ECONOMICS AND POLITICS 0954-1985
Volume 14 November 2002 No. 3

THE ECONOMICS OF TRADE DISPUTES, THE GATT'S ARTICLE XXIII, AND THE WTO'S DISPUTE SETTLEMENT UNDERSTANDING

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Economic theory has yet to provide a convincing argument that can explain why the threat of retaliation under the GATT/WTO dispute settlement procedures is not sufficient to prevent countries from violating the agreement. We consider the question of why countries violate the agreed-upon rules in the face of explicit provisions which allow them to legally adjust their trade policy. Using the GATT/WTO institutional structure and the guiding principle of reciprocity, we provide a theory suggesting when countries will choose to implement protection in violation of GATT/WTO rules, as opposed to under the relevant safeguards provisions, when trade policy adjustments are necessary between "negotiating rounds."

1. INTRODUCTION

SINCE 1947 over 140 countries have either signed the original General Agreement on Tariffs and Trade (GATT, 1947) or have become members of the World Trade Organization (WTO). Under these agreements, countries subject themselves to rules that place limitations on their available trade policies, bind tariffs to agreed-upon levels, and prohibit most other non-tariff barriers to trade. Article XXIII of the GATT 1947 and the *Dispute Settlement Understanding* (*DSU*) of the WTO provide fora to which countries bring grievances claiming that other participating countries have violated the agreed-upon rules of trade. Legal scholars such as Dam (1970) have emphasized that the GATT system is structured so that countries that are injured by rules violations are authorized to threaten *retaliation* under the dispute settlement mechanism so that the agreements may maintain a balance of obligations. Yet even in the presence of such a system, trade disputes in which countries deliberately violate the GATT/WTO rules are frequent to occur. Since its 1995 inception, the WTO has been notified of over 240 complaints (WTO, 2001). The central purpose of this paper is to provide an economic framework that can be used to further our understanding of the dispute settlement mechanism and to interpret the role of disputes in the formal institutions of international trade.

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The normative role of the GATT/WTO dispute settlement mechanism has been a subject of considerable historic controversy, and as Jackson states:

> A number of interesting policy issues are raised by the experience of the [dispute settlement] procedure, not the least of which is the question of what should be the fundamental objective of the system – to solve the instant dispute (by conciliation, obfuscation, power threats, or other means), or to promote certain longer-term goals.... The historical question is whether the GATT preparatory work and practice through its decades establishes a goal of dispute-settlement more oriented toward "conciliation and negotiation" or toward "rule integrity."
>
> (Jackson, 1989, pp. 92–93)

In the economics literature, analysis of the dispute settlement mechanism has focused almost exclusively on Jackson's "rule integrity" orientation. Theorists typically model the mechanism as a trigger strategy (i.e. a policy that governments will enact so as to follow a given "rule") in an infinitely repeated, non-cooperative, tariff-setting game between countries, exploring the mechanism's role in supporting *low equilibrium tariffs* (i.e. one important "longer-term goal" of the GATT).[1] However, the typical equilibria of these models either never exhibit trade disputes, or the equilibria exhibit disputes that are automatically triggered after the observance of a random fluctuation, such as a terms-of-trade change.[2] Once the structure of the GATT institution is taken as given, the trade disputes are neither avoidable nor the result of a deliberate, rational policy *choice* of a government.

Our first contribution is to focus on Jackson's alternative "conciliation and negotiation" aspect of the dispute settlement mechanism, which we feel has largely been ignored.[3] However, in order to provide a convincing interpretation of this role, we must determine why a country that seeks flexibility in its trade policy chooses to deliberately disregard GATT rules and its obligations, even knowing that it would be caught and that a trade dispute would result. There are, of course, explicit GATT safeguards provisions whose *purpose* is to give governments flexibility under the agreement so that they may "legally" alter their trade policy and avoid disputes.[4] To understand the GATT/WTO dispute

[1] Riezman (1991), Hungerford (1991), and Ludema (2001) use this structure in a bilateral setting, as does Maggi (1999) in a multilateral setting. This line of analysis applies the dynamic oligopoly theory of implicit collusion of Green and Porter (1984) and Rotemberg and Saloner (1986) to the implicit enforcement of trade policy in a dynamic tariff-setting game between countries. Relying on the notion of "international obligation," Kovenock and Thursby (1992) add a cooperative component to this structure by allowing countries to violate the agreement at some positive cost. Staiger (1995, pp. 1519–1528) provides a more complete survey of this literature.

[2] The exception to this is Kovenock and Thursby (1992), where trade disputes can occur when policy-makers cheat because they are possessed by a "demon."

[3] Ludema (2001) does consider "renegotiation-proof" equilibria, but with the intent of understanding how this affects the longer-term goal of lower cooperative tariffs.

[4] Countries have most frequently sought trade policy flexibility under Article XIX (for temporary import protection) and also Article XXVIII (for permanent import protection). Though less common, countries can alter their trade policy on the grounds of national security or other general exceptions (Articles XX and XXI) or under unusual circumstances when granted a waiver (Article XXV), or when suffering balance-of-payments crises under Articles XII or XVIII:B. For a discussion see Finger (1998).

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TABLE 1 GATT TRADE DISPUTES AND ALLEGED VIOLATIONS, 1947–1994

Total GATT Disputes	254
Allegations of excessive import protection causing the *nullification or impairment* of GATT benefits	... 206
Other Disputes	... 48
Disputes Brought Under Article XXIII	196
Allegations of import protection by violating Articles I (MFN), II (Tariff Bindings), III (National Treatment), XI (Quantitative Restrictions), other	... 162
Allegations of export (subsidies) promotion, measures taken for non-economic (political/retaliatory) reasons, or valid submissions for legal interpretations	... 34
Disputes Brought Under 1979 Tokyo Round Codes[a]	24
Allegations of import protection under Subsidies, Antidumping, Procurement, Standards or Aircraft Codes	... 21
Allegations of export promotion under Subsidies Code	... 3
Other Documented Disputes[b]	34
Allegations of import protection	... 23
Allegations of export promotion	... 11

Sources: Compiled by the author from WTO (1995, 1997) and Hudec (1993).
[a]Disputes under provisions of the 1979 MTN Codes were brought to the Code's own dispute resolution forum and not under Article XXIII as not all GATT countries had signed on to each of the individual Codes.
[b]Compiled and published in Hudec (1993). These disputes were often brought forth at ministerial meetings or without following the proper Article XXIII channels and have hence not been documented by GATT/WTO publications as Article XXIII disputes, even though they are substantively equivalent.

settlement mechanism and the basis of the disputes, we attempt to justify one motive for why countries sometimes prefer to implement policies in violation of GATT/WTO rules or their obligations, so that negotiations occur under the dispute settlement mechanism, as opposed to implementing the policies in a manner that would allow for negotiations to be held under the GATT's safeguards provisions.

In order to better motivate our perspective, consider the issues that most frequently lead to a trade dispute. Most disputes under the GATT regime, for example, involved a claim that a government had provided more protection for an *import-competing* industry than it had stipulated it would limit itself to in a prior negotiating round. Table 1 illustrates this by providing a description of the trade disputes that occurred during the GATT tenure. Of these 254 trade disputes, over 81% (206) involve such a claim: a country has violated the GATT rules in order to provide excessive import protection. The most common infractions were countries using quantitative restrictions to limit trade (violations of Article XI), but countries have also failed to observe the rules on MFN (Article

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TABLE 2 THE FREQUENCY OF ARTICLE XIX, XXIII, and XXVIII ACTIONS OVER GATT HISTORY, 1947–1994

	Illegal activity Article XXIII[a]	Legal import protection	
		Article XIX	Article XXVIII
1947–56	48	8	44
1957–66	15	34	69
1967–76	20	41	52
1977–86	77	49	84
1987–94	94	18	26
Total	254	150	275

Sources: Compiled by the author from WTO (1995, 1997) and Hudec (1993).
[a]Cases falling under Article XXIII, the MTN Codes' dispute resolution fora, or "Other Documented Disputes" of Table 1.

I), national treatment (Article III), subsidies (Article XVI), or the various Codes of the Tokyo Round, or have failed to implement lower negotiated tariffs thereby nullifying expected benefits (Article II). The other 48 cases primarily involve the use of subsidy policies for export promotion (violating Article XVI), though there have been instances in which disputes occurred over trade policies that were undertaken for purely political reasons.[5] Surprisingly, there have been few submissions in which a country sought a GATT panel opinion over a question of legal interpretation.[6] A good number of these cases involve legitimate claims that a country has provided import protection that is (i) excessive, relative to its negotiated trade liberalization commitments made in an earlier negotiating round, and (ii) this excessive protection has not been afforded under the safeguards provisions. In what follows, we will refer to these types of policy adjustments as GATT-'illegal' protection.

Table 2 illustrates the historic use of GATT Articles XIX, XXIII, and XXVIII pitting the frequency of countries violating the rules and getting caught against those instances in which countries implemented protection under two of the most easily quantifiable safeguards provisions. With the exception of a period in the 1960s when the dispute settlement mechanism was not often utilized,[7] GATT countries appear to have been frequent in implementing protection both legally

[5] For example, see *Poland* v. *US* (1982) for US sanctions due to suppression of the "Solidarity" movement, *Argentina* v. *EC, Canada & Australia* (1982) for the Falklands War embargo, *Nicaragua* v. *US* (1985) for the US trade embargo, and *Yugoslavia* v. *EC* (1992) for trade restrictions over the war in Yugoslavia.

[6] The recent high-profile disputes such as Tuna/Dolphin, Beef/Hormones and Shrimp/Sea Turtle are clear exceptions, but these cases over international environmental and health standards are relatively atypical.

[7] The 1960s should not be mistaken as a period when countries were relatively more "law-abiding." As Hudec notes, "... the 1960s can be seen as a period when GATT more or less suspended its legal system while it tried to sort out, by negotiation, the legal and economic adjustments that were needed ..." (Hudec, 1993, p. 13).

