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**Stability and Rigidity: The Dispute Settlement  
Procedure at the WTO**



# Stability and Rigidity: The Dispute Settlement Procedure of the WTO<sup>1</sup>

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## **Abstract**

The multilateral trading system (the WTO) and most regional trade initiatives incorporate a dispute settlement procedure (DSP) as part of the broad set of agreements. The most significant perhaps is the Dispute and Appellate Panel at the WTO; NAFTA has a DSP, as will the FTAA; MERCOSUR has plans for one.

Under a DSP a country may file a dispute if it believes that another member has violated its obligations under the treaty. The DSP produces a finding to which the member country is obliged to respond either by rescinding the offending measure or by "compensating" the affected country (with trade or other concessions). Why develop an institution such as the DSP within a trade agreement with adjudicative, but not enforcement powers? What could explain the apparent willingness of countries to delegate (and pool) authority over trade policy to such a supranational adjudicative institution? More fundamentally, is international cooperation enhanced by adopting a DSP?

In a model of repeated bilateral international tariff setting in the face of domestic, two-sided political uncertainty, we show that a) any agreement with a DSP is more stable than an agreement without such a mechanism; b) a wider variety of countries are more willing to sign an agreement with a DSP procedure than any agreement without; c) agreements with such a mechanism are easier to strike *ex ante*.

In addition this paper sheds light on another recent debate on the effectiveness of the WTO and its DSP. Some have viewed the introduction of the WTO-DSP as highly successful; others have suggested instead that the frequent use of the DSP is not evidence of success, but indicates an increased level of defection. This paper establish that while there may be more violations of the treaty when a DSP is present relative to any agreement without such a DSP, it makes the overall agreement more stable and makes countries more willing to remain within the cooperative world trading system. Moreover this result hinges on the "compensation" principle: that the cost of any violation is limited to the best guess of the impact of the violation on the trading partners and is not larger or more punitive.

**Keywords:** *Political Economy of Free Trade Agreements, International Institutional Design, Domestic Politics and International Trade.*

**JEL:** F13; K33.

## INTRODUCTION

The dispute settlement procedure (DSP) adopted as part of the broad set of agreements at the conclusion of the Uruguay Round of Negotiations of the General Agreement on Tariffs And Trade (GATT) has been described as the “linchpin’ of the whole trading system” (Jackson 1997a, 124). The DSP allows a contracting party to the GATT (and its successor, the World Trade Organization (WTO)) to file a dispute with the WTO if it believes that another member has violated its obligations under the treaty. The DSP will produce a finding (a report of the dispute settlement panel, or the appellate panel) to which the member country is obliged to respond either by rescinding the offending measure or by compensating the affected country (with trade or other concessions). While the finding may be legally binding on the members (Jackson 1997b), the WTO has no enforcement powers, “no jailhouse, no bail bondsmen, no blue helmets, no truncheons, no tear gas” (Bello 1996), that it could exercise to enforce compliance.

The DSP raises a number of puzzling questions to the student of international trade relations. What could explain the apparent willingness of countries to delegate (and pool) authority over trade policy to such a supranational adjudicative institution, a policy realm over which traditionally political conflict has been acute and politicians have been reluctant to relinquish? Moreover, why develop a an institution such as the DSP with adjudicative, but not enforcement powers? More fundamentally, is international cooperation (to keep trade barriers low) enhanced by adopting a DSP with these characteristics?

This paper provides two clear answers to these questions: any agreement with a DSP of this kind is *more stable* than an agreement without such a mechanism. Moreover, a *wider variety of countries* are more willing to sign an agreement with a DSP procedure than any agreement without. Agreements with such a mechanism are easier to strike *ex ante* (Fearon 1998 ).

The key to these results lies in understanding the role of domestic politics, and more importantly recognizing that domestic political pressures and alignments are subject to changes that are imperfectly anticipated or even unexpected. A country’s negotiator at the international bargaining table is a political representative, responding (optimally) to and constrained by the political pressures it faces back home (Putnam 1988). That is the governments negotiating trade agreements are not merely benevolent social welfare maximizers, but are motivated by the

political or electoral consequences of its actions.

Consider such a negotiator considering the full intertemporal effects of signing a trade agreement. Such a negotiator may be fully informed about the political conditions that obtain domestically. However, the crucial details of the political alignments and pressures that exist in the domestic polity of the negotiating partner are less well known. Moreover, both parties are imperfectly informed about the nature of political pressure each (and the other) might experience at any time in the future.

In periods in which the political pressure to provide some sort of protection to the domestic import-competing industry becomes acute, a government may be willing (in the absence of any means of escape) to abrogate its responsibilities under a trade agreement entirely in order to protect its domestic constituency (and its own incumbency). If however, there are opportunities for signatories to escape their obligations (at least temporarily until the unexpected political pressure passes to a more “normal” state of affairs), an affected country may take such an opportunity while remaining within the parameters of the international agreement. One such avenue of escape is a willingness to be subject to the discipline of the DSP under the WTO. That is, a violation incurred for political reasons, may be tolerated by other signatories under the agreement if the violation is temporary, and some sort of compensation scheme is available for the affected country(ies). The use of the DSP therefore allows a contracting partner to violate the agreement, compensate the losers, and still remain within the community of cooperating nations. Hence an agreement with a DSP is less prone to abrogation by a state suffering intense political pressure to protect; such an agreement is more stable than one without a DSP<sup>1</sup>.

