second, the standard formulation of the collective security ideal neglects the role of domestic politics in shaping the incentives of states to engage in conflictual or cooperative behavior in the international arena (see Wilkenfeld, 1973, and references therein).

The latter critique is addressed by the literature on “two-level” or “nested” games of domestic politics and international relations (Putnam, 1987; Tsebelis, 1990). The models developed in this literature emphasize the role of domestic constraints--specifically, the presence of domestic veto players--on the bargaining power enjoyed by governments in international negotiations. They provide a theoretical underpinning for the observation that states often exploit the presence of domestic constraints--e.g., domestic ratification requirements for international treaties--to enhance their international bargaining power. This literature also “rationalizes”

apparently irrational or stupid behavior of players in a domestic game by making explicit the embeddedness of their actions in an international game that imposes constraints on the domestic game, and vice versa.

My paper complements the literature on two-level or nested games. Instead of developing my argument in the context of a ratification or bargaining game, I invoke the standard repeated Prisoners' Dilemma game. My theory deals with the effect of conflictual or cooperative domestic politics on the strategic interaction between states at the international level, and vice versa. The ultimate goal is to develop conditions under which domestic-international linkage improves domestic and international outcomes.

Domestic and international cooperation may reinforce each other via a punishment linkage: a defection at the domestic level may trigger a breakdown of international cooperation, and vice versa. If the incentives to cooperate differ across levels of play, domestic-international linkage may allow credibility to be "exported" from one level to alleviate the credibility gap at the other level. As a consequence, conflict and cooperation among nations may not be well-understood without reference to the nature of the underlying domestic politics. In principle, domestic-international linkage can increase or decrease the prospects for cooperation, but the players will only choose to link domestic and international issues if doing so enhances the prospects for cooperation.

My analysis focuses on the symmetric, simultaneous-move Prisoners' Dilemma game, but it should be understood that the logic of my argument applies more generally to problems in which credible commitments are beneficial.

For a domestic politics example illustrating the benefits of credible commitment, consider electoral competition between two parties (Hibbs, 1977; Alesina, 1987). A partisan political business cycle arises if parties representing different constituencies and standing for different policy platforms succeed each other in office. Risk-averse parties with a multi-period time horizon are better off if they cooperate by implementing a non-partisan policy compromise when incumbent. If the parties' discount factors are sufficiently high, then trigger strategy punishments can enforce the cooperative outcome, in which case the partisan political business cycle is eliminated.

Another domestic politics example involves a government that is elected by simple majority rule and thus has incentives to cater to the median voter. The majority of the population

earn their income from supplying labor. Investors form a minority; or they are foreigners and as such not politically represented. Once investors have sunk their investments, the government has an ex post incentive to impose confiscatory taxes on the minority, or confiscate the property of foreigners, and redistribute the resulting revenue to the majority. However, if investors fail to invest because they rationally anticipate being expropriated, then from the worker majority suffers a loss, too. The median voter would be better off ex ante if the government committed itself to limit its powers of taxation and respect property rights.

Strategic trade theory offers an international relations example illustrating the benefits of cooperation. States can use trade barriers strategically to improve their terms of trade or gain other advantages at each others' expense (e.g., Conybeare, 1987; see Krugman, 1994, for a survey and critique). According to the "new strategic traders," the game of international trade has the characteristics of a Prisoners' Dilemma. If one country cooperates by opening its markets to another country's imports, then the latter country has an incentive to defect by maintaining its trade barriers; and vice versa. Noncooperative play involves both states following a strategy of trade protection. Both countries would be better off under the cooperative outcome of universal free trade.

Another international relations example deals with two countries that compete to improve their international competitiveness by following an expansionary monetary policy (e.g., Lohmann, 1993). They seek to depreciate the value of their respective currencies, with the goal of furthering the international competitiveness of their domestic producers in foreign markets. Neither country achieves this goal, and both end up with undesired inflation. Monetary or exchange rate cooperation would allow them to avoid this inflationary bias, with no loss in employment or output.

2 The Repeated Prisoners' Dilemma

This section develops a simple Prisoner's Dilemma game. The one-period utility levels U of two players, A and B , are given by

$$U^A = -\frac{1}{2} a^2 + \mu (a - b) , \quad [1]$$

$$U^B = -\frac{1}{2} b^2 + \mu (b - a) , \quad [2]$$

where a and b are the choice variables of players A and B , respectively, and μ is a parameter, $\mu > 0$. (The quadratic term is pre-multiplied by one half to simplify the first-order conditions derived later on.) The two players have an infinite horizon, and their common time discount factor is given by δ . (Time subscripts are omitted to avoid notational clutter.)

Players A and B set a and b simultaneously. The noncooperative choice of these variables is given by

$$a_{nc} = b_{nc} = \mu , \quad [3]$$

where the subscript nc stands for “no cooperation.” In the absence of cooperation, the players’ one-period utilities are given by

$$U^A(a_{nc}, b_{nc}) = U^B(a_{nc}, b_{nc}) = -\frac{1}{2} \mu^2 . \quad [4]$$

Assuming that the two players place equal weights on their respective utility levels in the cooperative maximization problem, the cooperative choice of a and b is given by

$$a_c = b_c = 0 , \quad [5]$$

where the subscript c stands for “cooperation.” In the presence of cooperation, the players’ one-period utilities are given by

$$U^A(a_c, b_c) = U^B(a_c, b_c) = 0 . \quad [6]$$

If the two players agree to cooperate, then each player may nevertheless choose to defect from this agreement and set her choice variable at the noncooperative level (see equation [3]). The player’s temptation to defect is given by the difference between the utility she achieves by

defecting, taking as given that the other player does not defect, and the utility under the cooperative regime:

$$\begin{aligned} T^A(a_c, a_{nc}, b_c) &= U^A(a_{nc}, b_c) - U^A(a_c, b_c) = \\ T^B(a_c, b_c, b_{nc}) &= U^B(a_c, b_{nc}) - U^B(a_c, b_c) = \frac{1}{2} \mu^2. \end{aligned} \quad [7]$$

The model presented so far defines the Prisoners' Dilemma whose one-period payoff matrix is given in Figure 1. The matrix illustrates that the severity of the conflict between the two players is parametrized by μ , with $\mu = 0$ standing for zero conflict, $\mu = \infty$ for “infinitely” strong conflict.

[FIGURE 1 ABOUT HERE]

With repeated play, a defection may be punished by the “grim trigger,” the breakdown of cooperation for the indefinite future. The punishment is the difference between the future benefits of cooperating and future benefits under the regime of noncooperation:

$$\begin{aligned} P^A(a_c, a_{nc}, b_c, b_{nc}) &= \frac{\delta}{1-\delta} [U^A(a_c, b_c) - U^A(a_{nc}, b_{nc})] = \\ P^B(a_c, a_{nc}, b_c, b_{nc}) &= \frac{\delta}{1-\delta} [U^B(a_c, a_c) - U^B(a_{nc}, b_{nc})] = \frac{\delta}{1-\delta} \frac{1}{2} \mu^2. \end{aligned} \quad [8]$$

It immediately follows that the punishment will dominate the temptation to defect and cooperation is sustainable if

$$\begin{aligned} T^A(a_c, a_{nc}, b_c) &\leq P^A(a_c, a_{nc}, b_c, b_{nc}) \Leftrightarrow \\ T^B(a_c, b_c, b_{nc}) &\leq P^B(a_c, a_{nc}, b_c, b_{nc}) \Leftrightarrow \frac{1}{2} \mu^2 \leq \frac{\delta}{1-\delta} \frac{1}{2} \mu^2 \Leftrightarrow \delta \geq \frac{1}{2}, \end{aligned} \quad [9]$$

where the sign \Leftrightarrow stands for “is equivalent to.” This is, of course, the standard result that cooperation is sustainable if the players' discount factor is sufficiently high, that is, if $\delta \in [0.5, 1]$.

For the range of discount factors where full cooperation is unsustainable, $\delta \in [0, 0.5)$, the players may agree to engage in partial cooperation. Suppose they set

$$a_{pc} = b_{pc} = \lambda \mu , \quad [10]$$

where the subscript pc stands for “partial cooperation” and $\lambda \in [0, 1]$ parametrizes the degree of partial cooperation, with $\lambda = 0$ standing for full cooperation and $\lambda = 1$ standing for noncooperation (compare equations [3] and [5]). The one-period utility from partial cooperation is equal to

$$U^A(a_{pc}, b_{pc}) = U^B(a_{pc}, b_{pc}) = -\frac{1}{2} \mu^2 \lambda^2 . \quad [11]$$

The temptation to defect from partial cooperation is equal to

$$\begin{aligned} T^A(a_{pc}, a_{nc}, b_{pc}) &= U^A(a_{nc}, b_{pc}) - U^A(a_{pc}, b_{pc}) = \\ T^B(a_{pc}, b_{pc}, b_{nc}) &= U^B(a_{pc}, b_{nc}) - U^B(a_{pc}, b_{pc}) = \frac{1}{2} \mu^2 (1 - \lambda)^2 . \end{aligned} \quad [12]$$

The punishment is the difference between the future benefits of cooperating partially and the future benefits under the regime of noncooperation

$$\begin{aligned} P^A(a_{pc}, a_{nc}, b_{pc}, b_{nc}) &= \frac{\delta}{1 - \delta} [U^A(a_{pc}, b_{pc}) - U^A(a_{nc}, b_{nc})] = \\ P^B(a_{pc}, a_{nc}, b_{pc}, b_{nc}) &= \frac{\delta}{1 - \delta} [U^B(a_{pc}, b_{pc}) - U^B(a_{nc}, b_{nc})] = \frac{\delta}{1 - \delta} \frac{1}{2} \mu^2 (1 - \lambda^2) . \end{aligned} \quad [13]$$

The maximum degree of cooperation that is sustainable in equilibrium, $\tilde{\lambda}$, drives the players to the point of indifference between cooperating partially, on the one hand, and defecting on the regime of partial cooperation on the other:

$$T^A(a_{pc}, a_{nc}, b_{pc}; \tilde{\lambda}) = P^A(a_{pc}, a_{nc}, b_{pc}, b_{nc}; \tilde{\lambda}) \Leftrightarrow \quad [14]$$

$$T^B(a_{pc}, b_{pc}, b_{nc}; \tilde{\lambda}) = P^B(a_{pc}, a_{nc}, b_{pc}, b_{nc}; \tilde{\lambda}) \Leftrightarrow$$

$$\frac{1}{2} \mu^2 (1 - \tilde{\lambda})^2 = \frac{\delta}{1 - \delta} \frac{1}{2} \mu^2 (1 - \tilde{\lambda}^2) \Leftrightarrow \tilde{\lambda} = 1 - 2 \delta .$$

For the range of discount factors where full cooperation is unsustainable, $\delta \in [0, 0.5)$, the players may cooperate partially. As the discount factor δ varies between zero and one half, the maximum sustainable degree of partial cooperation ranges from $\tilde{\lambda} = 1$ (no cooperation) to $\tilde{\lambda} = 0$ (full cooperation) (see equation [14]).