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TABLE 3 COUNTRY INVOLVEMENT IN GATT ARTICLE XIX, XXIII, and XXVIII ACTIONS, 1947–1994

	Illegal activity Article XXIII[a]		Legal import protection			
			Article XIX		Article XXVIII	
	Defendant	Plaintiff	Taken action	Affected[b]	Taken action	Affected[b]
EC[c]	92	55	26	49	18	110
US	71	81	25	38	20	105
Japan	20	5	0	37	6	20
Canada	14	22	22	16	18	27
Norway	6	6	1	6	6	25
Brazil	5	12	0	5	3	2
Australia	4	12	38	6	33	15
Korea	4	1	0	15	0	1
Sweden	3	3	0	6	11	38
Finland	3	3	2	3	11	16
Chile	3	9	3	1	1	6
Argentina	2	6	0	6	0	0
New Zealand	1	3	1	4	32	6
Austria	1	2	8	6	10	14
South Africa	0	1	4	2	40	14
Other	39	64	20	104	66	236
Total	268	285	150	304	275	635

Sources: Compiled by the author from WTO (1995, 1997) and Hudec (1993).
[a]Cases falling under Article XXIII, the MTN Codes' dispute resolution fora, or "Other Documented Disputes" of Table 1. Though there have been only 254 distinct disputes, there are many examples of (i) multiple plaintiffs v. a common defendant and (ii) a single plaintiff v. multiple defendants.
[b]A country that is "affected" under Article XIX or XXVIII is a country that has notified GATT that it is seeking negotiations with a country taking action in order to obtain compensation to balance *substantially equivalent concessions*, as authorized under the statute. For one Article XIX or XXVIII action taken, there may be multiple "affected" countries, or the measure implemented may be so insignificant that there may be zero "affected" countries. The figures listed in the table are the number of times each country has notified the GATT that it has been "affected" by an Article XIX or XXVIII action.
[c]"EC" is the entire EC or EC member country or group of EC member countries within the same action taken. Any pre-1957 actions involving one of the original six Treaty of Rome countries have been categorized as "EC" as well.

and illegally (and getting caught).[8] Table 3 also shows clearly that most governments who have been accused under Article XXIII of violating their obligations have also frequently utilized the GATT provisions in order to afford protection *legally* under Articles XIX and XXVIII.

The tables provide evidence that countries understand the GATT system and their basic rights and obligations. The policies that provide excessive protection to import-competing industries and lead to GATT trade disputes have been

[8] Presumably there were many more instances not captured in these tables in which countries were not "caught" but nevertheless implemented protection in a manner that violated GATT rules.

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undertaken by countries with experience in using the GATT's safeguards provisions. This then begs the following question. When a country seeks trade policy flexibility, why would it at one instance and with one set of trading partners adhere to the rules of the GATT system and at another instance with other partners disregard the rules and implement a policy that would cause it to face the threat of sanctions under the dispute settlement mechanism?

Dam (1970) has suggested that trade disputes may occur because the GATT's dispute settlement mechanism is ineffective in preventing countries from violating their obligations when trade is with respect to a certain class of partners. As an example, he states,

> [a]nd even retaliation itself may prove to be a relatively weak sanction where the injured contracting party is not a major customer for a major product of the offending contracting party. Many less-developed countries have felt powerless to influence the restrictive commercial policies of developed countries because they did not consume enough of any of the latters' exports.
>
> (Dam, 1970, p. 368)

Our focus on the GATT/WTO dispute settlement mechanism as a forum of negotiation enables us to provide an economic model that can be used to address Dam's general point. Consider a country's protection implementation decision: it can make the trade policy adjustment *legally* under the GATT's safeguards provisions, where compensation due to affected trading partners is limited by the rule of *reciprocity*,[9] or it can implement the protection illegally, get caught, and face a dispute. This framework serves to establish two negotiating fora that the protection-affording country ultimately chooses between when making its policy decision. Following Dam's observation, when a country's trading partners are relatively "powerless," the country may readily initiate a policy that leads to a trade dispute simply because there is little fear of retribution should compensation negotiations break down. Interpreted from the perspective of a "weaker" country, this bilateral imbalance of power motivates why other countries implement policies under the safeguards provisions: it is a means to avoid disputes and the threats of unprotected retaliation.[10]

This paper provides a theory to explain why countries deliberately implement trade policy adjustments in violation of GATT/WTO rules that may knowingly result in a trade dispute. Formally, our theory of the GATT/WTO dispute

[9] In order to clarify, *reciprocity*, in its formal role in the GATT (see Bagwell and Staiger, 1999, 2001, and our discussion below), serves as a rule of *moderation* in determining the affected trading partners' permissible retaliatory response to a country that follows the rules when increasing protection. This is distinct from the notion that countries seek *reciprocity* in "market opening," trade liberalization negotiations, which is not required in the GATT statute, but is simply more a "rule of thumb." This informal role for reciprocity is not a focus of our analysis.

[10] Our results concerning the role of "power imbalances" are reminiscent of Maggi (1999). Note, however, that Maggi's focus is not on trade disputes but on showing that a multilateral trade agreement can support a lower level of cooperative tariffs than a collection of bilateral agreements in the presence of bilateral imbalances of power.

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settlement mechanism utilizes a simple model of international trade with political economy influences. As will be clarified from our modeling assumptions, we deliberately abstract from questions as to the *enforcement* of international trade agreements, which is arguably the approach taken by the literature referred to earlier (see footnote 1). Our intent instead is to focus on the rules of the GATT/WTO as they apply to negotiations over *adjustments* to trade policies necessitated "between rounds." Thus, we start our analysis from an efficient trade agreement and suppose that a government experiences an unanticipated "shock" so that it has a legitimate efficiency reason to adjust its trade policy away from tariff bindings negotiated in an earlier "round." We assume that a country which chooses to implement the policy under the safeguards provisions will do so in a straightforward manner, by simply updating its level of protection to the new efficient level. The only essential conditionality for countries who implement protection legally under the GATT's safeguards provisions is that they are to negotiate compensation with the affected trading partner in accordance with the principle of *reciprocity*. On the other hand, countries could choose to implement protection illegally and face the threat of retaliation under the dispute settlement mechanism.

We model the GATT rules of retaliation under the safeguards and dispute settlement provisions as establishing two distinct threat points to be used in a bargaining game between countries which ultimately negotiate to the new, efficient outcome. The country implementing protection will choose the route (legal or illegal) which gives it the more advantageous bargaining position. In order to understand the intuition behind the results, it is again necessary to recognize the nature of self-reliance that the GATT/WTO system requires. Countries must have the *capacity* to retaliate in order to put themselves in a favorable bargaining position in compensation negotiations.

Our results can be summarized as follows. We show that the rules of retaliation in the GATT/WTO system induce *efficient* behavior on the part of countries that face the question of whether or not to update their trade policies. However, in terms of the pattern of behavior, the results indicate that a protection-affording country will have little fear of retribution and will use the illegal route when the terms-of-trade effect induced by its tariff increase outweighs the terms-of-trade effect induced by the threatened retaliatory tariff increase of the affected trading partner. Conversely, if the terms-of-trade effects are aligned to favor the affected trading partner, the protection-affording country uses the GATT's safeguards provisions so as to mitigate the powerful, affected country's potential response.

Once we have developed a basic understanding of Jackson's "conciliation and negotiation" role of the GATT's dispute settlement mechanism and the role of reciprocity as it applies to the safeguards provisions, we consider some of the WTO reforms that apply to this framework. From the perspective of our model, we interpret the reforms as providing substantive change to the incentives facing protection-affording countries under the *Agreement on Safeguards* and the *DSU*,

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suggesting a weakening in the permissible retaliatory threats and thus a change in the resulting qualitative pattern determining how countries make trade policy adjustments under the new system "between rounds."

The rest of this paper proceeds as follows. Section 2 establishes the basic theoretical model, and section 3 presents the decision-making structure and economic incentives facing countries that choose between affording protection illegally versus legally under the GATT 1947. Section 4 illustrates the effects of the WTO reforms, and section 5 then concludes.

2. THE MODEL

To address these issues we use a model with political economy influences in the spirit of Bagwell and Staiger (2001). Assume a world with two countries, Home (no *) and Foreign (*). Each country produces and consumes two goods, and x (y) is the natural import good of Home (Foreign).

2.1 *Market Structure*

Assume that demand in each country for each good shares a common linear function. Let p_x and p_y denote the local prices for the imported and exported good, respectively, in the Home market, and let p_x^* and p_y^* denote the local prices in the Foreign market. Home's demand functions are then given by $D(p_x) = 1 - p_x$ and $D(p_y) = 1 - p_y$. Foreign's demand functions are symmetrically defined as $D(p_x^*) = 1 - p_x^*$ and $D(p_y^*) = 1 - p_y^*$.

The supply functions for each good are also assumed linear, and the production of each good takes place under the conditions of perfect competition. Home is assumed to have a comparative advantage over production of the y good (which it exports), and Foreign is assumed to have a comparative advantage over the x good (which it exports). The supply functions in Home are given by $Q_x(p_x) = p_x$ for the import-competing good and $Q_y(p_y) = 1 + p_y$ for the export good. Similarly, the supply functions in Foreign are given by $Q_y^*(p_y^*) = p_y^*$ and $Q_x^*(p_x^*) = 1 + p_x^*$.

The profit functions in Home are therefore $\Pi_x(p_x) = p_x^2/2$ for the import-competing industry and $\Pi_y(p_y) = p_y^2/2 + p_y$ for the export industry. Similarly, the profit functions in Foreign are $\Pi_y^*(p_y^*) = p_y^{*2}/2$ and $\Pi_x^*(p_x^*) = p_x^{*2}/2 + p_x^*$.[11]

[11] Home's functions derive from production functions of the form $Q_x = (2L_x)^{1/2}$ and $Q_y = (2L_y)^{1/2} + 1$, where L_x (L_y) is the labor used in the production of the x (y) good, assuming that the supply of labor is infinitely elastic at a unitary wage and noting that Foreign's functions can be defined symmetrically. Then close the partial equilibrium model by adding a traded numéraire good, z, where we assume the utility of the representative agent is $U = C_z + (C_x - C_x^2/2) + (C_y - C_y^2/2)$ where C_i denotes the consumption of good $i \in \{x,y,z\}$. Assuming that z is sufficiently abundant in each country so that it is always consumed in positive amounts by each agent, the marginal utility of income is fixed at unity, and we can utilize partial equilibrium analysis of the two non-numéraire sectors. Trade in z will then be determined by the requirement of overall trade balance.