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<sup>1</sup>This argument provides a justification for the existence of the escape clause and other safeguard measures of the GATT. Article XIX measures may play the role of providing a crucial escape valve for domestic political pressures that may have accumulated. See Rosendorff and Milner (1999) for a formal model that establishes that agreements with an escape clause Pareto dominate those without in the presence of imperfect information regarding future political pressures. Sykes (1991) provides a compelling argument that purpose of Article XIX safeguards are to accommodate politicians’ need to accommodate the pressures of materially injured sectors. A comparison of the DSP and Article XIX actions is discussed below.

While this paper studies the WTO’s DSP in some detail, the underlying intuition regarding the utility of such procedures readily applies to other, regional agreements that embody dispute settlement procedures. See for example Gruber (1999) on supranational governance in the NAFTA, or Busch (1999) on forum shopping across

Consider again the self-interested international negotiator pondering the gains and losses of entering into an agreement with a DSP. Such a politician may be more willing to sign such an agreement (and be constrained by its provisions) if s/he is aware that breach of its obligations is permitted under certain circumstances. The possibility that future political pressures to protect might become intense implies that an astute politician will want to preserve a policy instrument to deal with that pressure. Commitment to a trading regime where some sort of instrument remains in the hands of the politician is easier to achieve than without it. The “shadow of the future” stretches less far and is less penal when temporary accommodation to political pressure is available (Sykes 1991, Fearon, 1998, Rosendorff and Milner 2001). Whereas only the most patient politicians who value the future very highly can sustain cooperation in an environment without a DSP, an appropriately designed DSP can facilitate entry into the agreement by any state, irrespective of its “patience” or its relative valuation of the future.<sup>2</sup>

The model to be presented below also sheds light on another recent debate on the effectiveness of the WTO and its DSP. Many scholars (and negotiators and WTO officials) have viewed the introduction of the WTO DSP as highly successful (Jackson 1997a), and the relatively frequent appeal by its members to the (new) DSP is taken as evidence of the perceived effectiveness of this method of seeking redress from treaty violations. Reinhardt (1999) suggests that instead the frequent use of the DSP are not evidence of “success,” but marks “potential challenges to the system” (p. 2).<sup>3</sup> The increased filings of disputes are not attempts to maintain cooperation but are instead evidence of increased violation of treaty obligations. Setear (1997) also argues that the enhanced DSP is a “step backward in the process towards greater cooperation”: its ease of use increases opportunities for non-cooperation and since punishment for violators is restricted to a “proportional” response increases the likelihood of defection. This paper clarifies agreements, or Levy and Srinivasan (1995) on the effect of allowing private parties access to a regional agreements’ DSP on the government’s willingness to sign such an agreement.

<sup>2</sup>Unexpected fluctuations in imports have been used to explain the tendency to adopt “managed trade policy”, the unilateral use of protection in periods of high imports (Bagwell and Staiger 1990).

<sup>3</sup>Reinhardt (1999) suggests that democracies are more likely be targets of the DSP because the policy-makers are more likely to be captured by import-competing interests than in other regime types. There is no compelling reason to think that autocrats are any less susceptible to capture by those same interests, however. On the link between regime type and trade policy, see Mansfield, Milner and Rosendorff (2000).

this confusion. We establish that while there may be more violations of the treaty when a DSP is present relative to any agreement without such a DSP, it makes the agreement more stable and makes countries more willing to remain within the cooperative world trading system. That is while there may be apparently less cooperation at any instant, in the long run, the probability that the regime breaks down is much smaller and hence the long average level of cooperation is higher. Moreover this result hinges on the “compensation” principle: that the cost of any violation is limited to the best guess of the impact of the violation on the trading partners and is not larger or more punitive.

We might call this trade-off between less cooperation today and more on average in the future, a trade-off between *rigidity* and *stability*. A movement to incorporate an effective DSP reduces the rigidity of the system – a country can violate its obligations and subject itself to the DSP while remaining within the terms of the agreement (a less rigid institutional structure than one where no DSP is available), increases the long run stability of the cooperative institution.

Why then do countries subject themselves to the discipline of the WTO’s DSP? Or alternatively, how can the DSP be effective without enforcement powers? The answer comes from the self-enforcing nature of the agreement. An astute politician may prefer to protect a politically powerful industry in periods of unexpected stress, and at the same time, compensate its trading partners for any burden. While the compensation demanded may be severe, the political affects of paying the compensation are likely to be smaller than the political benefits from protecting the industry. But what is more crucial is that by paying the compensation voluntarily, the country is signalling to its trading partners that it intends to return to a cooperative stance as soon as the temporary pressure rescinds. The payment of compensation acts as a signal of the country’s intent to continue to cooperate in the future, an intent justified by the continued benefits of cooperation. The payment is a penalty paid in order to preserve a country’s reputation as a cooperator (at least in “normal” times). In response the trading partners observe this willingness to pay in order to preserve its reputation, and opt not to punish the offending partner by revoking concessions or even exiting the system.

If the costs associated with using the DSP was excessively large, countries would not be willing to apply these penalties to themselves and the DSP would lose its teeth. The mechanism would be ineffective in either increasing the stability of increasing the level of cooperation if the costs

of violation were prohibitive.