In the variants of the model considered so far, defection never occurs in equilibrium, and cooperation never breaks down (assuming that cooperation is feasible and the players coordinate their beliefs so as to achieve cooperation). Cooperation is sustained by expectations about trigger strategy punishments executed “out of equilibrium.” In practice, it is plausible that players might make mistakes; they might defect in extreme circumstances; or some “types” of players might defect whereas others cooperate. In this case the concept of partial commitment, which allows for equilibrium defections, is relevant.

For example, suppose whenever a player intends to play cooperatively, she “slips” with probability $\varepsilon \in [0, 1]$ and defects instead of cooperating. The one-period expected utility under the regime of partial commitment is equal to

$$E[U^A(a_c, a_{nc}, b_c, b_{nc}, \varepsilon)] = E[U^B(a_c, a_{nc}, b_c, b_{nc}, \varepsilon)] = -\frac{1}{2} \mu^2 \varepsilon , \quad [15]$$

where E is an expectations parameter. Assuming that there is no slippage when players defect (they don’t cooperate mistakenly), the temptation to defect from the regime of partial commitment is equal to

$$T^A(a_c, a_{nc}, b_c, b_{nc}, \varepsilon) = U^A(a_{nc}, b_c, b_{nc}, \varepsilon) - U^A(a_c, a_{nc}, b_c, b_{nc}, \varepsilon) = \quad [16]$$

$$T^B(a_c, a_{nc}, b_c, b_{nc}, \varepsilon) = U^B(a_c, a_{nc}, b_{nc}, \varepsilon) - U^B(a_c, a_{nc}, b_c, b_{nc}, \varepsilon) = \frac{1}{2} \mu^2 (1 - \varepsilon) .$$

The punishment is the difference between the future benefits expected under the regime of partial commitment and the future benefits under noncooperation:

$$\begin{aligned}
P^A(a_c, a_{nc}, b_c, b_{nc}, \varepsilon) &= \frac{\delta}{1-\delta} [U^A(a_c, a_{nc}, b_c, b_{nc}, \varepsilon) - U^A(a_{nc}, b_{nc})] = \\
P^B(a_c, a_{nc}, b_c, b_{nc}, \varepsilon) &= \frac{\delta}{1-\delta} [U^B(a_c, a_{nc}, b_c, b_{nc}, \varepsilon) - U^B(a_{nc}, b_{nc})] = \\
&\left[-\varepsilon \frac{\delta (1-\varepsilon)^2}{1-\delta (1-\varepsilon)^2} - \frac{\delta [2\varepsilon (1-\varepsilon) + \varepsilon^2]}{1-\delta [2\varepsilon (1-\varepsilon) + \varepsilon^2]} + \frac{\delta}{1-\delta} \right] \frac{1}{2} \mu^2 .
\end{aligned} \tag{17}$$

This expression takes into account that under the regime of partial commitment, cooperation breaks down in each period with probability $2\varepsilon (1-\varepsilon) + \varepsilon^2$ (the probability that exactly one or both players defect) and continues into the next period with probability $(1-\varepsilon)^2$ (the probability that no player defects). The parameter $\varepsilon \in [0, 1]$ parametrizes the degree of partial commitment, with $\varepsilon = 0$ standing for full commitment and $\varepsilon = 1$ standing for zero commitment. For given ε , cooperation is sustainable for the set of discount factors $\delta \in [\tilde{\delta}, 1]$; the lower bound of the sustainable set, $\tilde{\delta}$, drives the players to the point of indifference between cooperating, with the possibility of accidental defections, and deliberately defecting on the regime of partial commitment:

$$\begin{aligned}
T^A(a_c, a_{nc}, b_c, b_{nc}, \varepsilon; \tilde{\delta}) &= P^A(a_c, a_{nc}, b_c, b_{nc}, \varepsilon; \tilde{\delta}) \Leftrightarrow \\
T^B(a_c, a_{nc}, b_c, b_{nc}, \varepsilon; \tilde{\delta}) &= P^B(a_c, a_{nc}, b_c, b_{nc}, \varepsilon; \tilde{\delta}) \Leftrightarrow \\
\frac{1}{2} \mu^2 (1-\varepsilon) &= \left[-\varepsilon \frac{\tilde{\delta} (1-\varepsilon)^2}{1-\tilde{\delta} (1-\varepsilon)^2} - \frac{\tilde{\delta} [2\varepsilon (1-\varepsilon) + \varepsilon^2]}{1-\tilde{\delta} [2\varepsilon (1-\varepsilon) + \varepsilon^2]} + \frac{\tilde{\delta}}{1-\tilde{\delta}} \right] \frac{1}{2} \mu^2 \Leftrightarrow \\
(1-\varepsilon) &= \frac{\tilde{\delta}}{1-\tilde{\delta}} - \varepsilon \frac{\tilde{\delta} (1-\varepsilon)^2}{1-\tilde{\delta} (1-\varepsilon)^2} - \frac{\tilde{\delta} [2\varepsilon (1-\varepsilon) + \varepsilon^2]}{1-\tilde{\delta} [2\varepsilon (1-\varepsilon) + \varepsilon^2]} .
\end{aligned} \tag{18}$$

For $\varepsilon = 0$, cooperation is sustainable for the set of discount factors $\delta \in [0.5, 1]$ (compare equations [9] and [18]). As ε goes from zero to one, the sustainable set, $\delta \in [\tilde{\delta}, 1]$, shrinks as

its lower bound $\tilde{\delta}$ increases from one half to one. (For example, we obtain $\tilde{\delta} \approx 0.52$ for $\varepsilon = 0.1$, $\tilde{\delta} \approx 0.57$ for $\varepsilon = 0.5$, and $\tilde{\delta} \approx 0.74$ for $\varepsilon = 0.9$.)

This variant of the model, which allows for accidental defections, is easily modified to capture other sources of breakdown. For example, we could assume that there are random realizations of the conflict parameter μ --in each period, each player draws the value infinity with probability ε and some strictly positive but finite value with probability $(1 - \varepsilon)$. The realization $\mu = \infty$ could be interpreted as an extreme shock that invites defection or as an extreme type who always defects.

When cooperation can break down in equilibrium, the grim trigger is generally suboptimal. In response, societies may develop punishment norms or institutions that allow for “excused default” or temporary punishments (Lohmann, 1995). Consider the case where players can distinguish between accidental and deliberate defections. They would be better off punishing only the latter kind of defection. Similarly, the players may decide to forgive defections that are due to extreme circumstances or types. On the other hand, if it is impossible to distinguish accidental and deliberate defections, some punishment is necessary to induce partial commitment; the same holds in the presence of imperfect information about shocks or incomplete information about types (Green and Porter, 1984). For example, a defection could trigger a breakdown of cooperation for a number of periods, after which cooperation is resumed. Under partial commitment, the optimal punishment horizon is generally finite, trading off two counteracting effects on the players’ welfare: a longer horizon reduces the temptation to defect, but it also increases the punishment, which is realized with positive probability. Lohmann and Penubarti (1996) and Downs and Rocke (1995) provide further discussion.

3 Issue Linkage

The incentives to cooperate in a repeated Prisoners’ Dilemma may be strengthened if the players interact with each other across different, possibly unrelated issues (Bernheim and Whinston, 1986; McGinnis, 1986; see also Tirole, 1988: 251). Suppose that the players interact over two issue dimensions, indexed $i = 1, 2$, over an infinite time horizon. The players’ one-period utility functions for issue i are given by

$$V^A_i = -\frac{1}{2} a_i^2 + \mu (a_i - b_i) , \quad [19]$$

$$V^B_i = -\frac{1}{2} b_i^2 + \mu (b_i - a_i) . \quad [20]$$

I additionally assume that the players interact more frequently with each other on the first dimension than on the second. More specifically, I assume that they interact over issue 1 in each period and over issue 2 every second period. (The consequences of assuming that the players interact with equal frequency on both dimensions are discussed further below.)

Consider first the case in which the two issues are delinked, that is, the trigger strategies on one issue dimension are independent of the past behavior (cooperation or defection) on the other issue dimension. In this case, cooperation is sustainable on issue 1 if equation [9] holds, that is, if $\delta \in [0.5, 1]$. A straightforward modification of the formal argument developed in the previous section shows that cooperation is sustainable on issue 2 if

$$\frac{1}{2} \mu^2 \leq \frac{\delta^2}{1-\delta^2} \frac{1}{2} \mu^2 \Leftrightarrow 1 \leq \frac{\delta^2}{1-\delta^2} \Leftrightarrow \delta \geq \sqrt{\frac{1}{2}} \approx 0.71 . \quad [21]$$

Thus, cooperation on issue 2 is sustainable for a smaller range of discount factors, $\delta \in [0.71, 1]$, than on issue 1, $\delta \in [0.5, 1]$. This result arises because the players interact less often over issue 2; as a consequence, the punishment of a breakdown of cooperation in the future is weaker for issue 2.