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2.2 Price Determination

In order to focus exclusively on governments providing protection for import-competing industries and the associated implications for the GATT/WTO dispute settlement mechanism, we allow governments to affect local and world prices via *import* tariffs only. Therefore let τ (τ^*) denote the specific import tariff in Home (Foreign) on imports of x (y).

As long as the tariff rates are not prohibitive, the local prices in each country will obey both a no-arbitrage and a market-clearing condition. No arbitrage requires that $p_x = p_x^* + \tau$ and $p_y^* = p_y + \tau^*$. Market clearing requires simply that supply equal demand between the two countries, i.e.

$$D(p_x) + D(p_x^*) = Q_x(p_x) + Q_x^*(p_x^*) \quad \text{and} \quad D(p_y) + D(p_y^*) = Q_y(p_y) + Q_y^*(p_y^*).$$

We use these two conditions to then solve for the local prices as a function of the available trade policies, $\hat{p}_x(\tau)$, $\hat{p}_x^*(\tau)$, $\hat{p}_y(\tau^*)$, and $\hat{p}_y^*(\tau^*)$. Since there are no export policy instruments, the world prices of x and y, given by p_x^w and p_y^w, respectively, are equivalent to the local prices in the exporting country.

2.3 Trade Volume

Next we look to characterize the trade volume that will occur between these two countries as a function of local prices. The import demand functions $M(\cdot)$ and $M^*(\cdot)$ and export supply functions $E(\cdot)$ and $E^*(\cdot)$ are given in Home and Foreign, respectively, by the following:

$$\begin{aligned} M(\hat{p}_x(\tau)) &= 1 - 2\hat{p}_x(\tau) \quad \text{and} \quad M^*(\hat{p}_y^*(\tau^*)) = 1 - 2\hat{p}_y^*(\tau^*) \\ E(\hat{p}_y(\tau^*)) &= 2\hat{p}_y(\tau^*) \quad \text{and} \quad E^*(\hat{p}_x^*(\tau)) = 2\hat{p}_x^*(\tau). \end{aligned} \tag{1}$$

The conditions under which trade volume is positive are given by:

$$M(\hat{p}_x) > 0 \;\Leftrightarrow\; \tau < \tfrac{1}{2} \quad \text{and} \quad M^*(\hat{p}_y^*) > 0 \;\Leftrightarrow\; \tau^* < \tfrac{1}{2}. \tag{2}$$

Since $M(\hat{p}_x) = E^*(\hat{p}_x^*)$ and $M^*(\hat{p}_y^*) = E(\hat{p}_y)$, equation (2) states that trade volumes will be positive so long as the import tariffs are not prohibitively large.

2.4 Politically Motivated Governments

We now define the objective functions of the Home and Foreign governments. Governments are assumed to maximize the politically weighted sum of consumer surplus, producer surplus, and tariff revenue. However, in order to narrow our focus, we restrict each country's government to be politically motivated with respect to its import-competing industry only.[12] That is, define γ and γ^* ($\geqslant 1$) to be the political economy weight on the surplus of the producers of x in Home and the producers of y in Foreign, respectively. To further simplify

[12] Grossman and Helpman (1994) have given this political economy representation a micro-analytic foundation in their lobbying model.

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the analysis, we allow a secondary policy instrument, T, so that the two governments have the ability to redistribute income internationally, lump sum.[13]

The Home government's welfare function is given by $W(\tau,\tau^*,T) = W_x(\tau) + W_y(\tau^*) + T$, where

$$W_x(\tau) = \int_{\hat{p}_x(\tau)}^{1} D(p_x)dp_x + \gamma \cdot \Pi_x(\hat{p}_x(\tau)) + \tau \cdot M(\hat{p}_x(\tau)),$$
$$W_y(\tau^*) = \int_{\hat{p}_y(\tau^*)}^{1} D(p_y)dp_y + \Pi_y(\hat{p}_y(\tau^*)).$$

Symmetrically, the Foreign government's welfare is $W^*(\tau,\tau^*,T) = W_x^*(\tau) + W_y^*(\tau^*) - T$, where

$$W_x^*(\tau) = \int_{\hat{p}_x^*(\tau)}^{1} D(p_x^*)dp_x^* + \Pi_x^*(\hat{p}_x^*(\tau)),$$
$$W_y^*(\tau^*) = \int_{\hat{p}_y^*(\tau^*)}^{1} D(p_y^*)dp_y^* + \gamma^* \cdot \Pi_y^*(\hat{p}_y^*(\tau^*)) + \tau^* \cdot M(\hat{p}_y^*(\tau^*)).$$

2.5 *The Efficient Tariffs*

We next turn to the efficient set of tariffs. In this setting, an *efficient* trade agreement will be a set of tariff policies that maximize "world welfare" defined by $W + W^*$, as well as any redistribution of income by the lump-sum transfer T. This approach yields a unique set of efficient tariffs given by

$$\tau^E(\gamma) = \frac{(\gamma - 1)}{2(5 - \gamma)} \quad \text{and} \quad \tau^{*E}(\gamma^*) = \frac{(\gamma^* - 1)}{2(5 - \gamma^*)}. \tag{3}$$

The second-order conditions for the tariffs in equation (3) are satisfied so long as $\gamma < 5$ and $\gamma^* < 5$. Using equation (2), we also note that trade volumes are positive so long as $\gamma < 3$ and $\gamma^* < 3$. Since we are interested in studying equilibria with positive volumes of trade, we restrict the space of the political economy parameters to be $\gamma \in [1,3)$ and $\gamma^* \in [1,3)$. In the presence of the political preferences of the model, the efficient tariffs result in free trade when redistributive influences are absent (i.e. $\gamma = \gamma^* = 1$), and they are otherwise increasing in the weight that the government places on its import-competing sector's producer surplus. We note again that the countries are symmetrically defined, with the exception being that we allow for $\gamma \neq \gamma^*$.

[13] In lieu of the transfer, in their original model Bagwell and Staiger (2001) include exports subsidies as a secondary policy instrument. The implications of our inclusion of T are discussed in considerable detail below, and for now we note that a $T > 0$ ($T < 0$) will be interpreted as a transfer from Foreign (Home) to Home (Foreign). For an exploration of inclusion of such a mechanism in models of trade agreements see, for example, Kowalczyk and Sjöström (1994).

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As our starting point we *assume* that countries have reached efficiency, so that each country has bound its tariffs to the efficient levels given in (3).[14] Define the welfare levels under this efficient outcome as

$$W^E \equiv W_x(\tau^E) + W_y(\tau^{*E}) + T^E \quad \text{and} \quad W^{*E} \equiv W^*_x(\tau^E) + W^*_y(\tau^{*E}) - T^E.$$

We are not concerned with the means by which countries have reached this initial efficient trade agreement, so for simplicity we assume that $T^E = 0$.[15] The transfer plays an explicit role in the policy adjustment phase and will be discussed in further detail below.

2.6 Unilateral Policy Changes and their Welfare Effects

Before we discuss policy changes within the context of the GATT/WTO, it is illustrative to first decompose by standard means the welfare effects of a unilateral tariff increase. Suppose Home raises its tariff from its initial level, τ^E, to some non-prohibitive level τ^1. The welfare effects of a non-prohibitive tariff increase are illustrated in Figure 1 and can be broken down exhaustively as follows.

2.6.1 Terms-of-Trade Effect

When Home imposes a higher tariff, it shifts the terms of trade in its favor by driving down the price that the Foreign exporters receive for good x. The result is a terms-of-trade gain to Home (given by the black rectangle in panel a of Figure 1) and an equivalent terms-of-trade loss to Foreign (given by the striped rectangle in panel b) of

$$\tfrac{1}{2}(\tau^1 - \tau^E)(\tfrac{1}{2} - \tau^1).$$

2.6.2 Offsetting Deadweight Losses

When Home increases its tariff, there are also associated deadweight losses. The sum of Home's traditional consumption and production distortion associated with the tariff increase (Home's gray shaded triangles in panel a of Figure 1) is

[14] Bagwell and Staiger (1999, 2001) focus on how the *fundamental* principles of the GATT (i.e. reciprocity and MFN) can be interpreted as rules that guide countries as they negotiate to such efficient trade agreements.

[15] This assumption is stronger than necessary. For our purposes it is sufficient to assume that any non-zero T^E exchanges hands before the realization of the "shock" that we introduce below, and that T^E does not provide any ongoing benefits that one party might credibly threaten to take away from the other after the shock. This assumption is necessary because we are interested in isolating our analysis on the GATT/WTO rules of tariff adjustments and tariff retaliation and not on the means by which countries might retaliate through *non-tariff* measures such as a threat to revoke any side benefits captured in T^E.

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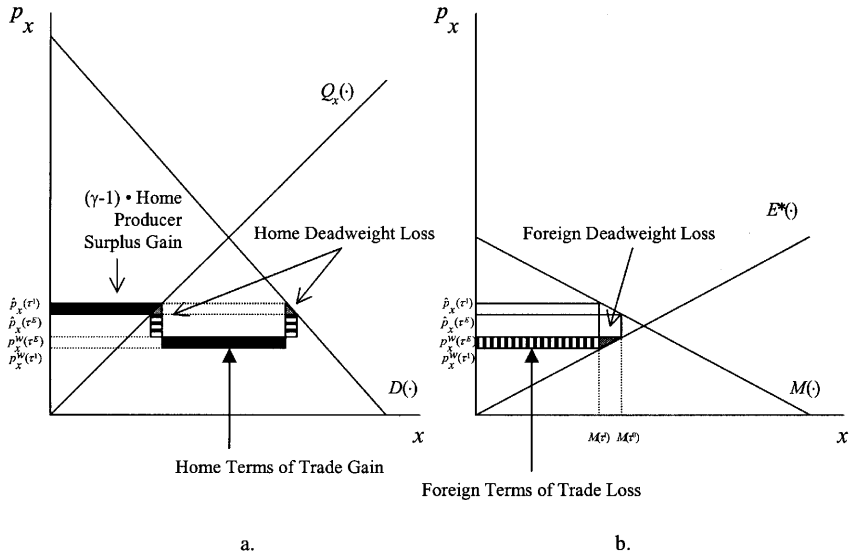

Figure 1. Welfare effects associated with a unilateral tariff increase.

equivalent to the deadweight loss imposed on Foreign (the gray shaded triangle of panel b), given by

$$\tfrac{1}{4}(\tau^1 - \tau^E)^2.$$

2.6.3 Local Effects

The two remaining effects on welfare will be referred to jointly as the *local effects* as they only affect the welfare of the policy-changing (Home) country.