The central problem that countries face in their attempt to cooperate in the face of uncertain political pressure is that they are unable to contract on the basis of an unobservable variable; the contract to cooperate is fundamentally incomplete. A trading partner must be able to verify the exact level of political pressure that another is facing when it must choose a tariff level. The problem of contracting in an environment of incomplete (and unverifiable) information has been well-studied in economics: this is the problem of “moral hazard” (Dixit, 1996)

In summary, then the central results of this paper are that

- *The DSP is a mechanism to deal with heightened, unexpected political pressure.*
- *Agreements with a DSP are more stable than those without.*
- *Stable agreements are possible with a wider variety of countries when those agreements embody a DSP.*
- *The DSP is self-enforcing and effective.*
- *Agreements with a DSP are less rigid and more stable – less per period cooperation but longer on average cooperation.*

## **CHARACTERIZATION OF THE DSP**

The procedures specified in the Dispute Settlement Understanding (DSU) adopted during the Uruguay Round Agreements are consistent with the practice that had developed since the GATT was first implemented in 1947. A contracting party may file a complaint with the WTO regarding a perceived violation of the treaty on the part of another member. If formal, bilateral consultations are unproductive (an attempt at a negotiated resolution), the complainant may request that a panel of independent experts to investigate the matter and make a recommendation (a more “judicial” approach). If the panel finds that the offending action is GATT-inconsistent, the offending party is obliged, should the panel so recommend, to terminate the violating measure and bring its practice back into conformity with its GATT obligations. The finding can be appealed to the Standing Appellate Body, a panel of three experts drawn from a permanent

roster of seven, selected for a four year term on a staggered basis. There is no possibility that any member can “block” the report.

If the recommendations of the panel are not implemented within a reasonable amount of time, the DSU permits possible “compensation” or retaliation. The purpose of this compensation or retaliation is to provide compensatory benefits to restore the balance of negotiated concessions disturbed by the non-complying measure (Dunoff and Trachtman 1999, Jackson 1997). If the offending state does not change its offending action or provide compensation, the WTO may authorize a retaliation to restore balance. While the agreement clearly favors compliance with negotiated concessions, it is clear that the WTO system **“authorizes a Member to choose to “breach” an obligation, and pay compensation to the injured party”** (Dunoff and Trachtman 1999 p X).<sup>4</sup>

The effect of a finding by a panel that there has been a violation is an obligation by the offending state to restore the losses experienced by the partner state. The DSP therefore takes three crucial actions:

1. it identifies that a violation has occurred;
2. it estimates the compensation that is due;
3. and it reports that compensation has been made (by virtue of closing of the case).

The institution then serves a crucial information-providing role.<sup>5</sup> It establishes the facts of a violation, estimates the damages, and reports a successful completion of the process. It is this informational role of the DSP that determines its effectiveness in the world trading system.<sup>6</sup>

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<sup>4</sup>This interpretation of the WTO’s DSP is consistent with the legal hypothesis of “Efficient Breach” – where breach is more efficient in a Pareto sense than is performance under a contract. In this view, the WTO can be viewed as an incomplete contract, and while there is no true court-like mechanism to compel payment in the case of breach, here we show that voluntary compliance can work just as well. See Dunoff and Trachtman (1999).

<sup>5</sup>Kovenock and Thursby (1994) suggest this role for the DSP at the GATT in a model without domestic politics but with a set of “demons” who introduce random deviations from the cooperative regime. Maggi’s (1999) model has the WTO informing third parties of any observed violation of a country’s obligations. The effect is to facilitate enforcement efforts. Here the information provided by the WTO prevents mistaken punishments from being applied.

<sup>6</sup>A variety of economic and political institutions have developed to provide crucial information to interacting

In the next section we compare two games of international trade policy played between two contracting parties. In the first game there is no DSP institution; in the second, at each period, the players listen to the information provided by the DSP; we examine the equilibrium strategies in these two games and examine their properties. We find that the equilibrium to the DSP game exhibits two crucial properties: the agreement is more stable and permits a wider variety of states to participate.

## THE ARGUMENT

We may view the DSP as an institution within the broader set of institutions that govern trading relations between states. Following North (1990)(North 1990) and others, we may view an institution as an equilibrium to a game of strategic interaction. In what follows we specify a pair of strategies for two countries that embody a procedure for dealing with violations of a commitment to cooperate that is consistent with the dispute settlement procedures as articulated in the Dispute Settlement Understanding adopted as part of the Uruguay Round Agreements. If this pair of strategies is a Nash equilibrium to the game of repeated strategic action that describes relations between trading states, then we can say that the DSP is an equilibrium institution.

Our purpose then will be to compare the features of the institution/equilibrium with and without a DSP. We will show that the institution with the DSP is more stable than those without a DSP; moreover, a wider variety of states will be willing to sign agreements when a DSP is available than when no such possibility exists.

## THE ECONOMY

Consider two countries that are identical, except for their endowments. Each country is endowed with two goods labelled  $x$  and  $m$ ; the home country is relatively well endowed with good  $x$ , and the foreign country with  $m$ . On the demand side, to keep things simple, we allow the consumers in each country to consume only the imported good. Then home will import and consume good  $m$ , while foreign will import and consume  $x$ .

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parties; for example the Law Merchant (Milgrom, North and Weingast, 1990), or lobbies (Milner and Rosendorff, 1997). For the informational role of multilateral institutions see Oye (1986).

Each country has a single instrument at its disposal: a tariff on its the imported good. Home can apply the specific tariff  $t$  on the imports of good  $m$  while foreign levies  $\tau$  on its imports of  $x$ . Then the price of  $m$  at home, and hence home's consumer surplus is a decreasing function of  $t$ , while the consumer surplus abroad is a decreasing function of  $\tau$ . The domestic firms earn profits  $\Pi_m(t)$  (for the import-competing firms) and  $\Pi_x(\tau)$  for the export firms, with  $\Pi_m(t)$  rising with  $t$  and  $\Pi_x(\tau)$  falling with  $\tau$ . Tariff revenues are denoted  $T(t)$  which rise and then fall with  $t$ .

