The Impact of Leadership Turnover and Domestic Institutions on International Cooperation

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In the context of a noisy, continuous-choice prisoner's dilemma, the authors examine how leadership turnover and domestic institutions affect the depth and reliability of cooperative agreement that can be enforced between states through the use of leader-specific punishment strategies. If foreign nations target punishments against leaders observed to cheat on cooperative arrangements (i.e., they refuse any future cooperation as long as the responsible incumbent remains in office), then citizens remove leaders caught cheating, providing the cost of doing so is less than the value of the cooperation foregone. For leaders who are easily replaced, being caught cheating cost them their job. Since cheating jeopardizes their tenure, such leaders can credibly commit to deeper and more reliable cooperation. The authors derive hypotheses about the patterns of cooperation and leadership turnover predicted under different institutional arrangements.

Keywords: *International cooperation; leadership survival; cooperation; prisoner's dilemma*

The prisoner's dilemma is a commonly used metaphor for international cooperation: mutual cooperation benefits both parties, yet each side has a dominant strategy to cheat on the agreement (Axelrod 1984; Axelrod and Keohane 1986; Bendor 1987; Downs and Rocke 1990; Gourevitch 1996; Milner 1992; Pahre 1994). In such a setting, cooperation is maintained by conditioning future cooperation on past behavior. In particular, nations threaten to end future cooperation in response to cheating. Provided nations value the long-run benefits of cooperation more than the short-term returns from exploiting the other side's cooperative behavior, then cooperation can be maintained (Axelrod 1984; Axelrod and Keohane 1986).

While this intuition is powerful, which explains the popularity of these ideas in the literature (Baldwin 1993; Goldstein 1991; Gowa 1986; Keohane 1984, 1986; Keohane and Nye 1977; Krasner 1983; Milgrom, North, and Weingast 1990; Milner 1992; Oye 1986; Ruggie 1993), cooperation within the prisoner's dilemma fails to account for many of the real-world features of international cooperation. First, cooperation is

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rarely the black-and-white decision of cooperate or defect. Rather, nations typically choose a degree of cooperation. We might term this the depth of cooperation (Downs, Rocke, and Barsoom 1996; Gilligan 2004).

Second, the world is a noisy place that is open to interpretation. Unfortunately, this allows for the possibility that actions are misinterpreted, with nation A perceiving nation B to have cheated on the agreement when in fact nation B had acted in accordance with the agreement or vice versa.

Third, and we think most important, cooperation in the prisoner's dilemma is a possibility result. While it states that cooperation is possible if nations are sufficiently patient (the precise level of patience given by the parameters of the game), it provides few comparative statics as to how factors affect the depth and quality of cooperation. For instance, it does little to explain why some nations enact cooperative agreements while others do not. Scholars have observed that regime type influences cooperation, with democracy generally engendering greater cooperation (see, e.g., Bliss and Russett 1998; Busch and Reinhardt 1993; Gaubatz 1996; Gowa 1994; Leeds 1999; Mansfield, Milner, and Rosendorff 2000; Mansfield and Pollins 2001; Martin 1993; McGillivray 1997, 1998; Milner 1997; Milner and Rosendorff 1997; Morrow, Siverson, and Taberes 1998; Oneal and Russett 1997, 1999a, 1999b, 2000, 2001; Oneal, Russett, and Berbaum 2003; Polachek 1997; Pollins 1989; Remmer 1998; Reuveny and Kang 1996, 1998; Reuveny 2000, 2001; Russett and Oneal 1999, 2001; Verdier 1998). The standard infinitely repeated prisoner's dilemma story offers no account for these institutional differences.

We address these three issues using a model of cooperation in which nations choose a level of output, P, in a noisy environment. Within this context, we examine the depth of possible agreement and how this level of cooperation can be influenced by domestic political arrangements.

We embed our study within the extant literature by studying the continuous-choice prisoner's dilemma (PD) proposed George Downs and David Rocke (1995). In this game, each of two nations (A and B) choose a level of protection, P_A and P_B, respectively, which result in PD-like payoffs. Absent any cooperation, both nations choose protection levels of 100. Both sides gain from cooperation in the sense that if they both reduce protection, they are both better off. However, the payoffs are PD like in that each side gains by reneging on this reduced level of protection, obtaining a temptation payoff for itself and a sucker's payoff for the other nation (Lambertini 1997; Molander 1985).

Consistent with Downs and Rocke's (1995) original interpretation, we often refer to P as a level of protection, yet the setting is quite general. For instance, P might be a level of pollution, production levels within a cartel (such as Organization of Petroleum Exporting Countries [OPEC]), or a level of extraction from a common-pool resource.

We add noise to the system by assuming imperfect observation of players' choices (Bendor 1987, 1993; Bendor, Kramer, and Stout 1991; Molander 1985; Signorino 1996; Wu and Axelrod 1995). Although the choices are P_A and P_B, players observe the actions Q_A and Q_B, which include some noise. Consistent with other approaches (Downs and Rocke 1990; Green and Porter 1984; Porter 1983), to examine the possibility of cooperation, Downs and Rocke (1995) assume that nations play some cooperative level $\tilde{P}$, unless one of the player's observed action is above some threshold, H. Should this latter contingency arise, then they proceed to play the noncooperative Nash strategy for T periods before restoring cooperation.

Given the PD structure of the game, each nation myopically wants to increase its level of production above the cooperative level $\tilde{P}$. However, such an increase in their level of protection increases the chance of being observed in breach of the agreement. Remember their observed action is the combination of their actual action and some stochastic error. The cooperative level $\tilde{P}$ represents a compromise between increasing short-term gains and jeopardizing future cooperation.

Through such a mechanism, limited cooperation can be maintained. As in the simple PD story, players trade off the long-run gains from cooperation against the short-term gains from cheating on the agreement. Although this mechanism captures the fact that nations' choices are typically a matter of degree in a noisy environment (rather than a perfectly observed cooperative and defect choice), it still fails to explain why some nations cooperate and others do not. Within the context of the Downs and Rocke (1995) model, we propose a mechanism in which regime type strongly influences the depth of possible cooperation between states and the patterns of cooperation between states.

Before describing the game and mechanism formally, we pause to outline the basic argument. Our proposed mechanism relaxes the unitary actor assumption to induce cooperation through leader-specific punishment strategies. In these strategies, punishments are targeted against the individual leader of a state rather than the state per se. Should the recalcitrant leader lose office and be replaced by a new leader, then the punishments end.

In the standard PD story, cooperation is maintained through the threat of the loss of future cooperation if a nation is caught cheating. If nation A cheats, then nation B refuses to cooperate with it in future periods. Rather than treating A and B as unitary actors, suppose nation A is led by leader α and nation B is led by leader β. Rather than refusing to cooperate with nation A for leader α's decision to renege on an agreement, suppose nation B refuses to cooperate with leader α. This is to say, B targets punishment at the actual leader responsible for cheating rather than at the nation it represents. By using the leader-specific punishment of refusing to cooperate with α but being willing to cooperate with any successor, B provides α with a powerful commitment to cooperate (McGillivray and Smith 2000, 2004; Guisinger and Smith 2002; Smith 2000).

Suppose leader α is observed to have cheated (i.e., his or her observed action, Q_A, is above the threshold H). Such a contingency under the leader-specific punishment strategy means that cooperation ceases for T rounds. Hence, if α remains in power, the citizens in A give up the opportunity of T periods of cooperation. Yet since B will cooperate with α's successor, A can avoid the loss of T periods of cooperation by replacing α. Providing the cost of replacing α is less than the value of T periods of cooperation, then being caught cheating costs α his or her job.

Leaders are primarily concerned with keeping their jobs. When leader removal is relatively easy, α's survival in office is dependent on not being observed to cheat. As such, leaders who are easily removed reduce the chance that Q_A is greater than the threshold for punishment (H) by reducing P_A. Of course, if the cost of leader removal is greater than the value of lost cooperation, then leaders caught cheating are not replaced. Since the tenure of such hard-to-remove leaders is not in jeopardy, these leaders have less incentive to avoid being caught cheating. They are less able to commit to cooperate.