Politically Weighted Producer Surplus Gain When Home imposes a higher tariff, some of what was previously its consumer surplus is now shifted to producer surplus, which is weighted more heavily in the government's objective function. The result is a gain [given by $(\gamma - 1)$ multiplied by the black trapezoid of panel a] equivalent to

$$\frac{\gamma - 1}{8}(\tau^1 - \tau^E)(1 + \tau^1 + \tau^E).$$

Additional Deadweight Loss Due to Lost Tariff Revenue Finally, when Home starts from an initial positive tariff τ^E, there is another deadweight loss given by a portion of lost tariff revenue. This additional deadweight loss is given graphically by the sum of the small striped rectangles in panel a and is

$$\tau^E(\tau^1 - \tau^E).$$

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2.6.4 Combining the Welfare Effects

Next let us combine the effects on Home and Foreign welfare that arise when Home imposes a higher tariff on its imports of x. One means by which we can aggregate the effects that will simplify the analysis that follows in the bargaining section is to consider the net welfare effect (Home effect minus Foreign effect) of a tariff increase from τ^E to τ^1, defined as follows:

$$\begin{aligned}\Omega_x(\tau^E,\tau^1) &\equiv [W_x(\tau^1) - W_x(\tau^E)] - [W_x^*(\tau^1) - W_x^*(\tau^E)] \\ &= [(\tau^1 - \tau^E)(\tfrac{1}{2} - \tau^1)] + \left\{ \frac{\gamma - 1}{8}(\tau^1 - \tau^E)\left(1 + \tau^1 - \frac{9-\gamma}{\gamma - 1}\tau^E\right)\right\}.\end{aligned} \tag{4}$$

The term in square brackets is *twice* the *terms-of-trade effect* (Home gain−Foreign loss), and the term in curly brackets represents the *local effect* on welfare due to Home's tariff increase in the x sector.

In a symmetric fashion we can define the net welfare effects that arise should Foreign raise its tariff from τ^{*E} to some non-prohibitive τ^{*1} as

$$\begin{aligned}\Omega_y(\tau^{*E},\tau^{*1}) &\equiv [W_y^*(\tau^{*1}) - W_y^*(\tau^{*E})] - [W_y(\tau^{*1}) - W_y(\tau^{*E})] \\ &= [(\tau^{*1} - \tau^{*E})(\tfrac{1}{2} - \tau^{*1})] \\ &\quad + \left\{ \frac{\gamma^* - 1}{8}(\tau^{*1} - \tau^{*E})\left(1 + \tau^{*1} - \frac{9-\gamma^*}{\gamma^* - 1}\tau^{*E}\right)\right\}.\end{aligned} \tag{5}$$

This is also the combination of *twice* the *terms-of-trade effect* (Foreign gain−Home loss) plus the *local effect* on welfare due to Foreign's tariff increase in the y sector.

2.7 Nash Bargaining and the Comparison of Threat Points

2.7.1 The Political-Economy Shock

Recall that we begin our analysis under the assumption that countries have reached an initial efficient agreement. In the following sections we consider how a country reacts when faced with a preference "shock" that causes it to seek an adjustment to its trade policy away from the initial efficient level. One motivation for this "shock" is a country having elections and facing a new government in power that prefers less trade than its predecessor. Perhaps the countries could not wait to sign the agreement until after all elections were held due to a time constraint on the round of negotiations; for example, imposed by the legislative time limit on the United States' executive's "fast-track" authority.

Without loss of generality we assume that *Home* receives the shock to its political-economy parameter. Let $\varepsilon \geqslant 0$ be the size of the shock and define $\hat{\gamma}(\gamma,\varepsilon) \equiv \gamma + \varepsilon$ to be the level of Home's political economy parameter after the shock has been received. For simplicity we require that the "shock" be sufficiently small so that if $\gamma < \gamma^*$, then $\hat{\gamma} < \gamma^*$ as well. First note that with the

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shock to the political economy parameter, Home's welfare is no longer W^E. With the new political economy parameter, define Home's new *transitional* level of welfare as $\hat{W}^T \equiv W(\tau^E, \tau^{*E}, \hat{\gamma})$. Foreign's welfare is unchanged and is still W^{*E}. The shock then provides an efficiency reason for Home to ultimately implement a new efficient tariff given by

$$\hat{\tau}^E(\hat{\gamma}) \equiv \frac{(\hat{\gamma} - 1)}{2(5 - \hat{\gamma})}. \tag{6}$$

2.7.2 Updating the Policy Change: Two Routes

We interpret the GATT/WTO system as having established two routes that Home can choose between in *eventually* implementing the new efficient tariff of equation (6) when such trade policy adjustments are necessary "between rounds."[16] First, Home could proceed "legally" by following the rules of the GATT/WTO's safeguards provisions. We assume that the process of *legal* implementation of protection requires (i) that Home immediately update its tariff to the new efficient level, and (ii) that Home notify Foreign of the tariff change so as to negotiate compensation under the threat of sanctions determined by the GATT/WTO rules on safeguards. On the other hand, Home could implement a new tariff "illegally." As we are not interested here in questions of uncertainty and monitoring, we assume that an illegal tariff is detected instantaneously and with certainty, and that Home negotiates to the new efficient outcome under the threat of Foreign sanctions as determined under the dispute settlement mechanism.

We model the illegal and legal routes as establishing two distinct fora which have two associated sets of rules over the retaliatory tariff threats that Foreign is committed to using. We use the GATT/WTO statutes to interpret and identify the levels of retaliation under each of the two routes. We then assume that Home's initial tariff (illegal or legal) and the associated Foreign retaliatory tariff threat imply welfare benchmarks that serve as threat points used during the negotiations back to the efficiency frontier. Instead of implementing a specific bargaining procedure, we use the Nash bargaining solution and assume equal bargaining power across countries, in order to illustrate the negotiated outcome on the efficiency frontier.[17] Ultimately in this structure Home makes its protection–implementation choice of which path to follow by simply comparing threat points.

[16] We have greatly simplified the analysis by assuming that any policy adjustments take the form of tariff barriers, neglecting consideration of quantitative restrictions, domestic policies, and other non-tariff barriers which might lead to "non-violation nullification and impairment" complaints. We address how it is that the model might be expanded to include these additional issues in section 5.

[17] For a discussion of Nash bargaining in a general equilibrium trade model see Mayer (1981) or Riezman (1982). Though our results are determined by relative power imbalances which refer to "weak" and "strong" countries, these imbalances are determined by the interaction of the rules of the system and each country's *capacity* to retaliate and affect the terms of trade. A more general bargaining game with asymmetric bargaining powers across governments (and perhaps even across statutes) would provide interesting additional insights.

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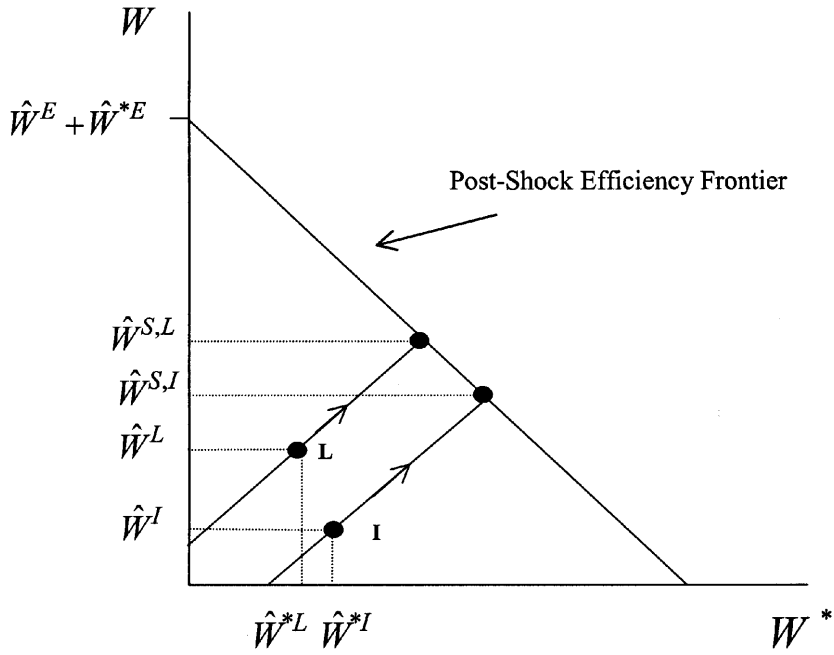

Figure 2. The "illegal" and "legal" threat points.

Consider next the role of the transfer mechanism in the *renegotiations* phase. After the shock the "new" efficient tariffs are uniquely determined by $\hat{\tau}^E$ and τ^{*E} of (6) and (3), respectively. Therefore, as illustrated in Figure 2, the assumptions generate a linear efficiency frontier determined by $\hat{W}^E \equiv W(\hat{\tau}^E, \tau^{*E})$ and $\hat{W}^{*E} \equiv W(\hat{\tau}^E, \tau^{*E})$, and the two countries are renegotiating over the size of a transfer, $\hat{T}$. Figure 2 also provides a pair of hypothetical threat points to provide intuition for our approach: one threat point under the *illegal* route (I) and the other under the *legal* route (L). Assume that the benchmark welfare levels at I and L are $\{\hat{W}^I, \hat{W}^{*I}\}$ and $\{\hat{W}^L, \hat{W}^{*L}\}$, respectively, where the welfare levels are to be determined by the illegal and legal sets of tariff changes that we formally identify below. Given our assumptions, the equilibrium value for $\hat{T}$ in the renegotiations phase is *determined* by the combination of the threat point of the chosen route and the position of the efficiency frontier. As illustrated in Figure 2, if we identify $\hat{W}^{S,L}$ as the final negotiated settlement (S) level of welfare on the efficiency frontier that Home achieves under the *legal* route, the legal route transfer is simply $\hat{T}^L \equiv \hat{W}^{S,L} - \hat{W}^E$. We calculate the value for $\hat{T}^L$ explicitly below.