A government's (one-period) utility depends on the sum of consumer surplus, and tariff revenues. Moreover, political pressure which import competing firms bring to bear is added to the objective function by weighting the firms' profit term. Let  $a > 0$  denote the weight that government attaches to firm's profits. The home government's (one period) utility function then is

$$G(t, \tau; a) = CS(t) + a\Pi_m(t) + \Pi_x(\tau) + T(t). \quad (1)$$

Similarly for the foreign government:

$$G^*(t, \tau; \alpha) = CS^*(\tau) + \alpha\Pi_x^*(\tau) + \Pi_m^*(t) + T^*(\tau) \quad (2)$$

where  $\alpha$  is the weight put on the interests of the import-competing sector in foreign by the foreign government.<sup>7</sup>

The political pressure parameters  $a$  and  $\alpha$  are stochastic; they are independently and identically distributed (iid) with cumulative distribution function (cdf)  $\Phi$ . At the beginning of each period, the government in each country knows the level of political pressure it faces at home; it is uninformed about the political pressures that have emerged in the foreign country. And each is equally uninformed about the nature of the politics each might face in any future period.

### **International Cooperation: The Prisoner's Dilemma**

We characterize the fundamental problem of sustaining cooperation between countries in the realm of international trade as a Prisoner's Dilemma (PD). Each governments' welfare depends on the action of the other; moreover, lower tariffs for both players Pareto dominate an environment of higher tariffs for both. However, each government prefers high domestic tariffs and low foreign

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<sup>7</sup>These "politically optimal objective functions" capture the idea that government officials are politically motivated (Baldwin 1987).

tariffs over other policy pairs, and hence each has an incentive to deviate from any low tariff environment.

We establish in this section the conditions under which cooperation can be sustained in the infinitely repeated PD game.<sup>8</sup>

### Under Nash Equilibrium.—

Under the Nash equilibrium (NE) to the one shot game, each player chooses a level of domestic trade barriers as a best response to the behavior of the opponent. In any period in which  $a$  and  $\alpha$  are known we can solve for the Nash equilibrium in trade barriers for that period. Let  $t(\tau) = \arg \max_t G(t, \tau; a)$ , and  $\tau(t) = \arg \max_\tau G^*(t, \tau; \alpha)$ , and solving simultaneously, leads to the Nash pair  $(t^N, \tau^N)$ . Denote home government's utility under the Nash as  $N(a, \alpha) = G(t^N(a), \tau^N(\alpha); a)$ .<sup>9</sup>

### Under Cooperation.—

The agreement specifies the pair of trade barriers that constitute cooperation. Let that pair be  $(t^C, \tau^C)$ , with  $t^C < t^N(a)$  for all  $a$ , and  $\tau^C < \tau^N(\alpha)$  for all  $\alpha$ . Denote the utility of each of the governments under the cooperation as  $C(a) = G(t^C, \tau^C; a)$  and  $C^*(\alpha) = G^*(t^C, \tau^C; \alpha)$ .

### What about Defections?.—

What are the payoffs when, say, home defects and foreign cooperates in the one-shot game? The optimal defection is  $t^D = \arg \max_t G(t, \tau^C; a)$ , and utility under the optimal defection is  $D(a) = G(t^D(a), \tau^C; a)$ . If instead, foreign defects and home cooperates, home receives the sucker's payoff  $S(a, \alpha) = G(t^C(a), \tau^D(\alpha); a)$ .

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<sup>8</sup>This model follows somewhat closely that of Rosendorff and Milner (RM, 1999) with two crucial differences: the DSP must choose the compensation level  $L$ , (to be defined below) that is to be paid by the offending country to the trading partner, and it does so facing the same informational constraints that do the states. In RM on the other hand, the WTO simply reports if the offending country has penalized itself by incurring some exogenous adjustment costs.

<sup>9</sup>Note that  $t^N$  is not a function of  $\alpha$ , and  $\tau^N$  is not a function of  $a$  as a consequence of the separability of the objective functions.

## The Prisoners' Dilemma

So in any play of the game we have  $D(a) > C(a) > N(a, \alpha) > S(a, \alpha)$  for any pair  $(a, \alpha)$ , a prisoner's dilemma (PD), as represented by the standard  $2 \times 2$  normal form matrix.

	$C^*$	$D^*$	
$C$	$C(a), C^*(\alpha)$	$S(a, \alpha), D^*(\alpha)$	(3)
$D$	$D(a), S^*(a, \alpha)$	$N(a, \alpha), N^*(a, \alpha)$	

To simplify the notation,  $D(a) - C(a) \equiv B(a)$ . Each player is susceptible to political pressure both to protect against foreign imports and to open export markets; in the future both are equally unsure how much pressure each will experience. Hence home must make its best guess about the value of raising domestic tariffs (defecting) in any period by taking expectations over  $a$ : we denote this best guess by  $B = \int_a^R B(a) d\Phi$ . Similarly, both players are completely uninformed about the possible draws of  $a$  and  $\alpha$  in any future period. Hence the values of  $S(a, \alpha)$  and  $N(a, \alpha)$  are unknown for future periods. Expectations can be formed however: denote  $S = \int_a^R \int_\alpha^R S(a, \alpha) d\Phi d\Phi$  and  $N = \int_a^R \int_\alpha^R N(a, \alpha) d\Phi d\Phi$ .

This one-shot game is infinitely repeated, and the players choose strategies to maximize the expected sum of their discounted *one* period utilities:

$$E \sum_{i=0}^{\infty} \delta^i G(t_i, \tau_i; a) \quad \text{and} \quad E \sum_{i=0}^{\infty} \delta^i G^*(t_i, \tau_i; \alpha)$$

The PD in (3) above is played in the presence of uncertainty; as in the standard PD, however, a cooperative equilibrium in trigger strategies can be supported by a large enough discount rate.