Next, I examine the case in which the issues are linked; that is, the trigger strategies on one issue dimension depend on the play of the game (cooperation or defection) on the other issue dimension. More specifically, if a player defects on one or two dimensions, she triggers a breakdown of cooperation on both dimensions. Given that the punishment is independent of the number of dimensions a defector cheats on, a player who chooses to defect maximizes the gains from defection by cheating on both issue dimensions. Adapting the formal argument developed in the previous section, it is straightforward to show that cooperation is sustainable under issue linkage if

$$\frac{1}{2} \mu^2 + \frac{1}{2} \mu^2 \leq \frac{\delta}{1-\delta} \frac{1}{2} \mu^2 + \frac{\delta^2}{1-\delta^2} \frac{1}{2} \mu^2 \Leftrightarrow$$

$$2 \leq \frac{\delta}{1-\delta} + \frac{\delta^2}{1-\delta^2} \Leftrightarrow \delta \geq 0.59 ,$$
[22]

where the sign \Leftrightarrow stands for “is approximately equivalent to.” That is, cooperation is now sustainable for an intermediate set of discount factors, $\delta \in [0.59, 1]$. It is useful to compare equations [9] and [21], which contain the separate constraints governing the incentives for cooperation if the two issues are delinked, and equation [22], which contains the joint incentive constraint under issue linkage. In effect, linkage “pools” the incentive constraints across issues; the credibility surplus on one issue dimension works to reduce the credibility deficit on the other issue dimension.

[FIGURE 2 ABOUT HERE]

Figure 2 shows how the time discount factor interacts with issue linkage in determining whether the players cooperate. In the first region, $\delta \in [0, 0.5)$, the two players do not cooperate because their discount factor is too low. In the second region, $\delta \in [0.5, 0.59)$, their discount factor is sufficiently high to sustain cooperation on issue 1 but not on issue 2. That is, cooperation is sustainable on issue 1--but only if the two issues are delinked. In the third region, $\delta \in [0.59, 0.71)$, cooperation on both issues can be sustained--but only under issue linkage. In the last region, $\delta \in [0.71, 1]$, cooperation is sustainable on both issues independently of whether there is issue linkage, since the players care so strongly about the future.

Clearly, there are multiple belief-driven equilibria in this setting, some of which are associated with higher payoffs for both players. That is, if both players believe that the issues are linked, their beliefs will be self-fulfilling in equilibrium; the same holds for the belief that the issues are delinked. Depending on the discount factor δ , the Pareto-preferred equilibrium may involve issue linkage or delinkage, or linkage may not matter. (Recall that the players have identical payoffs ex ante so that distributional considerations are irrelevant for equilibrium selection.)

Issue linkage obviously makes no difference for the two regions $\delta \in [0, 0.5)$ and $\delta \in [0.71, 1]$. In the region $\delta \in [0.5, 0.59)$, cooperation is not sustainable on either dimension under issue linkage, whereas it is sustainable on issue 1 if the issues are delinked. Here, linkage is counterproductive: pooling the incentive constraints for cooperation reduces the credibility surplus on the first dimension to the point where cooperation over issue 1 becomes unsustainable; on the other hand, the credibility spillover does not reduce the credibility deficit on the second dimension to the point where cooperation over issue 2 becomes possible. To the extent that the players can coordinate their beliefs, they would choose to delink the issues. Finally, in the region $\delta \in [0.59, 0.71)$ cooperation on both issues is sustainable under issue linkage, but only on issue 1 if the issues are delinked. Here, the credibility spillover allows the players to maintain cooperation on dimension 1, while making cooperation possible on the dimension 2. Thus, the players would choose to link the issues. In summary, issue linkage can in principle increase or decrease the prospects for cooperation. Arguably, the players will only choose to link issues if doing so enhances the prospects for cooperation.

The contribution of issue linkage or delinkage toward cooperation also depends on the asymmetric frequency of interactions across issues. If the players interact with equal frequency on both issue dimensions, then the range of discount factors for which cooperation is possible on either issue is given by $\delta \in [0.5, 1]$ independently of whether the issues are linked or delinked. Even then, other differences could animate the linkage story. For example, the formal model is consistent with the assumption that the players interact over both issues in each period, but the discount factors governing their interactions over issue 1 and 2 are given by δ and δ^2 , respectively (compare equations [9], [21], and [22]). Similarly, in the presence of asymmetric payoffs across issue dimensions, issue linkage may allow for cooperation in cases where cooperation is unsustainable if each issue is dealt with separately (McGinnis, 1986). Such payoff asymmetries could be parametrized by issue-specific values of the conflict parameter μ .

The model is easily generalized to more than two issue dimensions. This can be done very simply by assuming issue-specific discount factors instead of issue-specific frequencies of interaction. Consider n Prisoners' Dilemma games played over n issues, indexed $i = 1, 2, \dots, n$, where the discount factor for issue i is given by δ_i . If the issues are delinked, then the players will cooperate over issue i if

$$\frac{1}{2} \mu^2 \leq \frac{\delta_i}{1-\delta_i} \frac{1}{2} \mu^2 \iff 1 \leq \frac{\delta_i}{1-\delta_i} \iff \delta_i \geq \frac{1}{2} . \quad [23]$$

If k out of n issues are linked, then the players will cooperate over those issues if

$$k \frac{1}{2} \mu^2 \leq \sum_{i=1}^n \frac{\delta_i}{1-\delta_i} \frac{1}{2} \mu^2 \iff k \leq \sum_{i=1}^n \frac{\delta_i}{1-\delta_i} , \quad [24]$$

where the issue dimensions are numbered such that issues $i = 1, \dots, k$ are subject to issue linkage. For the remaining issues, equation [23] continues to serve as the incentives constraint for cooperation. In general, players will choose to link some issues and delink others, depending on the distribution of the discount factors across issues, so as maximize their gains from cooperation. The maximization problem that defines the optimal set of issue linkages becomes quite intricate once we add further complications such as issue-specific frequencies of interaction, conflict parameters, and degrees of partial cooperation and of partial commitment. The resulting pattern of issue linkages and delinkages may be very complex.

The possibility of partial cooperation or partial commitment influences whether linkage is beneficial or counterproductive. Linkage is preferred over delinkage if the players can engage in partial cooperation. They are better off using the credibility surplus on one dimension to establish some degree of partial cooperation on the other dimension, rather than “wasting” the surplus. On the other hand, under partial commitment, there is a downside to linkage: a defection on one dimension, which occurs with positive probability, “infects” other dimensions. Depending on the correlation of mistakes, shocks, or types across issue dimensions, delinkage may be preferred because it prevents the contagious spread of defections.

4 Player Linkage

Cooperation can also be sustained as an equilibrium through decentralized third-party enforcement (Axelrod, 1984; Bendor and Mookherjee, 1990; Milgrom, North, and Weingast, 1990; Kandori, 1992).

Consider a society of four members, who meet each other on a one-by-one basis over an infinite time horizon. That is, in the first period, individual number one is paired off with individual number two, and number three with number four. In the second period, individual number one is paired off with individual number three, and number two with number four. In the third period, individual number one is paired off with individual number four, and number two with number three. This sequence of pairings is repeated indefinitely. The one-period utility functions of any two players who are paired off in any given period are provided in equations [1] and [2], and a and b are the choice variables of those two players. In other words, each individual plays the Prisoners' Dilemma game over and over again, but her partner changes over time. The players have the same discount factor δ .

Consider first the case in which a defector only gets punished by the individuals she cheats on, whereas she can continue to cooperate with other individuals. It immediately follows from my earlier analysis that cooperation is sustainable if

$$\frac{1}{2} \mu^2 \leq \frac{\delta^3}{1-\delta^3} \frac{1}{2} \mu^2 \Leftrightarrow 1 \leq \frac{\delta^3}{1-\delta^3} \Leftrightarrow \delta \geq \sqrt[3]{\frac{1}{2}} \approx 0.79, \quad [25]$$

that is, for the set of discount factors $\delta \in [0.79, 1]$.

Let us assume initially that cheating is commonly observed. (This assumption will be relaxed further below.) Now consider the case in which a defector is stigmatized--no other individual ever cooperates with her again, although they may continue to cooperate with each other. (Since defections do not occur in equilibrium, it makes no difference whether we assume that defectors are stigmatized selectively or that one defection leads to a breakdown of trust in the entire society so that no individual ever cooperates again.) Given these trigger strategies, the incentive constraints for cooperation are the same as in the game where two individuals are paired off in each period. Cooperation is then sustainable if equation [9] holds. That is, because of third-party enforcement, cooperation may emerge for the set of discount factors, $\delta \in [0.5, 1]$. This set is larger than the sustainable set under player delinkage, $\delta \in [0.79, 1]$.

Punishments are costly not only to the players they are imposed on but also for the players who execute them: the players who punish an offender by reverting to the noncooperative equilibrium would prefer to cooperate. But the following set of self-fulfilling beliefs ensures that

they will follow through with the punishment. All players are forced to punish the defector, otherwise they in turn are punished; if their punishers fail to follow through with the punishment, then they in turn are punished, and so on ad infinitum.