Before we proceed to a formal comparison of the threat points and a determination of Home's equilibrium protection implementation behavior as well as the equilibrium transfer, we pause to interpret the role of the transfer at,

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for example, the conclusion of negotiations under the safeguards provisions. Recall that our model assumes the existence of *import* policies only. We think of $\hat{T}^L$ as substituting for export policies in the model, allowing countries to transfer welfare directly, in lieu of redistributing rents through a restructuring of Home's tariff into a Foreign voluntary export restraint (VER). Ono (1991) has noted the economic efficiency gains that arise when countries conclude compensation negotiations with a VER which has one layer of efficiency losses and a transfer of rents, as opposed to two layers of efficiency losses, the second of which would be due to a retaliatory tariff.[18]

Finally, while we often refer to Foreign's *retaliation* in the discussion that follows, note that retaliation is only used to establish a threat point from which countries commence their compensation negotiations. Ultimately countries do not retaliate and the outcome results in efficiency. Our interests lie in the equilibrium path that countries choose in order to negotiate to the new efficiency frontier.[19]

2.7.3 Comparing the Threat Points

Since we are using the Nash bargaining solution to determine the negotiated equilibrium, we can make this simple comparison of the threat points in Figure 2 with:

Observation 1. Home will follow the illegal route if its threat point yields a better bargaining position, i.e. if $[\hat{W}^I - \hat{W}^{*I}] - [\hat{W}^L - \hat{W}^{*L}] > 0$.

But we can expand this algebraically and rewrite it for this general case as

$$\begin{aligned}
&[\hat{W}^I - \hat{W}^{*I}] - [\hat{W}^L - \hat{W}^{*L}] \\
&\quad = [(\hat{W}^I - \hat{W}^T) - (\hat{W}^{*I} - \hat{W}^{*E})] - [(\hat{W}^L - \hat{W}^T) - (\hat{W}^{*L} - \hat{W}^{*E})] \\
&\quad = [\{(\hat{W}^I_x - \hat{W}^T_x) + (W^I_y - W^E_y)\} - \{(\hat{W}^{*I}_x - \hat{W}^{*E}_x) + (W^{*I}_y - W^{*E}_y)\}] \\
&\quad - [\{(\hat{W}^L_x - \hat{W}^T_x) + (W^L_y - W^E_y)\} - \{(\hat{W}^{*L}_x - \hat{W}^{*E}_x) + (W^{*L}_y - W^{*E}_y)\}] \\
&\quad = [\hat{\Omega}_x(\tau^E, \tau^I) - \Omega_y(\tau^{*E}, \tau^{*I})] - [\hat{\Omega}_x(\tau^E, \tau^L) - \Omega_y(\tau^{*E}, \tau^{*L})]. \qquad (7)
\end{aligned}$$

[18] However, for a discussion of the GATT-*legality* of VERs see Jackson (1993).

[19] While retaliation is permissible under the GATT, it has rarely been the "final outcome" in practice, for the noted efficiency reasons. Until the recent *US* v. *EC* Banana Regime and Beef/Hormone cases, no GATT/WTO dispute had ever concluded with GATT/WTO sanctioned retaliation being implemented, and only in the 1951 *Netherlands* v. *US* Dairy Quotas case was retaliation itself actually sanctioned (see Hudec, 1990, pp. 181–200). It would be misleading to suggest, however, that retaliation is irrelevant because it is rarely carried out. It can be presumed that retaliation has been *threatened* during negotiations and was GATT/WTO-*permissible* much more frequently. For example, the GATT reports 11 safeguards instances in which an affected country either cited Article XIX:3 or made a formal appeal for retaliation (WTO, 1995, pp. 539–559).

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Note first that after substituting $\hat{\gamma}$ for γ we replace (4) with

$$\hat{\Omega}_x(\tau^E,\tau^1) = [(\tau^1 - \tau^E)(\tfrac{1}{2} - \tau^1)] + \left\{ \frac{\hat{\gamma}-1}{8}(\tau^1 - \tau^E)\left(1 + \tau^1 - \frac{9-\hat{\gamma}}{\hat{\gamma}-1}\tau^E\right)\right\}, \tag{8}$$

where $\tau^1 \in \{\tau^L,\tau^I\}$. We use (8) in the last step of (7) as well as $\Omega_y(\cdot)$, which is determined as it was in (5). Therefore, we can restate Observation 1 as

Observation 2. Home will follow the illegal route if the associated net terms-of-trade and local effects are larger than they are under the legal route, i.e. if

$$[\hat{\Omega}_x(\tau^E,\tau^I) - \Omega_y(\tau^{*E},\tau^{*I})] - [\hat{\Omega}_x(\tau^E,\tau^L) - \Omega_y(\tau^{*E},\tau^{*L})] > 0.$$

In the following sections we add structure to Observation 2 by interpreting first how the GATT (section 3) and now WTO (section 4) statutes determine the *illegal* (τ^I,τ^{*I}) and *legal* (τ^L,τ^{*L}) tariff combinations which, in turn, determine the benchmark threat points. After establishing the threat points, we proceed to characterize the equilibria of the model.

3. THE RULES UNDER THE GATT 1947

We focus in this section on interpreting the GATT 1947 rules of retaliation. In section 4 we interpret the Uruguay Round reforms and illustrate how these changes affect the rules of retaliation and thus the qualitative nature of the results. We first look to formally determine the threat point that ensues under the rules of the GATT if Home were to implement the protection "legally."

3.1 The Legal Route and the Role of Reciprocity

The GATT founders realized that governments face changing political economy pressures from their private sectors that require a certain degree of flexibility with respect to their international obligations. As previously discussed, there are many areas of the GATT including Articles XIX and XXVIII under which countries are permitted to alter their tariff bindings without fear that the entire agreement will fall apart.[20] With respect to these safeguards measures, the GATT authorizes a Foreign country that has been affected by Home's tariff increase to (at least threaten to) obtain compensation through a limited retaliation in which it imposes additional protection for its import-competing sectors. If Home legally alters its trade policy, the language of the GATT 1947

[20] While Articles XIX and XXVIII are not perfect substitutes as Article XIX also has a "serious injury" provision, Jackson (1989, p. 165) notes that meeting such requirements was usually "abused or ignored" and rarely challenged.

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implies that Foreign may not retaliate beyond the point where it withdraws *substantially equivalent concessions*.[21]

Suppose, therefore, that Home chooses to use the safeguards provisions. With a change in its political economy parameter to $\hat{\gamma}$, we define Home as proceeding "legally" by assuming that the safeguards provisions require Home to notify the GATT that it wishes to increase its tariff directly from τ^E, given by equation (3), to its new efficient level, $\hat{\tau}^E$, given by equation (6).[22] Following the definition of Bagwell and Staiger (2001),[23] we say that given a set of tariffs $\{\tau^E, \tau^{*E}\}$, a second set of tariffs $\{\hat{\tau}^E, \tau^{*R}\}$ is defined as balancing *substantially equivalent concessions* (or satisfying the condition of *reciprocity*) if the proposed tariff change brings about equal changes in the volume of each country's imports and exports, when valued at existing world prices.[24] That is, Bagwell and Staiger have shown that this definition *implies* that the tariff pairs then satisfy the following condition:

$$[p_x^w(\tau^E) - p_x^w(\hat{\tau}^E)]M(\hat{\tau}^E) = [p_y^w(\tau^{*E}) - p_y^w(\tau^{*R})]M^*(\tau^{*R}), \tag{9}$$

where τ^{*R} is the Foreign *reciprocity* tariff. But comparing equation (9) to Figure 1, we can make:

Observation 3. The Foreign retaliatory tariff that satisfies the reciprocity condition will serve to neutralize the terms-of-trade effect induced by Home's original tariff increase.

Rather than solve for an explicit formula for the Foreign reciprocity tariff, it is sufficient to characterize its important properties. If we define Home's tariff change and Foreign's retaliatory response as $\hat{\tau}^E = \tau^E + \Delta$ and $\tau^{*R} = \tau^{*E} + \Delta^*$, respectively, then we can rewrite (9) as

[21] See Article XIX:3(a) for temporary measures and Article XXVIII:3(b) for permanent modifications of tariff bindings. Furthermore, unlike the case of Article XXIII, which we will discuss below, the *reciprocity* limit on retaliation under these safeguards provisions was arguably policed by the GATT. For example, the 1978 *Panel Report on Lead and Zinc* (see Pescatore et al., 1995, pp. 165–168) involved a case between the EC and Canada over the level of permissible retaliation by Canada in response to an EC Article XXVIII modification of its tariff binding.

[22] We do not consider a setting whereby Home solves for some optimal legal tariff given the reciprocity condition. We assume that the rules require that Home directly implement its new efficient tariff, and then the negotiations under the safeguards provisions concern the size of the transfer determined by the Foreign reciprocity tariff response and the Nash bargaining procedure. The efficiency and distributional properties of such a rule are explored in more detail below.

[23] A discussion of reciprocity in the GATT as it applies to renegotiations of tariff bindings can be found in Dam (1970, pp. 87–91). See also Bagwell and Staiger (1999).

[24] Referring again to the general equilibrium interpretation of the model, the reciprocity condition is *defined* as

$$p_x^w(\tau^E)[M(\hat{\tau}^E) - M(\tau^E)] + M_z(\hat{\tau}^E, \tau^{*R}) - M_z(\tau^E, \tau^{*E}) = p_y^w(\tau^{*E})[M^*(\tau^{*R}) - M^*(\tau^{*E})],$$

where M_z denotes Home imports of z. We then proceed in two steps. First, eliminate existing trade volumes from this condition by utilizing the requirement of balanced trade at the existing set of world prices. Second, use the requirement of balanced trade at the proposed tariffs' set of world prices to eliminate trade in the numéraire good under the proposed tariff. Given these two conditions, the definition of reciprocity implies the condition found in (9).