Since regime type affects the ease of leader replacement, it also affects the depth of cooperation to which leaders can commit. Dyads of democratic nations, in which leader replacement is relatively easy, can commit to greater levels of cooperation than can dyads involving a nation with relatively high costs for leader replacement. Furthermore, for any given threshold, H, specified in an agreement, the probability that cheating is observed (i.e., $Q > H$) is lower when leaders are easily removed. When a leader's tenure is in jeopardy, she or he tries, where possible, to mitigate the risk—in this case, by lowering P.

Our arguments suggest important differences in the dynamic patterns of cooperation. When leader removal is easy, then cooperation should be deep and cooperation failure rare. In the unlikely event that cooperation does falter, we anticipate the rapid replacement of the responsible leader and the associated rapid normalization of cooperative arrangements. In contrast, when leader removal is harder, cooperation is less deep, and cooperation failures are more common. The inability of the citizens to easily replace leaders means that following an incidence of cheating, noncooperation persists until either the specified punishment period is completed or until (for exogenous reasons) the leader is replaced. Under the leader-specific mechanism, prolonged periods of punishment following cheating are only likely when leader replacement is difficult. Under these circumstances, leadership turnover reinvigorates cooperation.

The arguments developed demonstrate how institutions shape relations between states. The logic of the theory derived here relies solely on institutional differences between states. The theory assumes that all the actors have the same identical preferences with respect to policy outcomes. That is to say, all the actors in nation A—leaders, political rivals, and citizens—receive the same payoff for policy outcomes. All the actors in nation B also have identical preferences over policy outcomes, and A and B's payoffs are symmetric. Institutional differences account for interstate behavior rather than differences in the motives of actors.

Dai's (2002) critique of Mansfield, Milner, and Rosendorff's (2000) model of trade protection argues that many existing theories of how institutions shape the relations between states are premised on how institutions induce different national preferences. Dai argues that the differences in the ability of states to cooperate are ascribed to different state motives under different institutional settings. While we do not disagree that different actors could have different preferences over policy outcomes, our argument is not dependent on such assumptions. Under the leader-specific theory proposed, differences in interstate behavior arise despite actors having no motivational differences. While institutionally induced preferences might reinforce such effects, our conclusions are not beholden to these considerations.

Audience cost theories have also been proposed to account for the higher level of cooperation between democratic states (e.g., Leeds 1999). According to such theories, leaders pay domestic political costs for breaking their commitments, and democratic leaders, due to their electoral accountability, pay higher costs than autocrats (Bueno de Mesquita and Lalman 1992; Fearon 1994; Schultz 1998, 1999, 2001, 2002; Smith 1998). Unfortunately, these arguments typically assert the existence of audience costs without a theoretical explanation for their origin. Thus, while the variance in audience costs across institutions might explain the differences in relations between states, these cost differences are asserted rather than derived as a feature of political institutions. Leader-specific theory provides an endogenous explanation for the origins of audience costs that arise from institutional differences between states. The key institutional difference considered is the ease of leader removal, and it is solely this cost difference that accounts for the differences in relations between states. The metric by which we characterize political institutions, the cost of leader removal, is not a standard comparison in comparative politics. Therefore, we pause before presenting our model to discuss how the ease of leader removal maps into more conventional differences between states.

Nations are not unitary actors. Although there is massive variation in polities, all political systems share the feature that some leader, or group of leaders, is chosen by the residents of a state to make choices on behalf of the polity as a whole. Domestic political institutions determine how easy it is for the principals (the citizens) to replace their agent (the leader).

Although there is a long legacy of examining the survival of democratic leaders (see, e.g., Bienen and van de Walle 1992; Browne, Frendreis, and Gleiber 1986; Diermeier and Stevenson 1999; Grofman and van Roozendaal 1994; Warwick 1995), outside of democratic systems, the determinants of leader survival have been less well explored (Bueno de Mesquita and Siverson 1995; Goemans 2000; Chiozza and Goemans 2004). Perhaps the most comprehensive comparative study is Bueno de Mesquita et al.'s (2003) *The Logic of Political Survival* (see also Bueno de Mesquita et al. 1999, 2002), in which they show that the smaller the number of supporters a leader needs to stay in power (the winning coalition) and the larger the pool from which these supporters can be drawn (the selectorate), the easier it is for leaders to survive. Democratic leaders (large winning coalition) find it hard to survive as their supporters face few opportunity costs from defecting to a rival. In contrast, in autocratic systems, where leaders rely on smaller groups of backers, survival is much easier.

The model in this article is parameterized in terms of the cost of leader removal. The literature on comparative leader survival allows these costs to be mapped back into real-world political institutions.

THE MODEL

We modify Downs and Rocke's (1995) continuous-choice prisoner's dilemma to explore the role of domestic politics in shaping international cooperation. Not all cases of international cooperation involve PD-like incentives. Many, for instance, involve problems of coordination (Morrow 1994). However, the prisoner's dilemma represents a common and pernicious problem. It is particularly difficult to solve because, despite the opportunities for mutual gain, each party has a myopically dominant incentive to cheat on any agreement. Downs and Rocke axiomize the properties of the PD game in the continuous-choice setting. Using a Taylor series approximation around the noncooperative Nash equilibrium, they state the shape of utility functions that satisfy these properties (Downs and Rocke 1995, 101-4). They also state a specific utility function to construct their examples. Although our arguments readily generalize to a broad range of utility functions, throughout we focus on their specific example. In particular, nations A and B pick levels of production P_A and P_B ($P_i \in 1R^+$) and receive payoffs of

$$U_A(P_{A,}\ P_B) = -(P_B - 100) - (P_A - 100)^2 + 0.9(P_A - 100)(P_B - 100) + 0.1(P_B - 100)^2$$

and

$$U_B(P_{A,}\ P_B) = -(P_A - 100) - (P_B - 100)^2 + 0.9(P_A - 100)(P_B - 100) + 0.1(P_A - 100)^2$$

in each round. The game is infinitely repeated, and payoffs are discounted according to a common discount factor δ. Table 1 illustrates the properties of the utility functions for some selected values of protection levels P_A and P_B.

In single-shot play, the unique subgame perfect equilibrium is $P_A^* = 100$ and $P_B^* = 100$, which results in payoffs of $U_A(P_A^*, P_B^*) = 0$ and $U_B(P_A^*, P_B^*) = 0$. As Table 1 shows, both nations gain from a mutual reduction in protection. Yet, as cooperation deepens and P is lowered, each side gains enormously from defecting. In general, for any given level of P_B, A's best response is $BR_A(P_B) = 55 + 0.45P_B$. Hence, at maximum cooperation (0,0), A's optimal defection is to set $P_A = 55$, which produces payoffs of 3125 and –5702.5. As cooperation deepens, the temptation to cheat and the cost of being exploited become huge.

We now integrate noise into the system. Rather than observing P precisely, we assume nations observe $Q_i = P_i + \varepsilon_i$, where $i = A, B$, and ε_i is a stochastic error with distribution $F(x) = \Pr(\varepsilon < x)$ and associated density $F'(x)$. In particular, in each round, we assume that ε_A and ε_B are independently normally distributed with mean zero and variance σ^2.

This describes the setup of Downs and Rocke (1995). We now add our principal-agent conceptualization of domestic politics using the following game form.

THE DOMESTIC VERSION OF THE CONTINUOUS-CHOICE PRISONER'S DILEMMA

The game is infinitely repeated, with the following stage game:

1. α and β, the leaders of nations A and B, respectively, play the continuous-choice prisoner's dilemma. In particular, they pick a level of protection P_A and P_B, respectively. The actual production decisions P_A and P_B remain private information for α and β. However, their observed actions Q_A and Q_B become publicly observable to all players.
2. At cost k_A and k_B, respectively, the citizens of A and B can replace their respective leaders. These choices are made independently.
3. All players receive payoffs. In addition to the payoff from the continuous-choice PD, leaders receive a payoff of ψ if they retain office.

TABLE 1
Payoff from Various Levels of Cooperation in the Continuous-Choice Prisoner's Dilemma

	Nation B's Protection Level P_B		
	100	*50*	*0*
Nation A's protection level P_A			
100	0, 0	300, –2,500	1,100, –10,000
50	–2,500, 300	50, 50	3,100, –5,200
0	–10,000, 1,100	–5,200, 3,100	100, 100

ENFORCING COOPERATION THROUGH THE THREAT OF WITHDRAWING FUTURE COOPERATION

Before describing the leader-specific punishment strategy, it is useful to discuss some preliminaries. There are two phases in the equilibrium: the cooperative phase and the punishment phase. Players start in the cooperative phase and continue until someone appears to cheat. By appearing to cheat, we mean that their observed level of production Q_i is above the threshold H_j. At this point, the player is no longer in good standing, and the opposing side enters the punishment phase, where for T periods the players play the noncooperative Nash equilibrium. The threshold level H plays a key role in the derivation of the equilibrium as it controls movement between cooperative and punishment phases of the game. For our purposes, it does not matter whether the threshold is set explicitly or implicitly. What matters is that in equilibrium, each side knows what constitutes acceptable versus unacceptable behavior. Similarly, both nations know the length of punishment T.