[FIGURE 3 ABOUT HERE]

Figure 3 shows how the time discount factor interacts with player linkage in determining whether the players cooperate. In the first region, $\delta \in [0, 0.5)$, the players do not cooperate because their discount factor is too low. In the second region, $\delta \in [0.5, 0.79)$, their discount factor is sufficiently high to sustain cooperation only if punishments are linked across players. In the last region, $\delta \in [0.79, 1]$, cooperation is sustainable independently of player linkage since the players care so strongly about the future. As before, there exist multiple equilibria, but the equilibrium described here is Pareto-preferred.

The players' preferences for player linkage follow immediately. Linkage obviously makes no difference for the two regions $\delta \in [0, 0.5)$ and $\delta \in [0.79, 1]$. In the region $\delta \in [0.5, 0.79)$, cooperation is sustainable only under player linkage. Thus, the players prefer to link their punishment strategies across players in order to achieve cooperation. Player linkage unambiguously improves the prospects for cooperation (at worst, it makes no difference).

An extension of this model to the case of n players is straightforward. If the players' punishment strategies are delinked, cooperation is sustainable only if

$$\frac{1}{2} \mu^2 \leq \frac{\delta^{(n-1)}}{1 - \delta^{(n-1)}} \frac{1}{2} \mu^2 \iff 1 \leq \frac{\delta^{(n-1)}}{1 - \delta^{(n-1)}} \iff \delta \geq \sqrt[n-1]{\frac{1}{2}} . \quad [26]$$

Since the number $\sqrt[n-1]{\frac{1}{2}}$ increases with n , it immediately follows that the range of discount factors for which cooperation is sustainable under player delinkage, $\delta \in [\sqrt[n-1]{\frac{1}{2}}, 1]$, shrinks with n . In the limit, for infinite n , individuals who are paired off once meet each other again in an infinite number of periods--in effect, never again. The repeated Prisoners' Dilemma then collapses to the one-shot game, in which case cooperation cannot be sustained as an equilibrium independently of

the discount factor. On the other hand, if the players link their punishment strategies, cooperation is sustainable for a large set of discount factors, $\delta \in [0.5, 1]$, independently of the number of players. Perhaps surprisingly, under player linkage cooperation is even sustainable when the likelihood that two players get paired off more than once is zero.

So far we have examined the case where player linkage in effect amounts to increasing the frequency of interaction between pairs of players. Alternatively, player linkage might affect the players' payoffs. For example, Pahre (1994) examines the question under what conditions states would choose to solve a public goods problem in a multilateral framework, as opposed to a bilateral one, and how the number of states affects this calculation. In his model, multilateral agreements may be sustainable when bilateral agreements are not. This is the case if the gains from cooperation increase with the number of countries involved. Cooperation is sustained by a grim trigger: if any one country defects, then all countries revert to the noncooperative equilibrium. It follows that as the number of countries increases, cooperation becomes sustainable for a larger set of discount factors.

My analysis is based on the assumption that people are fully informed; specifically, if one player cheats on another player, then third parties who are not directly involved can observe cheating and punish the offender. This assumption is often reasonable for settings with a small number of players. For example, in many cases the international community of states can observe predatory behavior exhibited by any one state, and they can punish the offender by imposing a variety of sanctions.

If the number of players is large, however, it is plausible that player linkage will be beset by informational problems. In the extreme, for infinite n , it is unreasonable to assume that each player can observe whether cheating occurred in all the games he or she is not directly involved in. However, player linkage may further cooperation even if the individuals' monitoring capabilities are severely limited. Consider a group of individuals, even in number, who are randomly paired off in each period, with each pair playing a Prisoners' Dilemma game. Each player observes only the play of the game she is directly involved in; that is, she knows whether her partner defects, but she does not know whether any other player defected. Now suppose the individuals adopt the following trigger strategies. Any player who has experienced defection, either as a defector or as a "sucker," henceforth cheats in all interactions. Thus, one defection triggers a cascade of further defections. Because one defection spreads through the population, the individuals' incentives to defect are muted: a defector is punished not only by the loss of

future cooperation with her immediate partner but also with other future partners. In an insightful article, Kandori (1992) analyzes such a cascade equilibrium.

Alternatively, monitoring problems may give rise to institutions that provide information about cheating, thereby improving the potential of player linkage to further cooperation or even making player linkage possible in the first place. When defections are not publicly observed, an institution that publicizes defections would allow society to shift from the cascade equilibrium to the equilibrium where the members of society selectively stigmatize defectors in all future interactions (or where a defection leads to a total breakdown of trust in the entire community). As a result, cooperation would be sustainable for a large range of discount factors. An exemplary piece of work in this vein is Milgrom, North, and Weingast (1990).

The analysis above suggests that players are always (weakly) better off with player linkage. Once we introduce the possibility of partial commitment, then player linkage has a downside. To illustrate the risks of linkage, consider n individuals who get randomly paired off in each period, with each pair of individuals playing a Prisoners' Dilemma game. Each individual observes everybody else's play of the game. Suppose that in each interaction an individual who intends to cooperate makes a mistake with probability $\varepsilon > 0$ and defects instead. Under player delinkage, cooperation between any given pair of individuals continues in the future only if none of the two individuals defects, which occurs with probability $(1 - \varepsilon)^2$. Under player linkage, one or more defections lead to an erosion of trust in the entire community, and cooperation continues only if no individual defects, which occurs with probability $(1 - \varepsilon)^n$. For small ε and large n , cooperation continues almost surely under player delinkage [$(1 - \varepsilon)^2$ is close to one] and breaks down almost surely under player linkage [$(1 - \varepsilon)^n$ is close to zero]. This group of individuals then faces a tradeoff: on the one hand, player linkage has the potential to further cooperation because a defection is punished by a breakdown of cooperation in the entire community rather than between pairs of individuals; on the other hand, player linkage may undermine cooperation by increasing the likelihood of "accidental" breakdown. (Of course, if the players can distinguish accidental and deliberate defections, their best bet is to "excuse" mistakes.)

The maximization problem that defines the optimal set of player linkages becomes quite intricate once we add complications such as player-specific frequencies of interaction, discount factors, conflict parameters, and degrees of partial cooperation and of partial commitment. The

resulting pattern of player linkages may be very complex. Bendor and Mookherjee (1987) provide an excellent analysis along these lines.

5 Domestic-International Linkage

I now synthesize the linkage games developed earlier to examine the interaction of conflict and cooperation within and across states (see also Lohmann, 1993). The model consists of two states and four players. Each state has a government (or a setter of foreign policy), and the two governments play a Prisoners' Dilemma game with each other. Within each state the government interacts with a domestic constituency (e.g., the public, an interest group, an opposition party, or some other part of government), and these two players also play a Prisoners' Dilemma game with each other. The domestic constituencies in the two states do not interact directly with each other. The one-period payoff matrices of the domestic and international Prisoners' Dilemma games are given in Figure 4.

[FIGURE 4 ABOUT HERE]

The model of domestic-international linkage combines elements of the issue and player linkage models analyzed earlier. Similar to the issue linkage model, each government is involved in two Prisoners' Dilemma games, one dealing with domestic issues, the other with international issues, and under domestic-international linkage the play of these two games is interdependent. Similar to the player linkage model, the domestic constituencies in the two states influence the play of all three Prisoners' Dilemma games--the domestic game in each of the two states and the international game between the two states--even though each constituency plays an "active" role only in one game.

Let us label the two states Home and Foreign. The Home government is indexed by A ; its domestic choice variable is \underline{a} , its international choice variable \bar{a} . The domestic constituency of the Home government is indexed by B ; the constituency's sole choice variable is b . Following standard practice in the international economics literature, the indices and variables for the Foreign country are identical, except that they are supplemented by a star (*). The one-period utility functions of the four players can be written as

$$W^A = -\frac{1}{2} \underline{a}^2 + \mu (\underline{a} - b) - \frac{1}{2} \bar{a}^2 + \mu (\bar{a} - \bar{a}^*) , \quad [27]$$

$$W^B = -\frac{1}{2} b^2 + \mu (b - \underline{a}) - \frac{1}{2} \bar{a}^2 + \mu (\bar{a} - \bar{a}^*) , \quad [28]$$

$$W^{A*} = -\frac{1}{2} \underline{a}^{*2} + \mu (\underline{a}^* - b^*) - \frac{1}{2} \bar{a}^{*2} + \mu (\bar{a}^* - \bar{a}) , \quad [29]$$

$$W^{B*} = -\frac{1}{2} b^{*2} + \mu (b^* - \underline{a}^*) - \frac{1}{2} \bar{a}^{*2} + \mu (\bar{a}^* - \bar{a}) . \quad [30]$$

In each of these expressions the first two terms capture the domestic Prisoners' Dilemma between the government and its domestic constituency, the last two terms the international Prisoners' Dilemma between the two governments. All four players have a common discount factor, δ .

I assume that the domestic players interact with each other more frequently than do the two states. (The opposite case is empirically less plausible, but analytically symmetric.) More specifically, each government and its domestic constituency interact in each period, the two governments every two periods.

The noncooperative choice of the variables \underline{a} , \bar{a} , b , \underline{a}^* , \bar{a}^* , and b^* is given by

$$\underline{a}_{nc} = \bar{a}_{nc} = b_{nc} = \underline{a}^*_{nc} = \bar{a}^*_{nc} = b^*_{nc} = \mu . \quad [31]$$

In the absence of cooperation, the players' one-period utilities are given by

$$\begin{aligned} W^A(\underline{a}_{nc}, \bar{a}_{nc}, b_{nc}, \bar{a}^*_{nc}) &= W^A(\underline{a}_{nc}, b_{nc}, .) + W^A(\bar{a}_{nc}, \bar{a}^*_{nc}, .) = \\ W^B(\underline{a}_{nc}, \bar{a}_{nc}, b_{nc}, \bar{a}^*_{nc}) &= W^B(\underline{a}_{nc}, b_{nc}, .) + W^B(\bar{a}_{nc}, \bar{a}^*_{nc}, .) = \\ W^{A*}(\underline{a}^*_{nc}, \bar{a}^*_{nc}, b^*_{nc}, \bar{a}_{nc}) &= W^{A*}(\underline{a}^*_{nc}, b^*_{nc}, .) + W^{A*}(\bar{a}^*_{nc}, \bar{a}_{nc}, .) = \\ W^{B*}(\underline{a}^*_{nc}, \bar{a}^*_{nc}, b^*_{nc}, \bar{a}_{nc}) &= W^{B*}(\underline{a}^*_{nc}, b^*_{nc}, .) + W^{B*}(\bar{a}^*_{nc}, \bar{a}_{nc}, .) = \\ \frac{1}{2} \mu^2 + \frac{1}{2} \mu^2 &= \mu^2 , \end{aligned} \quad [32]$$

where the period in the bracketed expressions stands for “all else equal.”