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$$\tfrac{1}{2}(\Delta)[\tfrac{1}{2} - \tau^E - \Delta] = \tfrac{1}{2}(\Delta^*)[\tfrac{1}{2} - \tau^{*E} - \Delta^*]. \tag{10}$$

Clearly if $\tau^E = \tau^{*E}$, then $\Delta = \Delta^*$ and $\tau^{*R} = \hat{\tau}^E$, and equation (10) indicates that under symmetry (when $\gamma = \gamma^*$), Foreign's reciprocity response will be identical to the original Home tariff increase. But if $\tau^E \neq \tau^{*E}$, then we note the following:[25]

Proposition 1. If Home's initial efficient tariff is larger (smaller) than Foreign's, then when Home increases its tariff, Foreign must make a proportionately smaller (larger) tariff increase in order for the reciprocity condition to be satisfied. That is, $\partial\Delta^*/\partial\tau^E < 0$.

This result has direct implications of consequent importance. Specifically, note that τ^{*R} has the following properties:

Corollary 1. If $\gamma < \gamma^*$, then $(\hat{\tau}^E - \tau^E) < (\tau^{*R} - \tau^{*E})$, and if $\gamma > \gamma^*$, then $(\hat{\tau}^E - \tau^E) > (\tau^{*R} - \tau^{*E})$.

In reference to Figure 2, so long as $\tau^{*R} \neq \tau^{*E}$, any legal threat point L which is now determined by the pair $\{\hat{\tau}^E, \tau^{*R}\}$ will be strictly inferior to the new efficiency frontier so that both countries can be made better off by *negotiating* a settlement under which they reach the frontier.

Finally, it is important to note that we are assuming that Foreign is also committed to *only* responding with its reciprocity tariff, τ^{*R}, when Home changes its tariff policy under the safeguards provisions. We return to a discussion of this assumption in subsection 3.3.2.

3.2 The Illegal Route and Dispute Settlement

Article XXIII of the GATT 1947 was the forum to which countries brought complaints that trading partners had undertaken policies which either violated GATT rules or *nullified or impaired* benefits that trading partners had expected to receive under the Agreement. In either case, Article XXIII allowed for countries affected by these measures to seek compensation through retaliation. Is the level of retaliation that a country might face under Article XXIII truly different from that which it might confront under the safeguards provisions? We argue in the affirmative, and our structure rests entirely on this assumption. We use the rest of this section to argue in support of this distinction.[26]

To address this issue we consider two different arguments made by legal scholars. First, one could take the position that limits on the level of permissible retaliation under Article XXIII were never adequately defined. In fact, in reference to the 1951 Dairy case discussed earlier, Hudec notes that during the dispute "[t]he Contracting Parties had brought out their biggest guns against the

[25] The proofs of all propositions are found in the Appendix.

[26] One clear way in which they are different is the language across the statutes. While both Article XIX *and* Article XXVIII use the phrase *substantially equivalent concessions*, Article XXIII:2 contains the distinct *such concessions* clause.

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dominant partner [the US]. They had threatened everything that could be threatened, including the collapse of the Agreement itself'' (Hudec, 1990, p. 184). In this early GATT dispute, the retaliation threat reached the level of the breakdown of the entire set of established rules. We assume that the ''collapse of the Agreement'' would be followed by countries implementing nationally optimal (Nash) policies.

Alternatively, other scholars have argued that the statute did limit the level of permissible retaliation in a trade dispute, it was simply that this level was not monitored. Roessler et al. have argued along these lines, stating that ''Article XXIII nominally put a constraint on the magnitude of 'damages,' [i.e. retaliation,] but there was no satisfactory mechanism for reviewing them and thus nations aggrieved by violations could threaten or even impose damages *out of proportion* to the harm that they had suffered'' (Roessler et al., 1999, pp. 34–35, emphasis added). In this case, we assume that if left unmonitored, countries could threaten to implement nationally optimal (Nash) retaliatory policies.

Taking either of these perspectives leads us to conclude that a country could face the threat of a more substantial retaliation under a policy which led to a trade dispute than it could face if it had proceeded legally under either Article XIX or XXVIII. We now turn to a consideration of the modeling implications of this assumption.

3.2.1 Trade Policies and Retaliation under the Illegal Route

In the context of our model, we focus on Article XXIII as the forum for countries to obtain compensation for their trading partners' ''illegal'' changes in trade policy. Based on our arguments of the previous section, we interpret the ''rules'' (or perhaps the lack of well-defined rules) of the GATT's dispute settlement mechanism as imposing no binding constraint on the level of retaliation that an affected Foreign country could threaten.[27]

With no external binding constraint, in recognition of the negotiations phase that would follow, we assume that Foreign threatens to respond with its Nash tariff, or the tariff that would serve to unilaterally maximize its objective function, W^*. In recognition of this policy response and with the similar intention of putting itself in an advantageous bargaining position for the negotiations to follow, if Home were to decide to implement the protection ''illegally'' in the first place, we assume that it would proceed by increasing its

[27] As suggested, this assumption is not without controversy, though we do explore the sensitivity of our results to changes in this assumption in section 4 below. Note also that throughout the analysis we do not consider the fact that under the GATT regime each country had a veto-power in which it could essentially block any panel report that might sanction retaliation. We assume that even in such cases, countries could still threaten retaliation either outside of Article XXIII negotiations, or as a last resort, perhaps through threats of the ''collapse of the Agreement.''

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tariff to the Nash level.[28] Therefore, we can work through each country's best response function and solve for the set of Nash tariffs yielding

$$\hat{\tau}^N(\hat{\gamma}) = \frac{\hat{\gamma}+1}{2(7-\hat{\gamma})} \quad \text{and} \quad \tau^{*N}(\gamma^*) = \frac{\gamma^*+1}{2(7-\gamma^*)}. \tag{11}$$

The second-order conditions for the tariffs given in equation (11) are satisfied and the Nash tariffs are non-prohibitive given the parametric restrictions already imposed. Note that for $\hat{\gamma},\gamma^* \in [1,3)$ the Nash tariffs are always positive, as the terms-of-trade gain is larger than the efficiency loss associated with the reduction in imports. We note as well that:

Observation 4. The difference between Home's (Foreign's) Nash and efficient tariffs is maximal when the political economy weight is one, and it decreases monotonically until it is smallest, i.e. the tariffs are equivalent, when the tariffs become prohibitive at $\hat{\gamma} = 3$ ($\gamma^* = 3$).

Again, we reiterate that there is no uncertainty or observational delay in the model. Ours is *not* a dynamic model where Home "defects" in order to achieve periods where it reverts to its Nash tariff and time passes before this is observed and Foreign is permitted to retaliate. We obtain our basic results even with the assumption that no time passes between when Home implements its illegal tariff and when Foreign is authorized to retaliate. Home's illegal tariff and Foreign's retaliatory tariff establish a threat point from which the countries immediately engage in Nash bargaining back to efficiency. Thus, if Home were to choose the illegal route so that both it and Foreign implement their Nash tariffs, the Nash threat point after the political-economy shock would serve as point *I* in Figure 2. We now turn to a characterization of the equilibria of the model.

3.3 Characterizing the Equilibria

Home's choice of whether to implement protection legally or illegally is dependent on the relationship between the two threat points established in the prior sections. Given that we have now established the legal and illegal tariffs under the GATT as $\tau^L = \hat{\tau}^E, \tau^{*L} = \tau^{*R}, \tau^I = \hat{\tau}^N$, and $\tau^{*I} = \tau^{*N}$, we can restate Observation 2 as:

Observation 5. Home will follow the illegal route if

$$[\hat{\Omega}_x(\tau^E,\hat{\tau}^N) - \Omega_y(\tau^{*E},\tau^{*N})] - [\hat{\Omega}_x(\tau^E,\hat{\tau}^E) - \Omega_y(\tau^{*E},\tau^{*R})] > 0.$$

[28] This approach is broadly consistent with the statements of the previous section, where we interpret threats as to the "collapse of the Agreement" as countries reverting to Nash tariff policies. An alternative "credible" threat could be the reversion to autarky, though we consider this threat to be less relevant to the context presented here. We provide a discussion of other potential policies (in the context of how they relate to trade disputes) aside from Home's Nash import tariff in the conclusion.

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And we can characterize our first substantive result with

Proposition 2. If $\gamma^* \geqslant \gamma$ then Home will choose the illegal route and implement protection by circumventing the GATT rules, leading to a trade dispute. However, if $\gamma^* < \gamma$ then a shock will cause Home to implement protection legally under the GATT's safeguards provisions.

While we relegate the formal proof to the Appendix, we discuss here the intuition behind the result. Consider Observation 5, equations (8) and (5), and the definitions of the tariffs, as these are the factors that serve to affect the welfare levels of the threat points in the model.

Under the *legal* route, by definition of the Foreign reciprocity tariff (see Observation 3), the terms-of-trade effects induced by the tariff changes in the x and y sectors would cancel, so we are simply left with the local effects. However, under the *illegal* route we must contend with the local effect *and* the terms-of-trade effect. Consider Figure 3 which illustrates the size of (twice) the *terms-of-trade effect* as well as the *local effects* of $\hat{\Omega}_x$ and Ω_y of equations (8) and (5), as a function of the political-economy parameters under the illegal route for Home (panel a) and Foreign (panel b). Clearly the terms-of-trade effect dominates the local effect in absolute terms for political-economy weights that are not too large.[29] Thus with any asymmetry in political-economy weights, the country with the lower political-economy weight will also have the dominant terms-of-trade effect.

Since Home chooses which route to take, if it were the country with the relatively low political economy weight (e.g. take γ_A and γ_A^* in Figure 3) it will take advantage of its dominant terms-of-trade effect by utilizing the illegal route. If Foreign has the lower weight (i.e. take the pair γ_B and γ_B^*) then Home will avoid the illegal route and the threat of the terms-of-trade loss imposed by Foreign, and it will choose the legal route instead.

To further develop the intuition behind this result, note how varying the political-economy parameter levels affect certain features of the model. First, combining (3) with equation (1) yields

$$M^E \equiv M(\hat{p}_x(\tau^E(\gamma))) = \frac{3-\gamma}{5-\gamma} \quad \text{and} \quad E^E \equiv E(\hat{p}_y(\tau^{*E}(\gamma^*))) = \frac{3-\gamma^*}{5-\gamma^*}. \tag{12}$$

Equation (12) and the fact that $\partial E^E/\partial\gamma^* < 0$ can be seen to provide support for Dam's (1970) point: a high γ^* would imply that Foreign "does not consume enough of [Home's] ... exports ..." to be able to shift the terms of trade by an amount that is sufficient to induce Home into proceeding legally. Suppose furthermore that $\gamma < \gamma^*$. By equation (3), under the original efficient agreement, Foreign's tariff bindings are already relatively high and by equations (3) and (12), a low γ implies that Home has low bindings and large pre-shock imports of

[29] Note that by (8) and (5) the legal local effects are smaller than the illegal local effects as $\hat{\tau}^E < \hat{\tau}^N$ and $\tau^{*R} < \tau^{*N}$.