It is convenient to introduce the notation S_A^t to indicate the standing of nation A's leader at the end of period t. At the start of the game or following the replacement of A's leader, nation A is in "good standing," $S_A^t = 0$.

The evolution of A's standing is as follows:

$$\begin{cases} 0 & \text{if} \quad \text{leader } \alpha \text{ is replaced in period } t \\ 0 & \text{if} \quad S_A^{t-1} = 0, \textit{and } Q_A \leq H_B \\ 0 & \text{if} \quad S_A^{t-1} = 0 \textit{ and } S_B^{t-1} > 0 \\ T & \text{if} \quad \alpha \textit{ retained}, S_A^{t-1} = 0, S_B^{t-1} = 0 \textit{ and } Q_A > H_B \\ S_A^{t-1} - 1 & \text{if} \quad \alpha \textit{ retained}, S_A^{t-1} > 0 \end{cases}$$

In words, this means that A maintains a good standing ($S_A^t = 0$) if its leader is replaced, if A is observed to have cooperated $Q_A \leq H_B$, or if B is in poor standing ($S_B^t > 0$). If both leaders are in good standing and α is observed to cheat ($Q_A > H_B$), then for the next T periods, A is in poor standing, $S_A^t > 0$.

As is common in infinity repeated games, although the statement of the equilibrium is complex, the path of play is straightforward. Therefore, we briefly describe the key features of the path of play for each of two scenarios: high and low cost of replacing leaders.

When the cost of replacing leaders is high, the citizens do not replace leaders in poor standing since the benefits of immediately restoring cooperation are too small to justify the cost of changing the leader. This case reduces to the unitary actor scenario, and the only incentive to maintain cooperation is the loss of T future periods of cooperation.

When the cost of replacing leaders is low, citizens replace leaders caught cheating. By doing so, the citizens ensure continued cooperation. Since leaders primarily care about keeping their jobs, they are careful to avoid being caught cheating. This desire to avoid cheating allows leaders to commit to maintaining a level of commitment that the principals (the citizens) themselves could not maintain.

We now state the leader-specific punishment strategy for period t. We state the strategy for nation A and leader α. B's strategy is analogous. For clarity, we separate the two cases:

Proposition 1 *(Unitary actor: high-cost case).* If

$$k_a \geq U_A(\tilde{P}_A, \tilde{P}_B)\frac{\delta-\delta^{T+1}}{1-\delta+(\delta-\delta^{T+1})p_a}$$

and $\tilde{P}$ satisfy equation (1), where $p_A = 1 - F(H_B - \tilde{P}_A)$ and $p_B = 1 - F(H_A - \tilde{P}_B)$, then the following is a subgame perfect equilibrium:

1. If both leaders are in good standing ($S_A^{t-1} = 0$ and $S_B^{t-1} = 0$), then α plays $P_A = \tilde{P}$. If either leader is in poor standing ($S_A^{t-1} > 0$ or $S_B^{t-1} > 0$), then $P_A = P_A^* = 100$.
2. The citizens retain leader α.

$$D\frac{dU_A(\tilde{P}_A, \tilde{P}_B)}{dP_A} - U_A(\tilde{P}_A, \tilde{P}_B)\frac{dP_A}{dP_A}(1-p_B)(\delta-\delta^{T+1}) = 0, \tag{1}$$

where $D = (1-(1-p_A)(1-p_B)\delta - (1-(1-p_A)(1-p_B))\delta^{T+1})$.

Proof. See Downs and Rocke (1990, 1995), Porter (1983), and Green and Porter (1984). We discuss the key aspects of the proof below.

Proposition 2 (Domestic politics: low-cost case). If

$$k_A \leq U_A(\tilde{P}_A, \tilde{P}_B)\frac{\delta-\delta^{T+1}}{1-\delta+(\delta-\delta^{T+1})(1-F(H_B-\tilde{P}_A)}$$

and $\tilde{P}_A$ satisfy equation (2), then the following strategy is a subgame perfect Nash equilibrium:

1. If both leaders are in good standing ($S_A^{t-1} = 0$ and $S_B^{t-1} = 0$), then α plays $P_A = \tilde{P}_A$. If either leader is in poor standing ($S_A^{t-1} > 0$ or $S_B^{t-1} > 0$), then $P_A = P_A^* = 100$.
2. If both players are in good standing and α is not observed cheating ($S_A^{t-1} = 0$, $S_B^{t-1} = 0$, and $Q_A \leq H_B$), then the citizens in nation A retain leader α. If α and β are in good stand-

ing ($S_A^{t-1} = 0, S_B^{t-1} = 0$) but α is observed to cheat ($Q_A > H_B$), then A replaces α. If α is in poor standing ($S_A^{t-1} > 0$), then A deposes α if

$$K_A \leq \delta U_A(\tilde{P}_A, \tilde{P}_B)\frac{1-\delta^{S_A^{t-1}}}{1-\delta+\delta p_A(1-\delta^{S_A^{t-1}})} \text{ and retains } \alpha \text{ otherwise.}$$

$$\tilde{P}_A \in \arg\max_{P_A \in \Re^+} U_A(P_A, \tilde{P}_B) + F(H_B - P_A)\frac{\Psi}{1-\delta F(H_B - \tilde{P}_A)} + \frac{\delta}{1-\delta}U_A(\tilde{P}_A, \tilde{P}_A) \tag{2}$$

Corollary 3. *For an interior solution $\tilde{P}_A$ H_B, equation (2) implies*

$$\frac{d}{d\tilde{P}_A}U_A(\tilde{P}_A, \tilde{P}_B) - \psi\left(\frac{F'(H_B - \tilde{P}_A)}{1-\delta F(H_B - \tilde{P}_A)}\right) = 0. \tag{3}$$

We discuss the most salient feature of the proof below with the remaining details considered in the appendix.

THE LOGIC OF COOPERATION

Here we explore the logic behind the propositions stated above.

HIGH COST OF LEADER REPLACEMENT (THE UNITARY ACTOR CASE)

The following analysis largely reproduces Downs and Rocke (1995, 97). We start by deriving the value of playing the game, starting with both sides in good standing ($S_A^{t-1} = 0, S_B^{t-1} = 0$). Providing this good standing is maintained, α and β play $P_A = \tilde{P}$ and $P_B = \tilde{P}$. Given these levels of production, the probability of A accidentally being observed to cheat is

$$p_A = \Pr(Q_A > H_B) = \Pr(P_A + \varepsilon_A > H_B) = \Pr(\varepsilon_A > H_B - P_A) = 1 - F(H_B - P_A).$$

Similarly, the chance of B being caught cheating is $p_B = 1 - F(H_A - P_B)$.
Using recursion, the value of playing $P_A = \tilde{P}_A$ and $P_B = \tilde{P}_B$ can be calculated as

$$V_A = U_A(\tilde{P}_A, \tilde{P}_B) + (1-p_A)(1-p_B)\delta V_A + (1-(1-p_A)$$
$$(1-p_B))\left(\frac{\delta-\delta^{T+1}}{1-\delta}U_A(P_A^*, P_B^*) + \delta^{T+1}V_A\right).$$

The first term represents the value of the game in the current period. The second term is the discounted value of the game multiplied by the probability that neither side is observed cheating. The final term is the probability that one side is observed to cheat multiplied by the payoff of the noncooperative outcome for the next T periods before the restoration of cooperation. α also receives the office-holding benefit ψ in every period. Yet, since α receives this payoff regardless of his or her action, we have excluded it from the calculation. Using the normalization that $U_A(P_A^*, P_B^*) = 0$, the expression for V_A reduces to

$$V_A = \frac{U_A(\tilde{P}_A, \tilde{P}_B)}{(1-(1-p_A)(1-p_B))\delta - (1-(1-p_A)(1-p_B))\delta^{T+1})}. \tag{4}$$

In its choice of $\tilde{P}_A$, A faces a trade-off. Nation A increases its immediate payoff by increasing P_A; however, doing so increases the risk of cooperation breakdown. The following first-order condition (FOC) ensures that these incentives are exactly balanced and is the basis of equation (1):

$$\frac{dV_A}{dP_A} = \frac{1}{D^2}\left(D\frac{dU_A(P_A, \tilde{P}_B)}{dP_A} - U_A(P_A, \tilde{P}_B)\frac{dp_A}{dP_A}(1-p_B)(\delta - \delta^{T+1})\right) = 0, \tag{5}$$

where D is the denominator in the expression of V_A in equation (4). While this FOC is complicated, Downs and Rocke (1995) have calculated the best-possible treaties under a variety of parameters.