**Lemma 1** *A pair of grim trigger strategies (cooperate until a defection is observed, then punish for ever) is an equilibrium to game (3) for all  $\delta > \frac{\max_a B(a)}{C - N + \max_a B(a)}$ .*

The (expected) incentive to defect in any period with draw  $a$  is  $B(a)$ . The largest value that  $B(a)$  can take is  $\max_a B(a)$ . If this maximal incentive to defect is less than the present discounted expected value of future punishments  $\frac{\delta}{1-\delta} (C - N)$ , cooperation is sustained.

We can view the cooperative outcome to this game as characterizing the international agreement in the absence of a mechanism to deal with disputes or other episodes of unfair practice.

In this game, the trigger strategy equilibrium requires an infinite punishment in the event of a deviation.

Notice that the stability of the international agreement requires very high discount factors – that irrespective of the draw of  $a$  in any period, there is still never enough political pressure to induce defection if the future is valued highly enough. Conversely, if the shadow of the future does not loom large, in periods of high political pressure, a government will defect. We have therefore the standard result that cooperation (here in the face of political pressure) is sustainable only when the players are very patient.

### **The Dispute Settlement (DS) Game**

Consider a period in which the government of the domestic country receives a high shock. The unexpectedly large value of  $a$  implies that the government has come under excessive pressure to protect the local import-competing industry. The options that the government faces are firstly to stick with the purely cooperative agreement and play  $t^C$  and earn  $C(a)$ , or alternatively to play  $t^D(a)$  and earn  $D(a)$ . In the event that home chooses to play the defect strategy,  $D$ , it would invoke an infinite punishment in the PD game, and the cooperative world trading system breaks down.

#### **The Ruling.—**

Instead consider the following DS game structure. After the domestic country has adopted a defect action (a violation) in any period, the other country (the complainant) files a dispute (requests a panel) with the *WTO*. The panel is equally uninformed about the political pressure that the governments in each country are facing. That is, the panel does not know precisely the values of  $a$  and  $\alpha$  that have been drawn in the current period. In equilibrium if a member defects, the other will file a dispute. The panel will then, using the best information at its disposal, verify the defection and attempt to measure the loss that the complainant has sustained due to the defect action of the other member.<sup>10</sup>

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<sup>10</sup>We focus here on the role of the panel as a mechanism firstly to declare that a violation has been observed and to estimate the compensation that is due. Notice that the panel has no enforcement ability – its role is merely to declarative.

So given that a state has defected, the panel estimates the losses to the injured state. If home defects, foreign receives  $S^*(a, \alpha)$  instead of  $C^*(\alpha)$ . Then the actual losses are  $L^*(a, \alpha) = C^*(\alpha) - S^*(a, \alpha)$ . However the panel cannot verify (ex ante) the actual values of  $a$  and  $\alpha$ . Instead it must take its best guess given the information at its disposal. The actual estimate of the losses incurred by foreign will be the expected value of  $L^*(a, \alpha)$ , which we write as  $L^* = \int_a \int_{\alpha} L^*(a, \alpha) d\Phi' d\Phi$  where  $\Phi'$  indicates a revised distribution of  $a$ , updated by the information that home has defected. Similarly, if foreign is the defecting party, the panel will establish a compensation of  $L = \int_a \int_{\alpha} L(a, \alpha) d\Phi' d\Phi$  where  $L(a, \alpha) = C(a) - S(a, \alpha)$ . Of course  $L = L^*$ , so we will simply refer to  $L$ .

**Compensation.**—

In this simple environment, the shock each period is identically distributed; therefore in any period, if there is defection, the compensation that is estimated will always be the same. That is any country contemplating a violation knows *ex ante* that the dispute panel will recommend compensation of size  $L$ .

In any period of the DS game, a player can take the Pareto action, i.e. play C as in the PD above, or can incur the costs of violating the agreement and paying the compensation, DS, at cost  $L$  (which accrues to the other player) or can defect D as before. That is the panel has no enforcement powers, and the defendant can choose not to pay any compensation whatsoever. Any compensation that is paid in equilibrium is done so on the volition only of the defendant state; a country might be willing to incur such costs in order to remain within broad parameters of the cooperative arrangement and to preserve its reputation as a cooperator.

The stage game is now  $3 \times 3$ , with the payoffs structures as in the table below.

	C*	DS*	D*
C	$C(a), C^*(\alpha)$	$S(a, \alpha) + L, D^*(\alpha) - L$	$S(a, \alpha), D^*(\alpha)$
DS	$D(a) - L, S^*(a, \alpha) + L$	$N(a, \alpha), N^*(a, \alpha)$	$N(a, \alpha) - L, N^*(a, \alpha) + L$
D	$D(a), S^*(a, \alpha)$	$N(a, \alpha) + L, N^*(a, \alpha) - L$	$N(a, \alpha), N^*(a, \alpha)$

(4)

Define “cooperation” as the play in any period of C or DS. Define defection as the play of D in any period.

**Definition 2** *An Dispute Settlement Strategy (for home) is a strategy in which home plays D if*

$D^*$  has been played in any period in the past; otherwise home plays C if  $B(a) < L$ ; plays DS if  $L \leq B(a) \leq \Lambda$  and plays D if  $B(a), L > \Lambda$  for some  $\Lambda$  to be defined later.