The cooperative choice of the variables \underline{a} , \bar{a} , b , \underline{a}^* , \bar{a}^* , and b^* is given by

$$\underline{a}_c = \bar{a}_c = b_c = \underline{a}_c^* = \bar{a}_c^* = b_c^* = 0 . \quad [33]$$

In the presence of cooperation, the players' one-period utilities are given by

$$\begin{aligned} W^A(\underline{a}_c, \bar{a}_c, b_c, \bar{a}_c^*) &= W^A(\underline{a}_c, b_c, .) + W^A(\bar{a}_c, \bar{a}_c^*, .) = \\ W^B(\underline{a}_c, \bar{a}_c, b_c, \bar{a}_c^*) &= W^B(\underline{a}_c, b_c, .) + W^B(\bar{a}_c, \bar{a}_c^*, .) = \\ W^A * (\underline{a}_c^*, \bar{a}_c^*, b_c^*, \bar{a}_c) &= W^A * (\underline{a}_c^*, b_c^*, .) + W^A * (\bar{a}_c^*, \bar{a}_c, .) = \\ W^B * (\underline{a}_c^*, \bar{a}_c^*, b_c^*, \bar{a}_c) &= W^B * (\underline{a}_c^*, b_c^*, .) + W^B * (\bar{a}_c^*, \bar{a}_c, .) = 0 . \end{aligned} \quad [34]$$

Consider first the situation in which domestic and international issues are delinked. That is, if defections occur and trigger strategy punishments are executed at one level, the play of the game(s) at the other level remains unaffected.

The governments' and their constituencies' temptations to defect at the domestic level and the governments' incentives to defect at the international level are given by

$$\begin{aligned} T^A(\underline{a}_c, \underline{a}_{nc}, b_c, .) &= W^A(\underline{a}_{nc}, b_c, .) - W^A(\underline{a}_c, b_c, .) = \\ T^B(\underline{a}_c, b_c, b_{nc}, .) &= W^B(\underline{a}_c, b_{nc}, .) - W^B(\underline{a}_c, b_c, .) = \\ T^A * (\underline{a}_c^*, \underline{a}_{nc}^*, b_c^*, .) &= W^A * (\underline{a}_{nc}^*, b_c^*, .) - W^A * (\underline{a}_c^*, b_c^*, .) = \\ T^B * (\underline{a}_c^*, b_c^*, b_{nc}^*, .) &= W^B * (\underline{a}_c^*, b_{nc}^*, .) - W^B * (\underline{a}_c^*, b_c^*, .) = \\ T^A(\bar{a}_c, \bar{a}_{nc}, \bar{a}_c^*, .) &= W^A(\bar{a}_{nc}, \bar{a}_c^*, .) - W^A(\bar{a}_c, \bar{a}_c^*, .) = \\ T^A * (\bar{a}_c^*, \bar{a}_{nc}^*, \bar{a}_c, .) &= W^A * (\bar{a}_{nc}^*, \bar{a}_c, .) - W^A * (\bar{a}_c^*, \bar{a}_c, .) = \frac{1}{2} \mu^2 . \end{aligned} \quad [35]$$

A defection in the domestic game in Home or Foreign is punished by a breakdown of cooperation at the domestic level in Home or Foreign, a defection in the international game by a breakdown of cooperation at the international level:

$$P^A(\underline{a}_c, \underline{a}_{nc}, b_c, b_{nc}, .) = \frac{\delta}{1 - \delta} [W^A(\underline{a}_c, b_c, .) - W^A(\underline{a}_{nc}, b_{nc}, .)] = \quad [36]$$

$$\begin{aligned}
P^B(\underline{a}_c, \underline{a}_{nc}, b_c, b_{nc}, .) &= \frac{\delta}{1-\delta} [W^B(\underline{a}_c, b_c, .) - W^B(\underline{a}_{nc}, b_{nc}, .)] = \\
P^A * (\underline{a}_c^*, \underline{a}_{nc}^*, b_c^*, b_{nc}^*, .) &= \frac{\delta}{1-\delta} [W^A * (\underline{a}_c^*, b_c^*, .) - W^A * (\underline{a}_{nc}^*, b_{nc}^*, .)] = \\
P^B * (\underline{a}_c^*, \underline{a}_{nc}^*, b_c^*, b_{nc}^*, .) &= \frac{\delta}{1-\delta} [W^B * (\underline{a}_c^*, b_c^*, .) - W^B * (\underline{a}_{nc}^*, b_{nc}^*, .)] = \\
&\frac{\delta}{1-\delta} \frac{1}{2} \mu^2, \\
P^A(\bar{a}_c, \bar{a}_{nc}, \bar{a}_c^*, \bar{a}_{nc}^*, .) &= \frac{\delta^2}{1-\delta^2} [W^A(\bar{a}_c, \bar{a}_c^*, .) - W^A(\bar{a}_{nc}, \bar{a}_{nc}^*, .)] = \quad [37] \\
P^A * (\bar{a}_c^*, \bar{a}_{nc}^*, \bar{a}_c, \bar{a}_{nc}, .) &= \frac{\delta^2}{1-\delta^2} [W^A * (\bar{a}_c^*, \bar{a}_c, .) - W^A * (\bar{a}_{nc}^*, \bar{a}_{nc}, .)] = \\
&\frac{\delta^2}{1-\delta^2} \frac{1}{2} \mu^2.
\end{aligned}$$

Domestic cooperation is sustainable if

$$\begin{aligned}
T^A(\underline{a}_c, \underline{a}_{nc}, b_c, .) &\leq P^A(\underline{a}_c, \underline{a}_{nc}, b_c, b_{nc}, .) \Leftrightarrow \quad [38] \\
T^B(\underline{a}_c, b_c, b_{nc}, .) &\leq P^B(\underline{a}_c, \underline{a}_{nc}, b_c, b_{nc}, .) \Leftrightarrow \\
T^A * (\underline{a}_c^*, \underline{a}_{nc}^*, b_c^*, .) &\leq P^B * (\underline{a}_c^*, \underline{a}_{nc}^*, b_c^*, b_{nc}^*, .) \Leftrightarrow \\
T^B * (\underline{a}_c^*, b_c^*, b_{nc}^*, .) &\leq P^B * (\underline{a}_c^*, \underline{a}_{nc}^*, b_c^*, b_{nc}^*, .) \Leftrightarrow \\
\frac{1}{2} \mu^2 &\leq \frac{\delta}{1-\delta} \frac{1}{2} \mu^2 \Leftrightarrow \delta \geq \frac{1}{2},
\end{aligned}$$

that is, for the set of discount factors $\delta \in [0.5, 1]$. International cooperation is sustainable if

$$\begin{aligned}
T^A(\bar{a}_c, \bar{a}_{nc}, \bar{a}_c^*, .) &\leq P^A(\bar{a}_c, \bar{a}_{nc}, \bar{a}_c^*, \bar{a}_{nc}^*, .) \Leftrightarrow \quad [39] \\
T^A * (\bar{a}_c^*, \bar{a}_{nc}^*, \bar{a}_c, .) &\leq P^A * (\bar{a}_c^*, \bar{a}_{nc}^*, \bar{a}_c, \bar{a}_{nc}, .) \Leftrightarrow \\
\frac{1}{2} \mu^2 &\leq \frac{\delta^2}{1-\delta^2} \frac{1}{2} \mu^2 \Leftrightarrow \delta \geq 0.71,
\end{aligned}$$

that is, for the set of discount factors $\delta \in [0.71, 1]$. This set is smaller than the sustainable set for the domestic level, $\delta \in [0.5, 1]$, because the players interact less frequently at the international level.