Next we examine the citizens' decision to retain their leader. If the incumbent is caught cheating in the current period (assuming both leaders are otherwise in good standing), then the citizens can expect T periods of noncooperative behavior before the restoration of cooperation. Thus, the value of retaining a leader who has just been caught cheating is $\frac{\delta - \delta^{T+1}}{1-\delta} U_A(P_A^*, P_B^*) + \delta^{T+1}V_A = \delta^{T+1}V_A$. Alternatively, if the citizens remove their leader (at a cost of k_A), then they can immediately restore their nation's good standing. The payoff from this is $-k_A + \delta V_A$. Providing $k_A > V_A(\delta - \delta^{T+1})$, the citizens never replace their leader.[1]

LOW COST OF LEADER REPLACEMENT (THE DOMESTIC POLITICS CASE)

When the cost of leader replacement is low, then citizens depose leaders caught cheating to avoid the suspension of cooperation. This threat to a leader's tenure in office provides a derivation for audience costs (Fearon 1994; Guisinger and Smith 2002). Given the threshold, H_B, if leader α chooses an output level of P_A, then she or he is observed to cheat with probability $p_A = \Pr(Q_A > H_B) = \Pr(\varepsilon_A > H_B - P_A) = 1 - F(H_B - P_A)$. Similarly, β's chance of being caught cheating is $p_B = 1 - F(H_A - P_B)$. Given the citizens' replacement strategy, if a leader is caught cheating, then she or he is immediately removed and cooperation continues. Hence, in equilibrium, if α and β choose effort levels $\tilde{P}_A$ and $\tilde{P}_B$, then α's expected value of playing the game (starting with a good standing) is

$$V_\alpha = \frac{1}{1-\delta}U_A(\tilde{P}_A, \tilde{P}_B) + \sum_{t=1}^{\infty}(1-p_A)^t\delta^{t-1}\psi = \frac{1}{1-\delta}U_A(\tilde{P}_A, \tilde{P}_A) + \frac{F(H_B - \tilde{P}_A)}{1-\delta F(H_B - \tilde{P}_A)}\psi.$$

1. Note that since the citizens do not replace their leader facing T periods of punishment, they would not want to remove their leader when facing less than T periods of punishment. That is, if the citizens were to replace their leader, they would do so immediately.

The first term represents the payoff from the cooperative outcome of the continuous-choice PD in every period. Remember that even if the leader is removed, he or she still continues to receive the payoff from cooperation under the next leader. The second term represents the net present value from office holding given that the leader retains office with probability $(1 - p_A)$ in each period. We define V_α more precisely in the appendix.

We now examine α's choice of optimal P_A in the immediate period. We do so mindful that in all future periods, α or any successor will play $\tilde{P}_A$. If $\tilde{P}_A$ is an equilibrium strategy, then it must be the optimal strategy to pick in the immediate round, given that it will be played in all future rounds and given the strategies of other players. Specifically, we need to ensure there is no one period defection that α prefers in the immediate round, given that he or she (or any replacement) intends to play $\tilde{P}_A$ in the future. α's payoff from playing $P_A = \underline{P_A}$ in the immediate period is

$$EU_\alpha(\underline{P_A}; \tilde{P}_A, \tilde{P}_B) = U_A(\underline{P_A}, \tilde{P}_B) + F(H_B - P_A)[\psi + \delta V_\alpha] + (1 - F(H_B - \underline{P_A}))\left[\frac{\delta}{1-\delta} U_A(\tilde{P}_A, \tilde{p}_A)\right].$$

The first term represents α's immediate payoff from the current period's play of the continuous PD, given α's choice of $\underline{P_A}$. The second term is the probability that α is not observed cheating (given her or his choice $\underline{P_A}$), multiplied by the value of retaining office this period and the expected value of playing the game in future periods (V_α). The final term is the probability that α is caught cheating (given her or his choice $\underline{P_A}$), multiplied by the value of cooperation in all future periods under new leadership. Substituting V_α into this expression yields

$$EU_\alpha(\underline{P_A}; \tilde{P}_A, \tilde{P}_B) = U_A(\underline{P_A}, \tilde{P}_B) + F(H_B - \underline{P_A})\frac{\Psi}{1-\delta F(H_B - \tilde{P}_A)} + \frac{\delta}{1-\delta} U_A(\tilde{P}_A, \tilde{P}_A).$$

If $\underline{P_A} = \tilde{P}_A$ is a best response given B's strategy, the citizens' strategy, and play in future rounds, then there is no one round defection that improves α's payoff:

$$\tilde{P}_A \in \arg\max_{\underline{P_A} \in \Re^+} EU_\alpha(\underline{P_A}; \tilde{P}_A, \tilde{P}_B).$$

This represents equation (2) in proposition 2.

For an interior solution, equation (2) implies the first-order condition given in equation (3) and the following second-order conditions.

$$\frac{d^2}{d\tilde{P}_A^2} U_A(\tilde{P}_A, \tilde{P}_B) + F''(H_B - \tilde{P}_A)\frac{\psi}{1-\delta F(H_B - \tilde{P}_A)} < 0. \tag{6}$$

For the case of ε_i being normally distributed, $P_A \leq H_B$ is a sufficient condition to ensure that the second-order condition is met and hence the corollary.

We now move to the citizens' decision to remove their leader. We start by calculating the citizens' value for having a leader in good standing:

$$V_{cA} = \frac{1}{1-\delta} U_A(\tilde{P}_A, \tilde{P}_B) - \frac{k_A}{1-\delta} p_A.$$

The first term is the expected reward from the continuous-choice PD game. The second term represents future expected costs of removing leaders caught cheating, which in each period occurs with probability $p_A = 1 - F(H_B - \tilde{P}_A)$.

Suppose A's leader has just been caught cheating ($Q_A < H_B$). If the citizens of A retain their leader, then they anticipate T periods of noncooperation before the restoration of cooperation, the net present value of which is

$$\sum_{t=1}^{T} \delta^t U_A(P_A^*, P_B^*) + \delta^{T+1} V_{cA} = \delta^{T+1} V_{cA}.$$

If, alternatively, the citizens replace their leader at a cost of k_A, then cooperation immediately resumes, which is worth $-kA + \delta V_{cA}$. Substituting for V_{cA}, this implies that, providing

$$k_A \leq U_A(\tilde{P}_A, \tilde{P}_B)\frac{\delta - \delta^{T+1}}{1 - \delta + (\delta - \delta^{T+1})p_A} = U_A(\tilde{P}_A, \tilde{P}_B)\frac{\delta - \delta^{T+1}}{1 - \delta^{T+1} + (\delta^{T+1} - \delta)F(H_B - \tilde{P}_A)},$$

the citizens of nation A replace α if he or she is caught cheating.

While this condition is illustrative of the cost at which citizens replace leaders, the formal characterization of the equilibrium requires a more careful exposition, which we present in the appendix.

THE ROLE OF DOMESTIC POLITICS IN CREATING INTERNATIONAL COOPERATION

When the cost of leader removal is high, the citizens retain their leader. Under these circumstances, leaders can commit to cooperate because they know being observed to have cheated ends cooperation for the next T periods. Providing the value of T periods of cooperation is worth more than the myopic gain of exploiting the other side, then cooperation is possible. This is the classic neoliberal approach to cooperation.