The extent of the political shock determines the gains to be had from defection this period; these gains rise with the political pressure that the firms bring to bear; i.e.  $B'(a) > 0$ . If these gains are small ( $B(a) < L$ ), then the government sticks to the Pareto play C. If the penalty is not too onerous ( $L < \Lambda$ ), then moderate gains from defection ( $L \leq B(a) \leq \Lambda$ ) cause the government to violate its obligations, and suffer the consequences of a negative finding by a WTO panel, DS, which include the payment of compensation. If the gains from defection are very large, and the penalty is large, i.e.  $B(a), L > \Lambda$ , then the government ceases to cooperate entirely, violates its treaty obligations and refuses to pay any compensation. A useful way to summarize the government's strategy is to say that the government cooperates (by playing C or DS) when  $\min(B(a), L) \leq \Lambda$  and defects otherwise.

The critical value of  $\Lambda$  is determined as the cost that would make any player of this game exactly indifferent between defecting (with compensation), and then returning to the cooperative regime, and defecting and exiting the system forever. It is intuitive, therefore, that if the costs the dispute procedure and the gains from defection are large, the government will cease to cooperate entirely.

**Proposition 3** *A pair of DS Strategies is a Nash Equilibrium.*

All the proofs are in the appendix.

An international agreement with features similar to the DSP emerges as an equilibrium to the game of international trade. In any period a country (say, home) can stick to the cooperative deal and play  $t^C$ , or in response to political pressure  $a$ , can defect to  $t^D(a)$ . The other country (foreign) observing that the tariff applies is larger than the agreement tariff  $t^D(a) > t^C$  files a complaint. The panel also observes  $t^D(a)$  and undertakes its first responsibility, to declare (the now obvious fact) that home has violated the terms of the treaty. The panel must now try to establish the loss that foreign has incurred,  $L^*(a, \alpha) = C^*(\alpha) - S^*(a, \alpha)$ . Now the panel has observed  $t^D(a)$ , but the panel is not informed about the value of  $a$ , nor is it aware of the political pressures in the filing country, i.e. the panel is not informed about the value of  $a$ . Hence the panel makes its best guess and recommends  $L^* = \int_{\alpha}^R \int_a^R L^*(a, \alpha) d\Phi' d\Phi$ . This is the penalty paid voluntarily, the WTO verifies the payment and closes the file. Cooperation resumes in the next

period. Hence the role of the institution is to verify the facts if the matter to its best ability and then to rely on the voluntary behavior of the participants.<sup>11</sup>

The next proposition and its corollary establish the central results of this paper: agreements with a DSP are durable – there is no positive probability that they will break down in any period, unlike an agreement without a DSP when countries are not sufficiently patient. The corollary establishes that it is exactly those countries who are not patient enough to sustain cooperation in the pure PD who will gain from incorporating a DSP into the agreement. The DSP effectively lowers the threshold value of the discount rate to zero in order to sustain a cooperative outcome.

**Proposition 4** *Agreements with a DSP are more stable than those without.*

Notice that in the standard PD (game (3) above), cooperation is sustained only for discount factors that are large enough, i.e.  $\delta > \bar{\delta} = \frac{\max_{\gamma} B(\gamma)}{P - N + \max_{\gamma} B(\gamma)}$ ; here in the Dispute Settlement equilibrium (DSE) on the other hand, cooperation can be sustained for any value of the discount factor as long as  $L \leq \Lambda$ .

**Corollary 5** *Agreements with a DSP are feasible for a wider variety of countries than one without.*

If the variety of countries is captured by variations in their discount factors, a PD agreement is feasible only if both countries have discount rates that are high enough, that is lie above  $\bar{\delta}$ . If the agreement has a DSP, then any two countries irrespective of their discount factors may strike a stable agreement. Hence countries with low discount factors are now able to join a stable agreement.

### The Trade-off between Rigidity and Stability

Notice that in any period where a state appeals to the dispute procedure, one (or both of the states) is playing, in that period, a defect action. There is no “true” cooperation in that period. The long run returns to each state that plays this game is lower as the dispute procedure is used more frequently. In contrast, if the dispute procedure is not available, there is more actual

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<sup>11</sup>This equilibrium is not renegotiation-proof. See Maggi (1999) and Ludema (1990) for a discussion of the effects of the possibility of renegotiation in the context of the GATT’s DSP.

cooperation in each period; yet the agreement will break down for certain at some point (for players with all but very high discount factors), since a defection will be too enticing, requiring an infinite punishment. Hence an agreement with a DSP yields lower per period cooperation but has a lower probability of breakdown.

## **Enforcement**

One particularly appealing aspect of this equilibrium from the point of view of the design of institutions is that compliance with the ruling of the WTO panel is self-enforcing. Any country that wishes temporarily to defect or violate its obligations under the GATT/WTO will visibly penalize itself by voluntarily compensating its trading partner. No external enforcement agency is required. In order for a defector to avoid being punished, it must pay the penalty  $L$  in a visible way. The institution plays a key role as information provider rather than an enforcer here: it is entrusted as an agent of the contracting states to check that when a dispute has been filed, it makes a recommendation as to the appropriate compensation; it informs all other players when such compensation has been paid. Only when penalties are not paid do the other states then need to punish.

## **On the number of signatories**

A consequence of the Uruguay Round agreements was essentially to make the DSP available to signatories; it effectively lowered the cost of relied (from prohibitive to something more affordable). The predicted effect is to increase the size of the set of discount factors that permit cooperation from the upper subinterval  $\frac{3}{4}, 1$  to the whole space  $(0, 1)$ . That is more countries (some less patient than others) could now credibly commit to the cooperative regime than was possible before the DSP was made more accessible,

When the WTO formally came into existence, 76 countries had ratified the Uruguay Round agreements, and hence those countries formed its first members, By the end of the second year of the WTO's existence, there were 129 members with another 34 negotiating for accession. Jackson (1997) predicts that "within a reasonably short period of time, 160 nations or independent customs territories will be members of the WTO" (p.1). This explosion of membership is exactly

what is predicted here.