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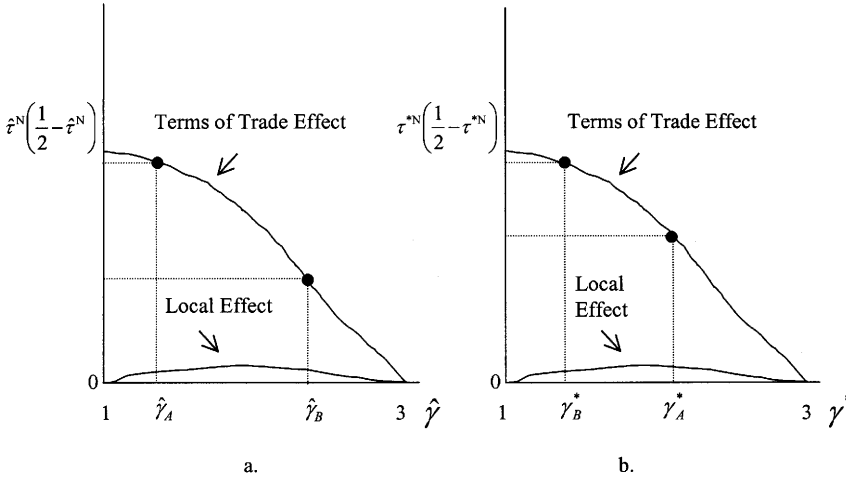

Figure 3. The terms-of-trade and local effects.

x from Foreign. By using the illegal route and its Nash tariff, Home capitalizes on its own large imports and low initial efficient tariff to shift the terms of trade and put itself in an advantageous bargaining position. Thus trade disputes occur when "strong" Home countries implement illegal policies that affect weaker trading partners who are relatively powerless in their ability to threaten retaliation in compensation negotiations.

Suppose, on the other hand, that $\gamma > \gamma^*$. Then via the equations in (3) we have the opposite result: high (low) values of γ (γ^*) imply that Home (Foreign) has high (low) tariff bindings. By equation (12) Home (Foreign) imports are small (large). By Home choosing the *legal* route, it prevents Foreign from threatening retaliation with its Nash tariff thereby avoiding a potentially large terms-of-trade loss in the y sector. Since Home's efficient tariff is already high and relatively close to its Nash tariff (see Observation 4) and its import volume is small, any terms-of-trade gains through Nash reversion in the x sector would be limited. Thus "weak" Home countries protect themselves by using the safeguards provisions to limit the retaliation of their "strong" trading partners to *reciprocity* compensation.

Another perspective on this result is to consider how a Home country with given political preferences proceeds when faced with protection–implementation decisions and Foreign trading partners who are differentiated by their γ^* parameter. Proposition 2 thus suggests that Home will proceed *illegally* with its most political trading partners and *legally* with the least political partners.

3.3.1 Equilibrium Transfers, Home Welfare, and the Efficiency of the Rules

With the unique efficient tariffs determining the position of the efficiency frontier in welfare space, we can use the welfare levels of the now well-defined threat

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points (see again Figure 2) and the Nash bargaining solution to determine the size of the equilibrium transfers. We work through the algebra formally in the Appendix, and find that the legal and illegal equilibrium transfers are

$$\hat{T}^L = -\tfrac{1}{2}\Omega_y(\tau^{*E},\tau^{*R}) < 0, \tag{13}$$

$$\hat{T}^I = \tfrac{1}{2}[\hat{\Omega}_x(\hat{\tau}^E,\hat{\tau}^N) - \Omega_y(\tau^{*E},\tau^{*N})] > 0. \tag{14}$$

To understand the intuition behind the equilibrium transfers, recall the definitions of Ω_y and $\hat{\Omega}_x$ from equations (5) and (8) as well as the elements of these welfare effects determined by the policy changes in subsection 2.6. When $\gamma > \gamma^*$ so that Home uses the *legal* route, the positive transfer from Home to Foreign of (13) is equal to the *terms-of-trade effect* plus half of the *local effect* induced by Foreign's reciprocity tariff in the y sector.[30] In lieu of the transfer mechanism, if we had modeled export policies, it would be possible for Home to transfer this welfare to Foreign by restructuring its new efficient tariff $\hat{\tau}^E$ into an alternative Home tariff/Foreign VER combination in the x sector. The tariff/VER combination could be structured to restrict the same amount of trade as does $\hat{\tau}^E$ (so that global welfare was the same), but the distribution of welfare would be changed as quota rents equal to $\hat{T}^L$ would move from Home to Foreign. This "VER-as-compensation" interpretation of the equilibrium transfer under the *legal* route is consistent with the anecdotal evidence provided in Table 4, which documents safeguards adjustments that resulted in managed trade.[31]

On the other hand, when $\gamma < \gamma^*$ and Home uses the "illegal" route, it receives an equilibrium transfer from Foreign equal to $\hat{T}^I$ of (14). Again referring to equations (5) and (8), in the illegal case the size of the transfer is the difference between the Home and Foreign tariff-induced *terms-of-trade effects* plus the difference between half the Home and Foreign tariff-induced *local effects* of their Nash policies. A realistic interpretation of an equilibrium transfer from Foreign to Home that occurs in actual trade disputes is the welfare gain that Home receives by the GATT (i) permitting Home a period of time to bring its GATT-inconsistent policy into conformity, and (ii) not allowing Foreign to retaliate in this interim period.

Consider next the *efficiency* of these rules of retaliation. We have not yet addressed the question of whether or not these rules on "between rounds" policy adjustments and retaliation responses under the legal and illegal routes actually induce countries to update their trade policies to the new, efficient level.

[30] See again Figure 1 for an illustration of the size of the terms-of-trade and local effects.

[31] It is difficult to say exactly how many cases conclude in VERs as the results of compensation negotiations under these Articles were contained in classified documents. The examples presented in Table 4 have been pieced together by matching the data on VERs that the GATT has been notified exist with the Article XIX and XXVIII data.

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TABLE 4 EXAMPLES OF GATT ARTICLE XIX and XXVIII COMPENSATION NEGOTIATIONS IN THE 1980s THAT RESULTED IN VERs

Importing country	GATT Article[a]	Year of action	Product	VER partners
Switzerland	XXVIII	1980	Cheese	Austria, EC, Finland
US	XXVIII	1981	Steel wire	Various countries
Sweden	XXVIII	1983	Textiles/Clothing	Hungary, Malta, Romania
Norway	XXVIII (XIX)	1984 (1986)	Textiles/Clothing	Malta, East Germany
EC	XXVIII	1984	Cheese	Austria, Finland, Norway
EC	XXVIII	1985	Image/Sound recorders	Japan
Canada	XIX	1986	Non-leather footwear	Korea, Taiwan
EC	XXVIII	1987	Sweet potatoes	Thailand
EC	XIX	1987	Sweet potatoes/Manioc	Indonesia, Thailand
EC (Portugal)	XIX	1987	Refrigerator/Freezer	Various countries
EC (Italy)	XIX	1987	Frozen squid	Korea
EC (Spain)	XIX	1987	Steel products	Various countries

Sources: Article XIX and XXVIII data compiled by the author from WTO (1995, 1997) and Hudec (1993) and matched to VER data of GATT (1989), *Appendix V* "Export Restraint Arrangements including Voluntary Export Restraints, Orderly Marketing Arrangements, Export Forecasts, Basic Price Systems, Industry-to-Industry Arrangements, Discriminatory Import Systems, etc."
[a]The Article under which the original implementation of protection by the importing country was made known to the GATT.

Therefore, suppose we assume that Home has the option of not adjusting its trade policy after receipt of the initial shock, would it *choose* to do so? Recall the alternative is Home's *transitional* level of welfare given by $\hat{W}^T = W(\tau^E, \tau^{*E}, \hat{\gamma})$.

Clearly if Home is "powerful" in the sense that it would use the illegal route in equilibrium, the answer to this question is trivial as the illegal route yields to Home a positive transfer ($\hat{T}^I$) *in addition to* the efficient level of welfare it achieves from updating its trade policy, where $W(\hat{\tau}^E, \tau^{*E}, \hat{\gamma}) > \hat{W}^T$ by the definition of $\hat{\tau}^E$. However, the answer to this question is not obvious with respect to a "weak" Home country's potential equilibrium use of the safeguards provisions. When $\gamma > \gamma^*$ would Home actually utilize the "legal route" in practice, even though we have found that under the safeguards provisions it pays Foreign an equilibrium transfer? Does the *reciprocity* requirement of the legal route induce efficient behavior, or does the requirement of compensation deter Home from updating its trade policy and remaining at the (newly inefficient) τ^E? We conclude this discussion with the following:

Proposition 3. The GATT rules induce efficient behavior. Even when $\gamma > \gamma^*$ Home is better off having followed the legal route than it would have been by not responding to the shock and remaining with the newly inefficient tariff τ^E and the transitional level of welfare $\hat{W}^T$.

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3.3.2 The Rules on Safeguards and the Foreign "Welfare Compromise"

In terms of *Foreign* welfare, we can show that Foreign is worse off relative to W^{*E}, i.e. its pre-shock level of welfare. However, to understand an additional (distributional) motive for the safeguards provisions, it is instructive to consider a thought experiment in which we contrast these results with an alternate set of rules for "policy-updating." Suppose Home could simply update its trade policy to the new efficient tariff without having to negotiate any compensation with Foreign.