When the cost of leader removal is low, then the enforcement of cooperation works slightly differently. Once a leader is caught cheating, the other nation refuses to cooperate with that leader for T periods. This is the same threat used in the unitary actor case, yet when the cost of leader removal is low, the citizens avoid the loss of cooperation for T periods by replacing their leader. Hence, while foreign nations threaten to remove cooperation for T periods, the consequential threat for the leader is the loss of his or her job. If leaders value keeping their jobs beyond all else, then the consequence of a breakdown of cooperation is much worse than the loss of cooperation: it is the loss of office. As the penalty associated with the breakdown in cooperation increases, leaders seek to reduce the risk. As we shall now see, this enables domestically accountable leaders to commit to far higher levels of cooperation.

When the cost of leader removal is low, as might be the case in large coalition systems, leaders can credibly commit to high levels of cooperation. Figure 1 illustrates this for the case in which the amount of noise is small: $\sigma \to 0$.

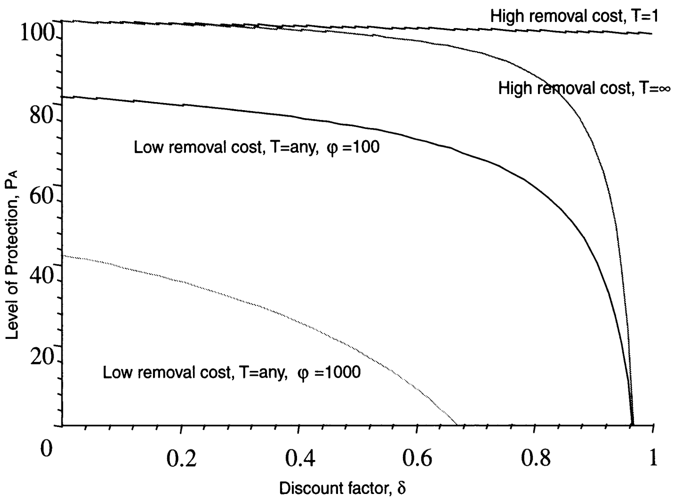

Figure 1: The Limits of Cooperation

The upper two lines represent the high removal cost scenario; the lower two lines represent the low removal cost scenario. Leaders can only credibly commit to cooperative arrangements (i.e., $\tilde{P}$) above these lines. Remember that in this setting, cooperative arrangements represent a reduction in protection from the Nash level of $P_A = 100$. The top line considers a single-period punishment, $T = 1$. This is to say, if A produces $Q_A > H_B$, then B withdraws cooperation for a single period. As the figure shows, the threat of losing a single period of cooperation is insufficient to support all but minimal cooperation. As shown, the lowest protection level, P_A, supportable even by very patient nations, is only slightly less than the noncooperative Nash case of $P_A = 100$. In contrast, when the threat is the permanent withdrawal of cooperation (the so-called grim trigger case, shown by the second line down in Figure 1), significant cooperation becomes possible when nations are patient.

When leader removal is easy, greater cooperation becomes possible, as shown by the two lower lines in Figure 1. The two lines differ by the value of office holding: $\psi = 100$ (third line down) and $\psi = 1{,}000$ (lowest line). While these office-holding values might appear large, they are of the order of magnitude of the value of agreements. Remember, complete cooperation by each side ($P_A = P_B = 0$) is worth 100 per period relative to the single-shot Nash equilibrium, and the temptation to defect under this circumstance is worth 3,125. When leaders care about office holding and citizens can remove leaders easily, then far deeper cooperative arrangements can be reached, and achieving these deals does not require extremely high patience.

In the high-cost unitary actor case, high patience is required before significant cooperation becomes possible. In the low-cost domestic politics case, cooperation is less dependent on patience. For leaders who value office highly, cooperative deals with protection levels half of those in the noncooperative case ($P_A = 50$) can be supported by even minimal discount factors. In the domestic politics case, leaders risk losing office, not future cooperation, from cheating. Although the net present value of office holding increases with an increased discount factor, leaders risk the immediate loss of office, even when the discount factor is low. Leader-specific punishments only force leaders to cooperate when the value of future cooperation is greater than the cost of removing the leader, the circumstances under which the citizens remove a leader caught cheating. In the low-noise case with T periods of punishment, this requires

$$k_A \leq U_A(\tilde{P}_A, \tilde{P}_B)\frac{\delta - \delta^{T+1}}{1-\delta} = (100 - \tilde{P}_A)\delta\frac{\delta^{T+1}}{1-\delta}.$$

Figure 1 shows clearly that in the low-noise world, leader-specific punishments allow for much deeper cooperation when leaders are easily replaced. These results hold even as we increase the amount of noise. For our simulations, we assume that the observational errors are normally distributed with variance $\sigma^2 = 1$. Downs and Rocke (1995, 98-9) provide tables on the limits of cooperation. For instance, with a discount factor of $\sigma = .9$, they find that no cooperative agreement is possible for short punishment periods; however, with an infinite punishment ($T = \infty$), the limit on cooperation is $P_A = P_B = 75.8$. In contrast, leader-specific punishment supports full cooperation, $P_A = P_B = 0$, at $\delta = 0.9$ if leaders value office at $\psi = 1{,}000$. This full cooperation is achieved by setting a threshold of $H = 2.667$.[2] Under this circumstance, leader α will accidentally be caught cheating 0.4 percent of the time. That the citizens are willing to pay the cost of deposing their leader should she or he be observed to cheat requires that the cost of leader replacement not be too high. In particular, the limiting cost in this scenario is

$$k_A \leq \frac{\delta - \delta^{T+1}}{1-\delta^{T+1} + (\delta^{T+1-\delta}F(2.667)}100,$$

which converges to 870 as $T \to \infty$. Alternatively, we require $k_A \leq$ if $T = 1$.

If, as we believe, office holding is the dominant motive for leaders, then full cooperation can be achieved with even a lower risk of breakdown. For instance, if $\psi = 100{,}000$, then a threshold of $H = 4.049$ achieves full cooperation ($P_A = 0$), with a risk of accidental breakdown of only $p_A = 0.000026$. In order that citizens replace their leader, the limiting cost of removal (for $T = \infty$) is $k_A \leq 899.8$, nearly nine times the value of full cooperation. As these simulations show, leader-specific punishments allow full cooperation even in the presence of noise.[3]

The predictions are clear. Even in the presence of noise, when citizens can easily remove leaders, then leader-specific punishment strategies enable office-seeking leaders to credibly enact deep cooperative agreements. In contrast, when leaders are hard to remove, the depth of possible agreement is far shallower and more dependent on the size of the discount factor.

2. Here we characterize fully cooperative agreements with the minimal risk of accidental failure of cooperation. Alternatively, one might ask what the optimal agreement is from the perspective of the leader or the citizens: $\max_{P,H} V_\alpha$, subject to the equilibrium constraints, and $\max_{P,H} V$, subject to the equilibrium constraints.

3. Full cooperation can still be supported even as the amount of noise increases. If $\sigma^2 = 100$, for instance, full cooperation with $\delta = 0.9$ and $\psi = 100{,}000$ requires a threshold of $H = 34.324$.

Leader-specific punishment strategies imply different dynamics depending on the cost of leader removal. When leader removal is easy, then cooperation can be deep. Knowing that being observed to cheat will cost them their jobs, leaders pick protection levels well below the punishment threshold. Instances of cooperation breakdown between nations are rare. In the event of these unlikely contingencies, the leader observed cheating is likely to be rapidly deposed, and so the cheating incident is unlikely to lead to a souring of relations.

In contrast, when one of the nations attempting to reach agreement has a high cost for leader removal, cooperation is shallow. Furthermore, since hard-to-remove leaders risk less in terms of tenure than their accountable counterparts, they pick protection levels closer to the punishment threshold than would an easily removed leader. Autocratic leaders cheat more often than leaders beholden to large winning coalitions. In addition, since such leaders are not easily removed, instances of cheating lead to prolonged periods of noncooperation. During these punishment phases, should the leader responsible for the failure of cooperation leave office, then good relations between the states are restored.

IMPLICATIONS

Leader-specific punishment strategies generate predictions about the relationships between international cooperation, domestic political institutions, and leadership turnover. It is now time to ask, so what?

When domestic political institutions make leader removal easy, as is the case in large winning coalition systems such as democracies, then states can cooperate deeply. In contrast, as the size of the domestic winning coalition contracts and states become more autocratic, it becomes increasingly costly for the incumbent's supporters to desert him or her as a result of his or her failure on the policy dimension of international cooperation. Once the cost of removing a leader is in excess of the value of lost cooperative opportunities, then leaders are immune from the domestic consequences of leader-specific punishments. Effectively, leaders in such circumstances behave as unitary actors in much the same way as nations are treated in extant neoliberal theories of international cooperation (Keohane and Nye 1977).