Next, we examine the case where the play of the games at the domestic and international levels are linked. Each government can defect in the domestic or international game, and every second period, it can defect in both. To analyze the sustainability of cooperation, I can restrict attention to the periods in which the governments have the strongest temptation to defect, namely when the gains from defection can be realized on both levels. The punishment-cooperation breaks down at both the domestical and international levels--is independent of whether a government defects on one or both levels. It follows that a defecting government maximizes the gains from defection by cheating on both levels simultaneously. The governments' maximum temptations to defect are then given by

$$\begin{aligned}
T^A(\underline{a}_c, \underline{a}_{nc}, \bar{a}_c, \bar{a}_{nc}, b_c, \bar{a}^*_c) &= W^A(\underline{a}_{nc}, \bar{a}_{nc}, b_c, \bar{a}^*_c) - W^A(\underline{a}_c, \bar{a}_c, b_c, \bar{a}^*_c) = \quad [40] \\
T^A * (\underline{a}^*_c, \underline{a}^*_{nc}, \bar{a}^*_c, \bar{a}^*_{nc}, b^*_c, \bar{a}_c) &= W^A * (\underline{a}^*_{nc}, \bar{a}^*_{nc}, b^*_c, \bar{a}_c) - W^A * (\underline{a}^*_c, \bar{a}^*_c, b^*_c, \bar{a}_c) = \\
&\quad \frac{1}{2} \mu^2 + \frac{1}{2} \mu^2 = \mu^2,
\end{aligned}$$

The domestic constituencies can defect in the domestic game only. Their temptations to defect are given in equation [35]. The governments and their domestic constituencies suffer the same punishments in the event of a defection:

$$\begin{aligned}
P^A(\underline{a}_c, \underline{a}_{nc}, \bar{a}_c, \bar{a}_{nc}, b_c, b_{nc}, \bar{a}^*_c, \bar{a}^*_{nc}) &= \quad [41] \\
&\quad \frac{\delta}{1 - \delta} [W^A(\underline{a}_c, b_c, \cdot) - W^A(\underline{a}_{nc}, b_{nc}, \cdot)] + \\
&\quad \frac{\delta^2}{1 - \delta^2} [W^A(\bar{a}_c, \bar{a}^*_c, \cdot) - W^A(\bar{a}_{nc}, \bar{a}^*_{nc}, \cdot)] = \\
P^B(\underline{a}_c, \underline{a}_{nc}, \bar{a}_c, \bar{a}_{nc}, b_c, b_{nc}, \bar{a}^*_c, \bar{a}^*_{nc}) &= \\
&\quad \frac{\delta}{1 - \delta} [W^B(\underline{a}_c, b_c, \cdot) - W^B(\underline{a}_{nc}, b_{nc}, \cdot)] + \\
&\quad \frac{\delta^2}{1 - \delta^2} [W^B(\bar{a}_c, \bar{a}^*_c, \cdot) - W^B(\bar{a}_{nc}, \bar{a}^*_{nc}, \cdot)] =
\end{aligned}$$

$$\begin{aligned}
P^A * (\underline{a}_c^*, \underline{a}_{nc}^*, \bar{a}_c^*, \bar{a}_{nc}^*, b_c^*, b_{nc}^*, \bar{a}_{nc}, \bar{a}_c) = \\
\frac{\delta}{1-\delta} [W^A * (\underline{a}_c^*, b_c^*, .) - W^A (\underline{a}_{nc}^*, b_{nc}^*, .)] + \\
\frac{\delta^2}{1-\delta^2} [W^A * (\bar{a}_c^*, \bar{a}_c, .) - W^A * (\bar{a}_{nc}^*, \bar{a}_{nc}, .)] = \\
P^B * (\underline{a}_c^*, \underline{a}_{nc}^*, \bar{a}_c^*, \bar{a}_{nc}^*, b_c^*, b_{nc}^*, \bar{a}_{nc}, \bar{a}_c) = \\
\frac{\delta}{1-\delta} [W^A * (\underline{a}_c^*, b_c^*, .) - W^A (\underline{a}_{nc}^*, b_{nc}^*, .)] + \\
\frac{\delta^2}{1-\delta^2} [W^A * (\bar{a}_c^*, \bar{a}_c, .) - W^A * (\bar{a}_{nc}^*, \bar{a}_{nc}, .)] = \\
\frac{\delta}{1-\delta} \frac{1}{2} \mu^2 + \frac{\delta^2}{1-\delta^2} \frac{1}{2} \mu^2 .
\end{aligned}$$

The governments can achieve twice the gains from defecting, while being subjected to the same punishment as their domestic constituencies (see equations [35] and [40]). To analyze the sustainability of cooperation, I can restrict attention to the incentive constraints of the players with the strongest incentives to defect, that is, the governments. Given the players' common discount factors, if the governments have incentives to cooperate, then their domestic constituencies will share these incentives. Cooperation is then sustainable under domestic-international linkage if the two governments' incentive constraints are satisfied,

$$\begin{aligned}
T^A(\underline{a}_c, \underline{a}_{nc}, \bar{a}_c, \bar{a}_{nc}, b_c, \bar{a}_c^*) &\leq P^A(\underline{a}_c, \underline{a}_{nc}, \bar{a}_c, \bar{a}_{nc}, b_c, b_{nc}, \bar{a}_c^*, \bar{a}_{nc}^*) \Leftrightarrow [42] \\
T^A * (\underline{a}_c^*, \underline{a}_{nc}^*, \bar{a}_c^*, \bar{a}_{nc}^*, b_c^*, \bar{a}_c) &\leq P^A * (\underline{a}_c^*, \underline{a}_{nc}^*, \bar{a}_c^*, \bar{a}_{nc}^*, b_c^*, b_{nc}^*, \bar{a}_{nc}, \bar{a}_c) \Leftrightarrow \\
\frac{1}{2} \mu^2 + \frac{1}{2} \mu^2 &\leq \frac{\delta}{1-\delta} \frac{1}{2} \mu^2 + \frac{\delta^2}{1-\delta^2} \frac{1}{2} \mu^2 \Leftrightarrow 2 \leq \frac{\delta}{1-\delta} + \frac{\delta^2}{1-\delta^2} \Leftrightarrow \delta \geq 0.59 ,
\end{aligned}$$

that is, for the set of discount factors $\delta \in [0.59, 1]$. This set is smaller than the sustainable set for the domestic game under domestic-international delinkage, $\delta \in [0.5, 1]$, but it is larger than the corresponding set for the international game, $\delta \in [0.71, 1]$.

[FIGURE 5 ABOUT HERE]

Figure 5 shows how the time discount factor interacts with domestic-international linkage in determining whether the players cooperate. In the first region, $\delta \in [0, 0.5)$, there is no cooperation at any level because the discount factor is too low. In the second region, $\delta \in [0.5, 0.59)$, the discount factor is sufficiently high at the domestic level to ensure domestic cooperation--but only if the domestic and international levels are delinked. In the third region, $\delta \in [0.59, 0.71)$, cooperation is sustainable at both the domestic and the international levels--but only under domestic-international linkage. In the last region, $\delta \in [0.71, 1]$, cooperation is sustainable on both issues independently of linkage, since the players care so strongly about the future.

The players' preferences for domestic-international linkage or delinkage follow immediately. Linkage obviously makes no difference for the two regions $\delta \in [0, 0.59)$ and $\delta \in [0.71, 1]$. In the region $\delta \in [0.5, 0.59)$, cooperation is not sustainable on either level under domestic-international linkage, whereas it is sustainable at the domestic level if the punishment strategies for the two levels are delinked. Thus, the players would choose to delink the issues. In the region $\delta \in [0.59, 0.71)$ cooperation is sustainable at both levels under domestic-international linkage, but only at the domestic level if the issues are delinked. Thus, the players would choose to link the levels. In summary, domestic-international linkage can in principle increase or decrease the prospects for cooperation. But to the extent that the players can coordinate their beliefs, they will choose to link the games played at the domestic and international levels only if doing so enhances the prospects for cooperation.

The potential of domestic-international linkage to further cooperation depends on the asymmetric frequency of interactions across the two levels, domestic and international. Suppose that the domestic game is played in every period, whereas the international game is played every k periods. If the domestic and international games are delinked, domestic cooperation is sustainable for $\delta \in [0.5, 1]$, as implied by equation [9]. International cooperation is sustainable under domestic-international delinkage if

$$\frac{1}{2} \mu^2 \leq \frac{\delta^k}{1 - \delta^k} \frac{1}{2} \mu^2 \iff \delta \geq \sqrt[k]{\frac{1}{2}} . \quad [43]$$

Under domestic-international linkage, cooperation is sustainable at both levels if

$$\frac{1}{2} \mu^2 + \frac{1}{2} \mu^2 \leq \frac{\delta}{1-\delta} \frac{1}{2} \mu^2 + \frac{\delta^2}{1-\delta^2} \frac{1}{2} \mu^2 \Leftrightarrow 1 \leq \frac{\delta}{1-\delta} + \frac{\delta^k}{1-\delta^k}, \quad [44]$$

The parameter k reflects the asymmetry between the domestic and international games. A state characterized by a low k interacts frequently at the international level; conversely, a high k stands for infrequent international interactions. In practice, the parameter k might capture the degree to which an economy is open to international trade and capital movements or the extent to which a country plays an active political role in the international community.

In the special case of $k = 1$, the set of discount factors for which cooperation is sustainable at each level is given by $\delta \in [0.5, 1]$, independently of linkage. Since the commitment to cooperate is equally credible at both the domestic and international levels, there is no potential for a spillover of credibility from one level to the other. In the other extreme, $k = \infty$, states cooperate internationally for a smaller set of discount factors, $\delta \in [0.67, 1]$, and international cooperation necessarily involves domestic-international linkage.

Domestic-international linkage or delinkage could also be driven by different discount factors across the two levels, domestic and international. Equations [9], [43], and [44] describe the incentive constraints for cooperation in a game where the domestic and international Prisoners' Dilemmas are played in each period, and the domestic game is subject to the discount factor δ , the international game to the discount factor δ^k . Further complications could be added by increasing the number of issue dimensions and allowing for different conflict parameters and different degrees of partial cooperation and of partial commitment across issues, countries, and levels of play.

6 Domestic Audience Costs

Under domestic-international linkage, a government that fails to respect its international commitments is punished (in part) by losing the trust of its domestic constituency. As the model currently stands, there is no conflict of interest between the government and its constituency with

regard to foreign policy: they share the same payoffs. If the government defected on its international commitments, it would presumably do so because it thereby maximizes its payoffs; as a by-product, the government would also maximize the payoffs of its constituency. Even though defections do not occur in equilibrium, the players' cooperative behavior is driven by their beliefs that the domestic constituency would punish its government for "doing good." There is some question whether such beliefs are plausible.²

On a related note, the international relations literature occasionally invokes a domestic "audience cost" to explain why governments can credibly commit themselves in foreign policy (Fearon, 1994; Martin, 1993a). Solving the problem of credible commitment by assuming that international violations are punished in the arena of domestic politics appears to simply shift the problem: where does the credibility of the threat that the government will incur a domestic audience cost come from?