## THE PRICE OF ESCAPE

A similar argument provides a rationale for the inclusion of escape clauses in the WTO agreements (Rosendorff and Milner 2001, Sykes 1991).<sup>12</sup> Article XIX allows signatories to renege on their commitments under certain circumstances. When increases imports “cause or threaten serious injury to domestic producers” of import-competing goods, a country may for a limited time, suspend its obligations under the GATT/WTO. This clause allows governments to escape their commitments in periods in which domestic industries are under pressure from increased imports from abroad.<sup>13</sup>

There are other forms of escape available throughout the GATT. Article VI of the GATT, the Antidumping and Countervailing Duties (CVD) codes (all part of the GATT agreement) allow member states to apply duties when imports are “dumped” or “sold at less than fair value” (in the case of dumping) or when the foreign competitor is being subsidized (in the case of CVD), and these have the same effect of allowing temporary relief when the local industry comes under pressure from foreign competitors and/or increases its lobbying and political pressure on the local government. Balance of payments exceptions (Articles XVII and XII), infant industry protection (XVIII) and tariff renegotiation (XXVII) all allow temporary escape from a country’s obligations under the GATT. It seems that optimal institutional design is to include possibilities for escape or relief when unanticipated political pressures become too intense to endure without some sort of accommodation.<sup>14</sup>

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<sup>12</sup>A crucial distinction between the model here and that of Rosendorff and Milner (2001), is that in this model we require direct compensation of the injured trading partner, while in RM, the offending state simply penalized itself by incurring some adjustment costs. Since the foreign country was not receiving a payment, its willingness to tolerate a temporary defection is actually lower in an escape clause environment than one with a DSP. Hence as escape clause can sustain cooperation only if the cost of doing so is higher, *ceteris paribus*, than the cost of exercising the DSP.

<sup>13</sup>It is sometimes called a “safeguard” action.

<sup>14</sup>Sykes (1991) suggests that political gains to one party of exercising an escape clause must be larger than the losses that accrue to the trading partner for an escape clause to be “politically Pareto efficient”. Notice we make no such demand here – rather the payment of the penalty acts as a signalling device of the intention of the rogue state to return to the fold of cooperating nations.

Overtime, more possibilities for escape have become available (many of these practices were created or codified in the sequence of negotiating rounds under the auspices of the GATT). The agreement has over time made escape more accessible, or easier to achieve; as a consequence we have seen an increased use of these measures. Some scholars and a number of negotiators have argued that it is time to tighten up some of these practices – and attempt to reform the AD practices that were unsuccessful during the Uruguay Round. The question effectively is how easy should it be for a state to obtain tolerated relief. The model provides a clear way to think about this: lower costs clearly means more frequent, tolerated escape, and less per period cooperation. But it also works to increase the stability of the agreement, and may permit more countries to accede to the deal. Stricter rules mean more cooperation, but fewer members and a more unstable agreement.

## **DSP and Cooperation**

We might reevaluate the debate mentioned in the introduction. Does the introduction of the DSP increase or reduce the degree of cooperation between states who are signatories to the GATT? The answer is that it does both. If we have two countries that are very patient, then they always cooperate irrespective of the domestic political conditions, and adding a DSP will reduce the per period cooperation by allowing temporary defections. If however, the signatories are of moderate patience (where we would expect most countries to fall), then the agreement (before a DSP) carried the risk that at some point a political shock would hit that is large enough to warrant complete abrogation of the treaty and an exit from the system. Such an agreement generates much cooperation while in place, but runs the risk of breakdown, a probability one event at some point in the future. Hence an introduction of a DSP reduces the per period cooperation (i.e. some periods there is temporary, tolerated defection), but the risk of breakdown of the entire treaty falls to zero.

So yes, there are more disputes and less cooperation at any instant; but the agreement is

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Notice that RM, Sykes (1991) and this paper all require some penalty to be paid for demanding relief that is tolerated by the trading partners. In that sense, these opportunities for escape resemble the penalties a private contractor might incur if it chose to breach a contract. Such a promisor might find it preferable to renegotiate, or pay damages, once time to perform arrives rather than perform under the terms of the contract.

clearly more stable and better able to endure despite the vicissitudes of domestic politics that affect the willingness of the signatories to remain within the community of cooperating nations.

## APPENDIX

**Definition 6** Let  $N(a, \alpha) - S(a, \alpha) \equiv A(a, \alpha)$

Recall that  $D(a, \alpha) - C(a, \alpha) \equiv B(a, \alpha)$ .

**Definition 7** Denote  $I(a) = \int_{\alpha}^R I(a, \alpha) d\Phi$ , and  $I = \int_a^R \int_{\alpha}^R I(a, \alpha) d\Phi d\Phi$  for any function  $I = A, B, P, D, N, S$ .