In addition to predicting greater cooperation between states where leader removal is easy, the theory also makes numerous predictions about the dynamics of leader turnover and cooperation. Yet, before turning to these, it is worthwhile to step back and put the theoretical ideas developed here in perspective. The theory proposes the possibility of cooperation through leader-specific punishments. Yet, the equilibria derived are not unique. For instance, nations playing the single-shot Nash equilibrium in each period is also a subgame perfect equilibrium, albeit a relatively uninteresting one. One might legitimately ask why picking out the interesting case of the leader-specific punishment over extant unitary actor strategies or the one-shot Nash equilibrium is of value to the social science community. There are two straightforward answers to this question. The first answer is empirical validity. Leader-specific punishment theory predicts that regime type influences the level of cooperation between states, a prediction absent in unitary actor approaches. There is considerable evidence in support of this claim (e.g., Leeds 1999; Oneal and Russett 2001). In addition, the theory makes detailed predictions with regard to the dynamics of leadership turnover and cooperation and how domestic political institutions moderate these relationships. These novel hypotheses offer the prospect of allowing us to discriminate between this and rival theoretical arguments.

The second justification for the focus on leader-specific punishments is that if nations do not currently use such strategies, then we have identified a mechanism through which they can improve international cooperation. That is, leader-specific strategies offer a powerful policy prescription through which nations can improve the welfare of their citizens. Whether the contribution of our theoretical predictions is in their positivist value in accounting for the world around us or their policy prescription for improving cooperative relations remains to be seen.

There is evidence that nations use leader-specific punishments on at least some foreign policy dimensions. For instance, in each of its last three foreign conflicts (with Yugoslavia, Afghanistan, and Iraq), the United States has been adamant that it has "no quarrel with the people"[4] and that it wished only to target the nation's leadership. In each of these three examples, the cost of domestic leader removal in the target state was high. Leaders in Yugoslavia, Afghanistan, and Iraq could incur the ire of the United States with relatively little fear of being deposed domestically. Indeed, it required direct U.S. military effort to displace leaders in the latter two states.

If relations are sour, then leader-specific punishments predict a normalization of relations following leadership turnover. The case of Yugoslavia provides some support for this prediction. Following Slobodan Milosevic's deposition, Western aid flooded into Yugoslavia (Aid talks 2001). Following the 1979 Islamic revolution that deposed the Shah, the United States and Iran have experienced poor relations. However, the instances of Hashemi Rafsanjani taking over following the death of the Ayatollah Khomeini in 1989 and Mohammed Khatami's succession in 1997 partly rejuvenated U.S.-Iranian relations. Relatedly, McGillivray and Stam (2004) report that leadership change is an important determinant in the ending of sanctions. For instance, they anticipate that U.S. sanctions against Cuba are likely to end with the departure of Castro.

The implementation of leader-specific punishment theory requires several practical considerations. Throughout this article, we have referred to the individual responsible for policy choice as the leader. In practical terms, however, few political systems have a monolithic leader, so the identity of who we describe as a leader can be ambiguous. For instance, do nations target punishments against individual leaders, such as a president or a prime minister, or do nations target the cabinet government or the coalition of ruling parties? The theory offers no guide as to the level at which political actors condition leader-specific punishments beyond the assumption that the leader is

4. Both Bush presidents have made this statement over crises with Iraq. Reagan stated it about Libya in 1985, and Clinton stated it over Kosovo (Fisk 2002; http://www.cnn.com/WORLD/europe/9810/07/kosovo.nato.02/). U.K. Prime Minister Blair has also used the same phrase with respect to Afghanistan (November 1, 2001; http://www.number-10.gov.uk/output/page3748.asp).

responsible for policy choice. Since the mechanism we describe could work equally well when the identity of the leader is conceived of as an individual leader or when the leader is identified as the governing coalition, the level at which the theory is most appropriately applied is an open empirical question.

Throughout, we have implicitly assumed that the electoral accountability mechanism makes leader removal easy in democracies. While elections make for low-cost replacement, electoral accountability is not always immediately available. For example, in fixed-term electoral systems, it may be several years from defection to the next election. Even in systems where election timing is endogenous, leaders have little incentive to call early elections that are likely to result in their removal (Smith 2004). This suggests that although democratic leaders still have incentives to avoid the electoral defeat that follows defection, on the rare occasions that they are observed to cheat, there may be a period of punishment until the electorate has the opportunity to replace them. However, elections are not the only means of leader replacement or even the most common. In parliamentary systems—the most common form of democracy—coalition breakups, cabinet reshuffles, and replacements of prime ministers are frequent occurrences, even in the absence of elections (Laver and Schofield 1990). Thus, in most democratic systems, leader replacement is readily obtainable even in the absence of elections.

Leader-specific punishment theory predicts higher levels of cooperation between states when leader removal is easy. The theory also predicts different dynamics between cooperation and leadership turnover depending on domestic political institutions. Cooperation should be deeper and more reliable between those nations whose leaders are easily removed. Furthermore, on the rare occasions that such accountable leaders are caught cheating on international norms of behavior, they should be removed. It is precisely because democratic leaders want to keep their jobs that they minimize the likelihood of bad relations.

In contrast, when leader removal is hard, as it is in autocracies, cooperation is neither deep nor reliable. Since the leaders in such systems do not jeopardize their tenure if they are caught cheating, these leaders do less to prevent the breakdown of cooperation. As such, in autocratic systems, the onset of punishment is more likely. Furthermore, once cheating is detected, without the mechanism of leader removal, relations between states sour until either the punishment phase is complete or the responsible leader leaves office.

Numerous scholars test the differences in cooperation across regime types (e.g., Russett and Oneal 2001). Yet to date, few studies have analyzed the dynamics between cooperation and leader turnover. In the context of dyadic trade flows, McGillivray and Smith (2004) use Bueno de Mesquita et al.'s (2003) metric of winning coalition size as a measure of the ease of leader replacement. Consistent with the arguments developed here, they show that leadership turnover in democratic systems leaves trade flows almost completely unaltered. In contrast, in autocratic systems, leader turnover affects trade flows. Leadership change generally reduces trade flows. However, if trade flows are low relative to recent historical averages, then, consistent with the arguments made here, leadership turnover enhances trade.

CONCLUSIONS

Although traditional liberal theories explain how international cooperation is possible, they fail to account for the huge variation in the depth and reliability of cooperative agreements. Nations differ greatly with respect to their domestic political institutions. In this article, we examined how these differences shape interstate relations.

Domestic institutions affect the ease with which citizens can replace their leaders. Within this context, we examined the consequences of targeting punishments against individual leaders rather than the nations they represent. If a leader, who is easily replaced, incurs the ire of another state, which in response withdraws cooperation or imposes other punishments, then the citizens of the first state can avoid punishment by deposing their recalcitrant leader. Not only do such circumstances provide a means to rejuvenate cooperation, but they also prevent the breakdown of cooperation in the first place and allow for deeper and more reliable cooperation. However, to do so requires that leaders are easily removed.

APPENDIX

Here we examine those aspects of the propositions that were inadequately dealt with in the main text. In particular, we focus on the citizens' decision to remove their leader. Porter (1983) and Green and Porter (1984) proved a detailed and thorough account of the derivation of first-order conditions and continuation values for proposition 1.

Leader removal. We examine leader removal in the low-cost case. The high-cost case follows trivially from these results. We consider the incentives to remove leader α in period t as a function of his or her standing, given the strategy of nation B and α's strategy. First, if the incumbent is in good standing, there is no benefit in replacing him or her. The citizens' expected payoff from replacing α is k_A less than the payoff from keeping him or her.

Second, suppose $S_A^{t-1} = 1$; that is, the incumbent is in poor standing, but the current period is the last period of punishment. Since in the next period, cooperation is restored whether or not the leader is replaced, there is no reason to replace α.