One possibility is to interpret the audience cost model as the "reduced form" of a more complex principal-agent model. In such a larger model, a breakdown of international cooperation might reveal something negative about the government's type, or the government's efforts on behalf of its domestic constituency, and the domestic audience might respond to this negative information in a way that also serves to punish the government. For example, if a democratically elected government fails on its commitments in the international arena, the electorate might infer that the government lacks competence in matters of foreign policy or that the government's foreign policy goals are inconsistent with the median voter's. Another example concerns the United States Trade Representative (USTR) whose office is responsible for international trade negotiations. If a trade war breaks out, perhaps because the office of the USTR is inadequate to its task, the president might decide to replace the USTR, or Congress might engage in aggressive oversight activities--and these actions might be costly to the USTR.

Another possibility is that the players' beliefs are mutually self-reinforcing. If there are multiple audiences whose equilibrium prescription it is to impose audience costs, one audience might create incentives for another audience to follow through with its trigger strategy punishments, and vice versa. For example, if a government fails on its commitments in the international arena, the domestic electorate might (rationally) believe that the government will be a

² As noted earlier, the model can be extended to allow for partial commitment, in which case defections may occur in equilibrium. This extension raises the related question why it is plausible to assume that the domestic constituency would punish the government for doing good.

less effective foreign policy player in the future. Because voters anticipate that they would be better off with a new government that is partially forgiven (by the international community of states) for the sins of its predecessor, the defector government becomes electorally vulnerable. On the other hand, the international community might (rationally) believe that the defector government is electorally vulnerable, and as a consequence the government does in fact lose some of its effectiveness as a foreign policy player. The beliefs of the two audiences, the domestic electorate and the international community of states, reinforce each other.

7 Institutions and Credible Commitment

My model of domestic-international linkage assumes a setting with decentralized play. Cooperation is not enforced by a centralized authority. It emerges because it is beneficial, as long as two conditions are fulfilled: the players must believe that defections trigger a breakdown of cooperation in the future; and the shadow of the future, as reflected in the time discount factor and the frequency of play, must be sufficiently strong. Linkage may further cooperation by “creating” beliefs that defections in one game will trigger a breakdown of cooperation in other games.

This theory does not provide an explicit role for institutions. In practice, however, cooperation within and between states often takes on institutionalized form. For example, European monetary cooperation is institutionalized with the European Monetary System; the League of Nations and the United Nations were devised as part of decentralized systems of collective security; and the integration of Italy, Mexico, and Japan into the community of states is shaped by international institutions and agreements such as the European Community, the North-American Free Trade Agreement, and the General Agreement on Tariffs and Trade.

Neoliberal institutionalism argues that institutions play an important role in making cooperation across (and by implication within) states more likely (Keohane, 1984). In the setting considered here, institutions may coordinate the players’ common conjectures about trigger strategy punishments, thereby selecting a Pareto-preferred equilibrium out of a multiplicity of possible equilibria (Lohmann, 1995). This function of institutions is all the more important because linkage is a fragile thing--it is established and maintained only by the players’ beliefs that cooperative behavior in one setting influences the prospects for cooperation in other, possibly functionally unrelated, settings.

In the presence of imperfect or incomplete information, institutions may improve the monitoring ability of the “audience” whose equilibrium prescription it is to punish defections (Lohmann, 1995). In games involving third-party enforcement, it obviously makes a difference whether the third-party can observe defections. When defections are partially or fully hidden from the relevant audience, institutions that provide information affect the play of the game and its payoffs.

It is often argued that institutions make cooperation possible because they allow governments to make credible commitments in the first place (Portnoy, 1995). However, even though institutions may enhance the prospects for cooperation for the reasons mentioned above, they are not generally necessary or sufficient for credible commitment (Bendor and Lohmann, 1993; Lohmann, forthcoming). In an infinite-horizon repeated game setting, cooperation can generally be sustained via non-institutionalized trigger strategy punishments like the ones considered here.

An institutional solution to a political commitment problem must also be supported by a trigger strategy equilibrium. Suppose a government commits itself to respect the constraints implied by an institutional arrangement. In any one period, it has an incentive to defect and ignore the constraints implied by the institution. Other players might punish such defection by disbelieving the government’s institutional promises in the future. That is, the government loses the future benefits of institutionalized cooperation. The credibility of the government’s institutional commitment is then a function of its discount factor, which determines the relative importance of the one-shot temptation to defect and the discounted future punishment.

In short, credible commitment is possible only if cheating is punished effectively. This proposition holds independently of whether the commitment in question takes on institutionalized form, in which case cheating amounts to institutional breakdown. For this reason, the theory of linkage politics developed here applies to institutionalized forms of cooperation even if the role of institutions is not made explicit.

8 Empirical Implications

To illustrate the explanatory power of my theory of linkage politics, I provide some empirical examples. I also sketch some testable implications in the hopes that further evidence will be forthcoming.

In recent decades, the member states of the European Community (EC) have made considerable progress on various dimensions of European integration. Interestingly, attempts at monetary integration have had a checkered history compared to, say, the fairly linear progress made in matters of trade integration (Frieden, 1994b). The European Snake of the 1970's attracted only a handful of countries, and occasionally some of them withdrew from this nearly-fixed exchange rate regime, only to rejoin the system some time later. The European Monetary System (EMS) of the 1980's and the early 1990's was more stable. Occasional devaluations became increasingly rare over time, and, with the exception of a period of instability in 1992/93 (in the aftermath of German unification), exits were unheard of and the membership of the EMS increased steadily over time. The member states of the EMS are now preparing for the European Monetary Union (EMU) that would fix exchange rates close-to-irrevocably. Clearly, the degree of commitment to monetary integration has risen over time.

It is interesting to note that in earlier decades monetary integration was not linked to other dimensions of European integration; for example, Great Britain has been a member of the EC since 1973, but until 1990 it successfully resisted joining the EMS. Nowadays, progress on various dimensions of European integration, including exchange rate matters, is linked in the minds of the relevant actors (Garrett, 1993; Frieden, 1994a).

My model of issue linkage provides an explanation. Initially, the member states of the EC interacted with each other infrequently. Over time, European integration on dimensions other than monetary policy increased the frequency of interaction. Correspondingly, the theory implies that as the frequency of interaction between players increases, cooperation is initially possible only on one dimension, or on a few dimensions, but it subsequently becomes sustainable for a higher number of dimensions because of issue linkage.

Frieden (1994a) analyzes the domestic politics of French and Italian policy that allowed for a gradual hardening of the commitment toward monetary integration as a result of the linkage between exchange rate policy and other EC policies. The logic of his argument differs from

mine. Frieden argues that linkage led actors who would otherwise have been indifferent towards exchange rate developments or even hostile toward the EMS to support monetary integration. His analysis is consistent with the quid-pro-quo notion of linkage developed by Tollison and Willett (1979) and Sebenius (1983). Their idea of issue linkage requires that states have different national valuations of policies, which makes possible the mutually beneficial exchange of concessions on different policy dimensions. My analysis complements the traditional approach, suggesting that linkage politics can create credibility gains even when countries are identical. This implication is consistent with the observation that the European states who have been most reliable in cooperating with each other, whether as members of the EC, the European Snake, or the EMS, have very similar economic characteristics.

On the “social dimension” of European integration, progress has been slow (Lange, 1993). For the longest time, EC interventionism on social issues was close-to-nonexistent. The member states of the EC retained the right to set social policy and regulate labor markets as they saw fit. The EC summit of December 1989 then passed the Community Charter of Basic Social Rights for Workers (with Great Britain dissenting), as well as an Action Program that would implement the principles laid out in the Charter. The regulation of worker health and safety and the removal of some kinds of market barriers was made subject to a qualified majority in the Council of Ministers, but all other directives listed in the Action Program required unanimous approval. Together with British obstructionism, the unanimity requirement prohibited major moves away from the status quo.

With the Maastricht Treaty of December 1991, the member states of the EC agreed upon a Social Protocol that would alter the decision rules applying to social issues. The agreement, which partly excludes Great Britain, requires a qualified vote for some issues (e.g., worker health and safety, working conditions, equal labor market treatment of men and women). It makes other issues subject to an unanimous vote (e.g., social security/social protection of workers, protection of workers after termination, representation/codetermination). Yet another set of issues is excluded from the agreement (wages, right of association, right to strike/lockout). Directives that were previously blocked by the unanimity requirement are now likely to pass. But the overall expectation is that

the social policies of the EC [will continue] to be fragmented, partial, and piecemeal, responding more to complex configurations of special interests than to any broad principle developed by stable political and social coalitions. (Lange, 1992: 229)

My theory could be applied to shed light on the changing patterns of issue and player linkages and delinkages over time.

European policymakers and scholars of European politics are currently discussing alternative paths toward European integration, labelled “multi-speed Europe,” “Europe à la carte,” or “European variable geometry” (see Dewatripont et al., 1995, for a survey). These proposals involve increased cooperation between the member states of the EC on a subset of issue dimensions, or increased cooperation between a subset of countries, to the exclusion of others. The theory of linkage politics developed here could be tested by examining how the proposed linkage patterns are related to the frequencies of interaction across issues and players, as measured (for example) by the degree of trade and financial integration.