**Definition 8** Let  $p = \Pr(C \mid \text{cooperation})$

That is  $p$  is the probability of playing C given that C or DS is to be played. Consider the current period in which nature has drawn  $(a, \alpha)$ . Home knows  $a$ , but is unsure of  $\alpha$ , and hence is unsure of the behavior of the foreign country. Since the countries are symmetric, we know that foreign plays C\* with probability  $p$  and plays DS\* with probability  $1 - p$ . If home plays C, then home earns in that period, in expectation  $pC(a) + (1 - p)[S(a) + L]$ , while if home plays DS, home earns  $pD(a) + (1 - p)(N(a) + L) - L$ . Then C is played if  $pC(a) + (1 - p)[S(a) + L] > pD(a) + (1 - p)(N(a) + L) - L$ , that is if  $L > p[D(a) - C(a)] + (1 - p)(N(a) - S(a))$  if  $L > pB(a) + (1 - p)A(a)$ . Hence  $p = \Pr(L > pB(a) + (1 - p)A(a))$ .

**Lemma 9** For any  $L$ , the function  $\Theta(p; L) = \Pr(L > pB(a) + (1 - p)A(a))$  has a fixed point,  $p = \Theta(p; L)$ .

**Proof.** For any  $L$ ,  $\Theta$  is a continuous function of  $p$  mapping from  $[0, 1]$  into  $[0, 1]$ . Now  $[0, 1]$  is a compact, convex set. Hence a fixed point exists by Brouwer's Fixed Point Theorem. ■

Lemma 2 implies that, implicitly, there exists a distribution function  $\Gamma$  such that  $p = \Gamma(L)$ .

**Lemma 10**  $\Gamma(0) = 0$  and  $\lim_{L \rightarrow \infty} \Gamma(L) = 1$

**Proof.**  $\Gamma(0) = \Pr(0 > A(a)) = 0$  since  $A(a) > 0$ .  $\lim_{L \rightarrow \infty} \Gamma(L) = \lim_{L \rightarrow \infty} \Pr(L > pB(a) + (1 - p)A(a)) \rightarrow 1$  since  $B(a), A(a)$  are finite for all  $a$  and  $p \in [0, 1] \forall L$  since  $p$  is a distribution function. ■

**Proof of Proposition 1** *A pair of Escape Clause Strategies is a Nash Equilibrium.*

The expected current period return from defection at home is  $D(a)$ , and hence the gains from defection are  $D(a) - \max(C(a), D(a) - L) = \min(B(a), L)$ . Consider the event that a deviation has been observed in some period. From then on, the one shot Nash strategies are played, yielding the Nash payoff (in expectation, since the draws in the future periods are unknown) forever. That is the aggregate Nash (starting in the next period) is payoff  $V_D = \frac{\delta}{1-\delta}N$ . What is the foregone cooperative aggregate payoff? If cooperation occurred in the last period, in the next, each player has the option of cooperating again, or defecting. The value of the game in a cooperative phase is the earnings from the play in that period, plus the continuation value,  $V = p[p(C + \delta V) + (1-p)(S + L + \delta V)] + (1-p)[p(D - L + \delta V) + (1-p)(N + \delta V)]$ . Solving we have

$$\begin{aligned} V &= \frac{1}{1-\delta} p^2 C + p(1-p)(S + D) + (1-p)^2 N \\ &= \frac{1}{1-\delta} p^2 (C - D + N - S) + p(S + D - 2N) + N \\ &= \frac{1}{1-\delta} p^2 (A - B) + p(-A + D - N) + N \end{aligned}$$

Hence

$$V - V_D = \frac{1}{1-\delta} p^2 (A - B) + p(D - N - A) + N(1-\delta)$$

Recall that  $p = \Gamma(L)$ . The no defect condition in any period is therefore

$$\min(B(a), L) < \frac{1}{1-\delta} (\Gamma(L))^2 (A - B) + \Gamma(L)(D - N - A) + N(1-\delta)$$

Let  $Z(L) \equiv \frac{1}{1-\delta} (\Gamma(L))^2 (A - B) + \Gamma(L)(D - N - A) + N(1-\delta)$ , and define  $\Lambda$  to be a fixed point of  $Z(L)$ , i.e.  $Z(\Lambda) = \Lambda$ . Set  $z(L) = Z(L) - L$ . Now  $z(0) = N(1-\delta) > 0$  and as  $L \rightarrow \infty, \Gamma(L) \rightarrow 1$ , and  $z(L) \rightarrow -\infty < 0$  from Lemma 2. Then we have a non-degenerate fixed point by the intermediate value theorem. Then  $\Lambda$  is the upper bound on any penalty in order to invoke the DS, and home plays C if  $B(a) < L < \Lambda$ ; plays DS if  $L \leq B(a) \leq \Lambda$  and plays D if both  $B(a), L > \Lambda$ . Hence a pair of Dispute Settlement Strategies is an equilibrium.

**Proof of Proposition 2** *Agreements with a DSP are more stable than those without.*

Given any  $\delta$ , the probability of the PD game breaking down is strictly positive for  $\delta < \bar{\delta} = \frac{\max_{\gamma} B(\gamma)}{P-N+\max_{\gamma} B(\gamma)}$ , and is equal to zero for  $\delta \geq \bar{\delta}$ . In the DS game the agreement never breaks down as long as  $L < \Lambda$ .

**Proof of Corollary 1** *Agreements with a DSP are feasible with a wider variety of countries than one without.*

With a DSP, true cooperation occurs as long as  $L \leq \Lambda$ ; there is no restriction on the discount factor  $\delta$ . That is, given any discount factor  $\delta$ , the penalty  $L \leq \Lambda$  which implies that a DSE exists. In the standard PD in the face of uncertainty, cooperation occurs whenever  $\delta > \bar{\delta}$ . Hence the set of discount factors under which the standard PD under uncertainty can support a cooperative equilibrium is  $\bar{\delta}, 1 \subset (0, 1)$ , the set of discount factors which an DSE exists.

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