Next consider $S_A^{t-1} = 2$; that is, there is one more period of punishment (after the current period) before the restoration of the incumbent's good standing. If the citizens depose α in period t, then their payoff is $-k_A + \delta V_{cA}$. If, alternatively, they retain α, then their payoff is $\delta U_A(P_A^*, P_B^*) + \delta^2 V_c A = \delta^2 V_{cA}$. Hence, the continuation value for playing the game with a standing of $S_A^{t-1} = 2$ is $Z_2 = \max\{-k_A + \delta V_{cA}, \delta^2 V_{cA}\}$.

Next consider $S_A^{t-1} = 3$. If A replaces α, then their payoff is $-k_A + \delta V_{cA}$. If, alternatively, A retains α, then their payoff is $0 + \delta Z_2$. Suppose that $Z_2 = -k_A + \delta V_{cA}$; that is, A will depose α in the next period. A deposes α if $-k_A + \delta V_{cA} \geq \delta(-\text{ka}+\delta V_{\text{cA}})$, which occurs when $k_A \leq \delta V_{cA}$. Yet since $Z_2 = -k_A + \delta V_{cA}$, we know that $k_A \leq \delta V_{cA} - \delta^2 V_{cA}$. Since $\delta V_{cA} < \delta V_{cA} - \delta^2 V_{cA}$, therefore $k_A \leq \delta V_{cA}$, so A deposes α at $S_A^{t-1} = 3$.

Suppose instead that $Z_2 = \delta^2 V_{cA}$; that is, A will not depose α in the next period. A deposes α in the current period only if $k_A \leq \delta V_{cA}(1 - \delta^2)$. Let the continuation value for playing the game with a standing of S_A^{t-1} be $Z_3 = \max\{-k_A + \delta V_{cA}, \delta^3 V_{cA}\}$.

We now reiterate these arguments inductively.

First, if $Z_i = -k_A + \delta V_{cA}$ (i.e., A will depose α given standing $S_A^{t-1} = i$), then A will depose α given standing $S_A^{t-1} = i + 1$; therefore, $Z_{i+1} = -k_A + \delta V_{cA}$.

Second, suppose $Z_i = \delta^i V_{cA}$ and consider A's deposition decision given a standing of $S_A^{t-1} = i+1$. If A deposes α, then their payoff is $-k_A + \delta V_{cA}$. If A retains α, then their payoff is $\delta Z_i = \delta^{i+1} V_{cA}$. Hence, $Z_{i+1} = \max\left\{-k_A + \delta V_{cA}, \delta^{i+1} V_{cA}\right\}$. Given this induction, $Z_T = \max\left\{-k_A + \delta V_{cA}, \delta^T V_{cA}\right\}$. This characterizes the optimal deposition decisions as specified in proposition 2 for $S_A^{t-1} = 1, \cdots, T$ and $S_A^{t-1} = 0$ (and α is not caught cheating).

Now consider the situation in which α (in good standing, $S_A^{t-1} = 0$) is caught cheating. If A deposes α, then its payoff is $-k_A + \delta V_{cA}$. If A retains α, then its payoff is δZ_T. If $Z_T = -k_A + \delta V_{cA}$, then A deposes α when he or she is caught cheating since $Z_T = -k_A + \delta V_{cA}$ implies $-k_A + \delta V_{cA} > \delta Z_T$. If $Z_T = \delta^T V_{cA}$, then A deposes α only if $k_A \, \delta V_{cA}(1-\delta^T)$. This implies that the limiting cost for the low-cost case is $k_A \, \delta V_{cA}(1-\delta T)$, which implies

$$k_A \le U_A(\tilde{P}_A, \tilde{P}_B)\frac{\delta - \delta^{T+1}}{1-\delta+(\delta-\delta^{T+1})p_A},$$

as stated in the main text.

$$\text{If } k_A > U_A(\tilde{P}_A, \tilde{P}_B)\frac{\delta - \delta^{T+1}}{1-\delta+(\delta-\delta^{T+1})p_A},$$

then A never deposes α, which characterizes the high-cost scenario.

α's continuation value. In the text, we report α's continuation on the equilibrium path. Here we provide a more careful consideration of V_α. Assuming both α and β are in good standing, then α chooses P_α in each period. Should α be replaced, the new leader (and any subsequent leaders) produces P_A in each period. Then

$$\begin{aligned} V_\alpha = {} & U_A(P_\alpha, P_B) + (\delta U_A(P_A, P_B))\sum\nolimits_{t=1}^{\infty} \delta^{t-1}(1-(F(H_B - P_\alpha)^t) \\ & + (\psi + \delta U_A(P_\alpha, P_B))\sum\nolimits_{t=1}^{\infty} \delta^{t-1}(F(H_B - P_\alpha))^t. \end{aligned}$$

The first term represents α's immediate payoff for the continuous-choice PD, the second is the net present value of paths in which α is deposed, and the final term is the net present value of paths in which α retains office. In equilibrium, $P_A = P_\alpha = \tilde{P}_A$, so this equation reduces to that reported in the main text. Maximizing this equation with respect to P_α provides an alternative method to derive equation (3).

REFERENCES

Aid talks after Milosevic drama. 2001. June 29. www.CNN.com.

Axelrod, Robert. 1984. *The evolution of cooperation.* New York: HarperCollins.

Axelrod, Robert, and Robert O. Keohane. 1986. Achieving cooperation under anarchy: Strategies and institutions. In *Cooperation under anarchy*, edited by Kenneth A. Oye. Princeton, NJ: Princeton University Press.

Baldwin, David A., ed. 1993. *Neorealism and neoliberalism: The contemporary debate.* New York: Columbia University Press.

Bendor, Jonathan. 1987. In good times and bad: Reciprocity in an uncertain world. *American Journal of Political Science* 31:531-8.

———. 1993. Uncertainty and the evolution of cooperation. *Journal of Conflict Resolution* 37:709-34.

Bendor, Jonathan, R. Kramer, and S. Stout. 1991. When in doubt . . .: Cooperation in a noisy prisoner's dilemma. *Journal of Conflict Resolution* 35:691-719.

Bienen, Henry, and Nicolas van de Walle. 1992. A proportional hazard model of leadership duration. *Journal of Politics* 54:685-717.

Bliss, H., and B. Russett. 1998. Democratic trading partners: The liberal connection. *Journal of Politics* 60:1126-47.

Browne, Eric C., John P. Frendreis, and Dennis W. Gleiber. 1986. The process of cabinet dissolution: An exponential model of duration and stability in Western democracies. *American Journal of Political Science* 30:628-50.

Bueno de Mesquita, Bruce, and David Lalman. 1992. *War and reason: Domestic and international imperatives.* New Haven, CT: Yale University Press.

Bueno de Mesquita, Bruce, James D. Morrow, Randolph M. Siverson, and Alastair Smith. 1999. An institutional explanation of the democratic peace. *American Political Science Review* 93:769-1044.

———. 2002. Political institutions, policy choice and the survival of leaders. *British Journal of Political Science* 32:559-90.

Bueno de Mesquita, Bruce, and Randolph Siverson. 1995. War and the survival of political leaders: A comparative study of regime types and political accountability. *American Political Science Review* 89:841-55.

Bueno de Mesquita, Bruce, Alastair Smith, Randolph M. Siverson, and James D. Morrow. 2003. *The logic of political survival.* Cambridge, MA: MIT Press.

Busch, Marc, and Eric R. Reinhardt. 1993. Nice strategies in a world of relative gains: The problem of cooperation under anarchy. *Journal of Conflict Resolution* 37:427-45.

Chiozza, Giacomo, and H. E. Goemans. 2004. International conflict and the tenure of leaders: Is war still ex post inefficient? *American Journal of Political Science* 48:604-19.

Dai, Xinyuan. 2002. Political regimes and international trade: The democratic difference revisited. *American Political Science Review* 96:159-65.

Diermeier, Daniel, and Randy T. Stevenson. 1999. Cabinet survival and competing risks. *American Journal of Political Science* 43:1051-68.

Downs, George W., and David M. Rocke. 1990. *Tacit bargaining, arms races, and arms control.* Ann Arbor: University of Michigan Press.

———. 1995. *Optimal imperfection? Domestic uncertainty and institutions in international relations.* Princeton, NJ: Princeton University Press.

Downs, George W., David M. Rocke, and Peter Barsoom. 1996. Is the good news about compliance good news for cooperation? *International Organization* 50:379-406.

Fearon, James D. 1994. Domestic political audiences and the escalation of international disputes. *American Political Science Review* 88:577-92.