This article also contributes to a debate among scholars of international relations on the relationship between domestic and foreign conflict behavior (see Wilkenfeld, 1973, and references therein). Rummel and Tanter (1971) argue on empirical grounds that this relationship is weak to nonexistent. On the other hand, Rosecrance (1963) provides evidence suggesting that

there tends to be a correlation between international instability and the domestic insecurity of elites. This correlation does not hold in all instances. War may occur in the absence of internal instability; internal friction may occur in the absence of war. In many of the chaotic international patterns of modern times, however, the two factors were associated. (Rosecrance, 1963: 304-305)

Numerous scholars have attempted to provide more conclusive evidence by qualifying the conditions under which conflictual behavior at the domestic and international level might be correlated. For example, Wilkenfeld (1973) examines whether political characteristics (“type of nation”) affects the relationship between domestic and foreign conflict behavior, with generally positive results. A related literature examines the empirical regularities linking democracies and nondemocracies, on the one hand, and war on the other (see Bueno de Mesquita, 1992, and references therein).

The frequency of interactions and the time discount factor play a central role in my model. In many empirical applications, the frequency of interactions is readily observed or measured, but the same is not true of the time discount factor. One testable variant of the model might reinterpret the government’s discount factor as a composite of the “true” time discount factor

(unobservable and assumed constant over time), on the one hand, and the probability that the government remains in power on the other. In a democracy this probability would depend on the government's re-election prospects. The composite discount factor would decrease over the electoral cycle, taking on its lowest value just before the next election. As a result, electoral cycles of international cooperation and conflict would emerge (see also Gaubatz, 1991). This model also suggests that democracies with stable governments (high re-election probabilities) behave more cooperatively than would instable democracies (low re-election probabilities).

With the economic and political development of a country, the wealth and well-being of its citizens depend in increasingly complex ways on their interaction with the government, as well as the interaction of interest groups, political parties, and various government actors. Thus, it is reasonable to assume that Prisoners' Dilemmas (or other problems of credible commitment) arise more frequently as a country develops economically. In other words, we can think of the frequency of interaction as increasing with the stage of development, which might be measured (for example) by gross national product per capita.

The comparative statics of my model then predict that underdeveloped countries tend to have conflictual domestic and international relations. Highly developed countries tend to enjoy cooperative domestic and international relations. Countries at intermediate stages of development can bootstrap their way into the highly developed group via domestic-international linkage.

Similarly, the frequency by which a country interacts with others at the international level is correlated with the size of its economy. All else equal, small countries gain more from international trade and are more likely to have open economies; while large countries can afford to remain relatively closed. The comparative statics of my model imply that open economies will tend to cooperate at the international level; but because of the frequency of their international interactions, they are less likely to rely on domestic-international linkages to ensure the sustainability of international cooperation. In contrast, closed economies are less likely to cooperate at the international level, but if they do cooperate, they tend to rely on domestic-international linkages.

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FIGURE 1

Payoff Matrix for Prisoners' Dilemma

		Player B	
		COOPERATE	DEFECT
Player A	COOPERATE	$0, 0$	$-\mu^2, \frac{1}{2}\mu^2$
	DEFECT	$\frac{1}{2}\mu^2, -\mu^2$	$-\frac{1}{2}\mu^2, -\frac{1}{2}\mu^2$

FIGURE 2

Issue Linkage

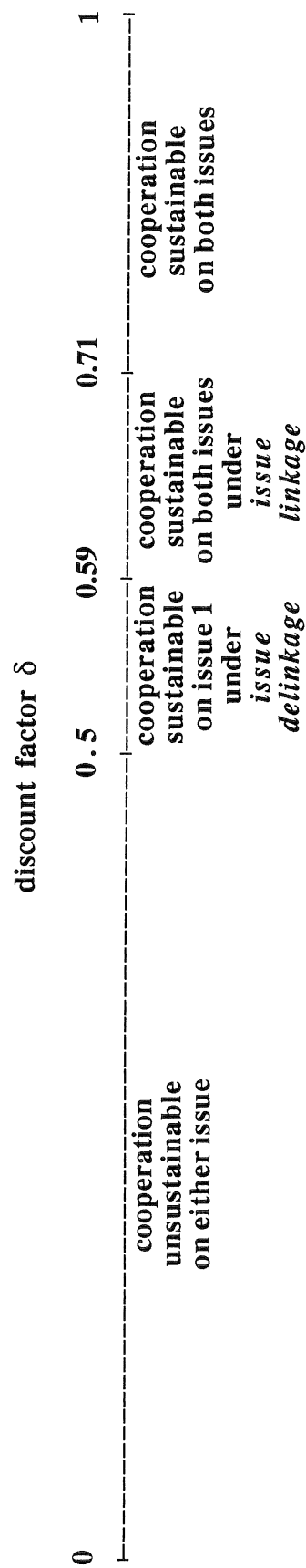


FIGURE 3

Player Linkage

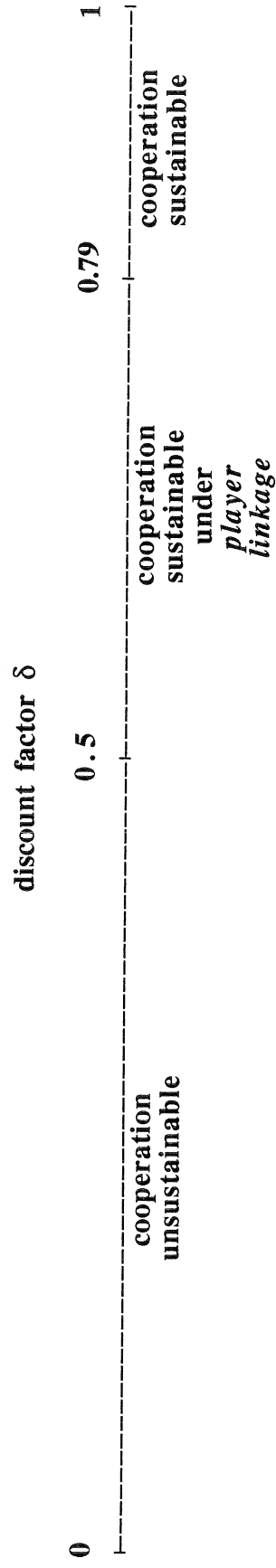


FIGURE 4

Payoff Matrices for Domestic-International Prisoners' Dilemma

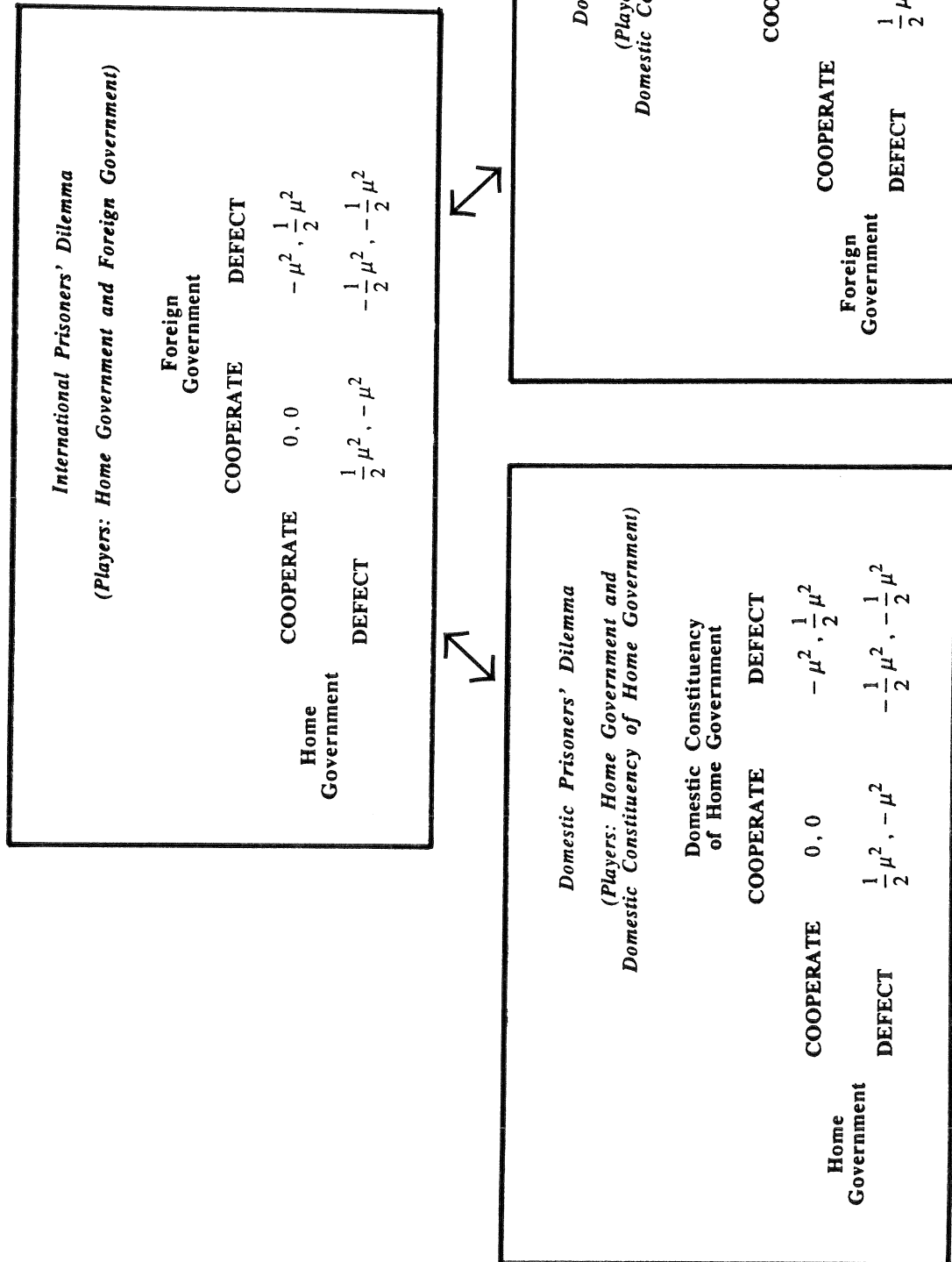


FIGURE 5
Domestic-International Linkage