Fisk, Robert. 2002. The mantra that means this time it's serious. *The Independent*, September 13.

Gaubatz, Kurt Taylor. 1996. Democratic states and commitment in international relations. *International Organization* 50:109-39.

Gilligan, Michael J. 2004. Is there a broader-deeper tradeoff in multilateral international agreements? *International Organization* 58:459-84.

Goemans, Hein E. 2000. *War and punishment.* Princeton, NJ: Princeton University Press.

Goldstein, Joshua S. 1991. Reciprocity in superpower relations: An empirical analysis. *International Studies Quarterly* 35:195-209.

Gourevitch, Peter A. 1996. Squaring the circle: The domestic sources of international cooperation. *International Organization* 50:349-73.

Gowa, Joanne. 1986. Anarchy, egoism and third images: The evolution of cooperation and international relations. *International Organization* 40:167-86.

———. 1994. *Allies, adversaries, and international trade.* Princeton, NJ: Princeton University Press.

Green, E., and R. Porter. 1984. Non-cooperative collusion under imperfect price information. *Econometrica* 52:87-100.

Grofman, Bernard, and Peter van Roozendaal. 1994. Towards a theoretical explanation of premature cabinet termination. *European Journal of Political Research* 26:155-70.

Guisinger, Alexandra, and Alastair Smith. 2002. Honest threats: The interaction of reputation and political institutions in international crises. *Journal of Conflict Resolution* 46:175-200.

Keohane, Robert O. 1984. *After hegemony.* Princeton, NJ: Princeton University Press.

———. 1986. Reciprocity in international relations. *International Organization* 40:1-27.

Keohane, Robert O., and Joseph S. Nye, eds. 1977. *Power and interdependence: World politics in transition.* Boston: Little, Brown.

Krasner, Stephen D., ed. 1983. *International regimes.* Ithaca, NY: Cornell University Press.

Lambertini, L. 1997. Prisoners' dilemma in duopoly (super) games. *Journal of Economic Theory* 77:181-91.

Laver, Michael, and Norman Schofield. 1990. *Multiparty government.* Oxford, UK: Oxford University Press.

Leeds, Brett Ashley. 1999. Domestic political institutions, credible commitments and international cooperation. *American Journal of Political Science* 43:979-1002.

Mansfield, Edward D., Helen V. Milner, and B. Peter Rosendorff. 2000. Free to trade: Democracies, autocracies, and international trade. *American Political Science Review* 94:305-21.

Mansfield, E., and B. Pollins. 2001. The study of interdependence and conflict: Recent advances, open questions, and new directions for future research. *Journal of Conflict Resolution* 45:834-59.

Martin, Lisa L. 1993. Credibility, costs and institutions: Cooperation on economic sanctions. *World Politics* 45:406-32.

McGillivray, Fiona. 1997. Party discipline as a determinant of the endogenous formation of tariffs. *American Journal of Political Science* 41:584-607.

———. 1998. How voters shape the institutional framework of international agreements. In *Strategic politicians, institutions, and foreign policy*, edited by Randolph M. Siverson, 79-96. Ann Arbor: University of Michigan Press.

McGillivray, Fiona, and Alastair Smith. 2000. Trust and cooperation through agent-specific punishments. *International Organization* 54:809-24.

———. 2004. The impact of leadership turnover on relations between states. *International Organization* 58:567-600.

McGillivray, Fiona, and Allan Stam. 2004. Political institutions, coercive diplomacy and the duration of sanctions. *Journal of Conflict Resolution* 48:154-73.

Milgrom, Paul R., Douglas C. North, and Barry Weingast. 1990. The role of institutions in the revival of trade: The medieval law merchant, private judges, and the champagne fairs. *Economics and Politics* 2:1-23.

Milner, Helen. 1992. International theories of cooperation among nations: Strengths and weaknesses. *World Politics* 44:466-94.

———. 1997. *Interests, institutions, and information: Domestic politics and international relations.* Princeton, NJ: Princeton University Press.

Milner, Helen, and Peter Rosendorff. 1997. Democratic politics and international trade negotiations. *Journal of Conflict Resolution* 41:117-46.

Molander, P. 1985. The optimal level of generosity in a selfish, uncertain world. *Journal of Conflict Resolution* 29:611-8.

Morrow, James D. 1994. Modeling the forms of international cooperation: Distribution versus information. *International Organization* 48:387-423.

Morrow, J. D., R. Siverson, and T. Taberes. 1998. The political determinants of international trade: The major powers, 1907-90. *American Political Science Review* 92:649-62.

Oneal, John R., and Bruce Russett. 1997. The classical liberals were right: Democracy, interdependence, and conflict, 1950-1985. *International Studies Quarterly* 41:267-93.

———. 1999a. Assessing the liberal peace with alternative specifications: Trade still reduces conflict. *Journal of Peace Research* 36:423-42.

———. 1999b. The Kantian peace: The pacific benefits of democracy, interdependence, and international organizations, 1885-1992. *World Politics* 52:1-37.

———. 2000. Why "An identified systemic analysis of the democracy-peace nexus" does not persuade. *Peace and Defense Economics* 11:1-17.

———. 2001. Clear and clean: The fixed effects of democracy and economic interdependence. *International Organization* 55:469-86.

Oneal, John R., Bruce Russett, and Michael L. Berbaum. 2003. Causes of peace: Democracy, interdependence, and international organizations, 1885-1992. *International Studies Quarterly* 47:371-93.

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

Pahre, Robert. 1994. Multilateral cooperation in an iterated prisoners' dilemma. *Journal of Conflict Resolution* 38:326-52.

Polachek, S. 1997. Why do democracies cooperate more and fight less: The relationship between trade and international cooperation. *Review of International Economics* 5:295-309.

Pollins, B. 1989. Conflict, cooperation, and commerce: The effect of international political interactions on bilateral trade flows. *American Journal of Political Science* 33:737-61.

Porter, R. 1983. Optimal cartel trigger-price strategies. *Journal of Economic Theory* 29:313-38.

Remmer, Karen. 1998. Does democracy promote interstate cooperation? *International Studies Quarterly* 42:25-52.

Reuveny, R. 2000. The trade and conflict debate: a survey of theory, evidence and future research. *Peace Economics, Peace Science and Public Policy* 6:23-49.

———. 2001. Bilateral import, export, and conflict/cooperation simultaneity. *International Studies Quarterly* 45:131-58.

Reuveny, R., and H. Kang. 1996. International trade, political conflict/cooperation, and granger causality. *American Journal of Political Science* 40:943-70.

———. 1998. Bilateral trade and political conflict/cooperation: Do goods matter? *Journal of Peace Research* 35:581-602.

Ruggie, John Gerald. 1993. *Multilateralism matters: The theory and praxis of an institutional form.* New York: Columbia University Press.

Russett, Bruce, and John R. Oneal. 1999. The Kantian peace: The pacific benefits of democracy, interdependence, and international organizations. *World Politics* 52:1-37.

———. 2001. *Triangulating peace: Democracy, interdependence, and international organizations.* New York: Norton.

Schultz, Kenneth A. 1998. Domestic opposition and signaling in international crises. *American Political Science Review* 92:829-44.

———. 1999. Do democratic institutions constrain or inform? Contrasting two institutional perspectives on democracy and war. *International Organization* 53:233-66.

———. 2001. Looking for audience costs. *Journal of Conflict Resolution* 45:32-60.

———. 2002. *Democracy and coercive diplomacy.* Cambridge, UK: Cambridge University Press.

Signorino, Curtis S. 1996. Simulating international cooperation under uncertainty. *Journal of Conflict Resolution* 40:152-206.

Smith, Alastair. 1998. International crises and domestic politics. *American Political Science Review* 92:623-38.

———. 2000. Personalizing crises. In *Essays in public policy.* No. 106. Stanford, CA: Hoover Institution on War, Revolution and Peace, Stanford University.

———. 2004. *Election timing.* Cambridge, UK: Cambridge University Press.

Verdier, Daniel. 1998. Democratic convergence and free trade? *International Studies Quarterly* 42:1-24.

Warwick, Paul V. 1995. *Government survival in parliamentary democracies.* Cambridge, UK: Cambridge University Press.

Wu, Jianzhong, and Robert Axelrod. 1995. How to cope with noise in the iterated prisoner's dilemma. *Journal of Conflict Resolution* 39:183-7.