The Legal Route First consider the *legal* route. With the "no-compensation" thought experiment determining the third level of welfare, the ordering from Foreign's perspective would be

$$W^*(\tau^E,\tau^{*E}) > W^*(\hat{\tau}^E,\tau^{*E}) - \hat{T}^L > W^*(\hat{\tau}^E, \tau^{*E}).$$

Since $\hat{T}^L < 0$ (an equilibrium transfer from Home to Foreign) the safeguards provisions under the GATT can be interpreted as a *welfare compromise* from the perspective of Foreign. When Home uses the legal route, Foreign is clearly not as well off as it would have been had Home not updated its tariff at all. However, if we make the assumption that a role for the GATT is to generate rules which create incentives for countries to update their policies to efficient levels, we can interpret the safeguards provisions as at least providing Foreign with more welfare than it would have received had Home been able to update its tariff to the new efficient level without having to yield any compensation.

However, one potentially troubling matter that we have not yet addressed is the assumption that there is an external enforcement mechanism that compels Foreign to respond with its *reciprocity* tariff when a "weak" Home country uses the legal route in equilibrium. Whenever a "weak" Home country proceeds legally, Foreign would clearly prefer to respond with its Nash tariff, which would then presumably move the negotiations away from the safeguards provisions and into the dispute settlement forum where, because $\gamma > \gamma^*$, *Foreign* would have a more favorable bargaining position.

We motivate this assumption by appealing to our discussion of the *welfare compromise*. We have essentially assumed that Home and Foreign have agreed to a set of rules whereby each trades away the right to respond illegally if the other initiates a policy change *legally*. In exchange, the countries agree to abide by the efficiency-enhancing rule of *reciprocity* compensation which leads, as we have noted, to the *welfare compromise*. We claim that the reciprocity rule is *efficiency-enhancing* by considering what would transpire in the absence of such a rule. If countries had not agreed to those rules and there were nothing to constrain Foreign from a Nash response when Home acted legally, a "weak" Home country would simply avoid the safeguards provisions altogether. Home would not, however, implement its new, efficient tariff by proceeding illegally. In fact, the transfer under the illegal route, $\hat{T}^I$, is negative when $\gamma > \gamma^*$ by (14), and

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we can show that a "weak" Home achieves a higher level of welfare by not updating its policy at all. Therefore, without a constraint on Foreign retaliation under the legal route, GATT rules would not induce efficient policy updating by "weak" Home countries.[32]

The Illegal Route When Home implements *illegal* protection, we cannot refer to an analogous *welfare compromise*. In fact, when including the "no compensation" thought experiment, Foreign's welfare ordering is

$$W^*(\tau^E,\tau^{*E}) > W^*(\hat{\tau}^E,\tau^{*E}) > W^*(\hat{\tau}^E,\tau^{*E}) - \hat{T}^I.$$

Foreign's welfare is again highest when Home does not adjust its policy. However, Foreign's welfare is now lowest when Home adjusts its policy illegally since $\hat{T}^I > 0$ (an equilibrium transfer from Foreign to Home). That is, relative to the equilibrium outcome, Foreign would actually prefer the rules of the "no compensation" thought experiment which would allow Home to update its tariff to the newly efficient level without any compensation (or transfer).

4. TRADE DISPUTES AND THE WTO

While the Uruguay Round reforms establishing the WTO did much to improve procedural elements of the agreement, we will focus on the changes to the rules of retaliation. The substantial changes to the rules on legally affording protection are contained in the *Agreement on Safeguards*, and the reforms of Article XXIII and the handling of disputes are contained in the *Dispute Settlement Understanding*.[33]

4.1 Retaliation when Protection is Afforded Illegally

The Uruguay Round reforms have attempted to limit the level of retaliation that is permissible under the new dispute settlement mechanism, the *DSU*. Specifically, the statute now states, "[t]he level of the suspension of concessions or other obligations authorized by the DSB shall be equivalent to the *level of the nullification or impairment*" (GATT, 1994, Article 22:4, emphasis added). WTO arbitrators have interpreted this language in the recent *US* v. *EC* Banana Dispute (WTO, 1999a, Section 7.8) and the *US* v. *EC* Beef/Hormones Dispute (WTO, 1999b, Section III), where for the first time it was necessary to define the limitations of a country's permissible retaliation in order to determine

[32] Alternatively, we could appeal to the notion of "international obligation" of Kovenock and Thursby (1992), which we could assume in this context to be a sizable cost that Foreign would face for implementing additional protection in the absence of a shock. Both approaches admittedly point to a shortcoming of a framework which abstracts from the issues of enforcement. We address this issue further in section 5.

[33] In addition, we note that under the GATT 1994's *Agreement on Safeguards* Article 11:1(b), the WTO has tried to prohibit countries from using VERs in order to facilitate settlements.

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compensation. And while the language of the "level of the nullification or impairment" clause is still different from the "substantially equivalent concessions" of the safeguards provisions, the WTO arbitrators in at least these two cases have arguably interpreted the permissible retaliation under the *DSU* as equivalent to the level of *substantially equivalent concessions* of Articles XIX and XXVIII. That is, we will consider this interpretation as if there were no distinction between the retaliation permitted under the safeguards provisions of the GATT 1947 and the illegal route of the WTO's *DSU*.[34] While this was not the only change in the rules of retaliation under the WTO, it is instructive to first consider the implications as if this were the only change.

4.1.1 *DSU* Reciprocity and the Model

Whereas we modeled the GATT's dispute settlement as if there were no limit on retaliation, under the *DSU* we now interpret an affected country's permissible retaliation as being the suspension of trade that is designed to stabilize the value of export and import trade volumes between countries, as in equation (9). To make a consistent comparison with our earlier results, we again assume that Home raises its tariff under the illegal route to $\hat{\tau}^N$. In this case, Foreign is only permitted to raise its tariff to the *DSU* tariff, τ^{*DSU}, implicitly defined in the reciprocity condition

$$[p_x^w(\tau^E) - p_x^w(\hat{\tau}^N)]M(\hat{\tau}^N) = [p_y^w(\tau^{*E}) - p_y^w(\tau^{*DSU})]M^*(\tau^{*DSU}). \tag{15}$$

First, this condition will be non-binding if $\gamma < \gamma^*$. We have already shown (see Figure 3) that Foreign will not be able to offset Home's terms-of-trade effect even with its Nash tariff, if Home has a smaller political economy weight than Foreign. If $\gamma < \gamma^*$, Foreign will simply retaliate with its Nash tariff and the terms-of-trade and local effects are determined just as they were in Observation 5.[35]

However, if $\gamma > \gamma^*$, then the reciprocity condition binds and Foreign will only be permitted a retaliation that serves to neutralize the terms-of-trade effects as detailed in equation (15). From the properties derived from Proposition 1 we note that this has the following implications:

Corollary 2. If $\gamma > \gamma^*$, then $(\hat{\tau}^N - \tau^E) > (\tau^{*DSU} - \tau^{*E})$.

Given that the legal and illegal tariffs under the WTO and under this set of parameter conditions are $\tau^L = \hat{\tau}^E, \tau^{*L} = \tau^{*R}, \tau^I = \hat{\tau}^N$, and $\tau^{*I} = \tau^{*DSU}$, we can now restate Observation 2 for this case as:

[34] Without external enforcement, however, there will always be the implicit threat of the "collapse of the Agreement."

[35] Foreign would never credibly threaten to raise its tariff above τ^{*N} as any increase above this level would be welfare-reducing relative to τ^{*N}. Second, note that we also do not consider a setting where Home solves for some optimal illegal tariff given the *DSU* condition of (15).

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Observation 6. If $\gamma > \gamma^*$, Home will follow the illegal route if

$$[\hat{\Omega}_x(\tau^E,\hat{\tau}^N) - \Omega_y(\tau^{*E},\tau^{*DSU})] - [\hat{\Omega}_x(\tau^E,\hat{\tau}^E) - \Omega_y(\tau^{*E},\tau^{*R})] > 0.$$

Finally, we can summarize the implications of this section with:

Proposition 4. In the absence of any other changes, the *DSU* constraint on Foreign retaliation would influence Home to always implement its protection changes illegally, leading to a dispute.

Again while the proof is relegated to the Appendix, we discuss the intuition here. Clearly for $\gamma \leqslant \gamma^*$ we have the same result (and intuition) as was previously the case under the GATT and was discussed in subsection 3.3. Since Home and Foreign both implement their Nash tariffs under the illegal route, Home's terms-of-trade effect would dominate and it would hence prefer the illegal route.

When compared to the GATT system described earlier, the incentives have changed when $\gamma > \gamma^*$. Under the WTO, Foreign's retaliatory tariff is binding below its Nash level and, by its definition, the terms-of-trade effects under the illegal route are neutralized, just as they are under the legal route as well. This constrains Foreign's retaliation when compared to the GATT regime, where it would have had the dominant terms-of-trade effect (with $\gamma > \gamma^*$), the threat of which thus induced Home into proceeding legally. With the neutralized terms-of-trade effects, we can then show that the remaining *local effects* are larger for Home under the illegal route.

4.2 Retaliation when Protection is Afforded Legally

The reform of the WTO rules of retaliation under the *DSU* were not the only changes to the GATT system. While the WTO rules have made the level of permissible *DSU* retaliation essentially equivalent to the level that affected countries were limited to under the legal route of the GATT 1947, the level of permissible retaliation facing countries who implement protection under the *Agreement on Safeguards* has also been modified. When a WTO member country utilizes the escape clause to raise its tariff on imported goods, its trading partners are still free to threaten the withdrawal of *substantially equivalent concessions*.[36] However, the statute forces affected trading partners in some cases to refrain from seeking compensation until three years have passed since the original safeguard measure was put in place.[37] We interpret this rule change as attempting to make the safeguards provisions a more attractive alternative to protection-affording Home countries, relative to the use of "illegal" policy adjustments.

[36] See *Agreement on Safeguards* (1994) Article 8:2. Many additional revisions were also undertaken in order to provide stricter standards to the injury test and specific time limits on the process. We do not address those issues here and instead focus purely on the level of compensation due to affected countries.

[37] Specifically the statute states, that "[t]he right of suspension ... shall not be exercised for *the first three years* that a safeguard measure is in effect, provided that the safeguard measure has been taken as a result of an absolute increase in imports ..." (AS, 1994, Article 8:3, emphasis added).

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4.2.1 Analyzing the Safeguards Reforms

In considering the effects of these WTO reforms, we illustrate the changes by placing a $\mu \in [0,1]$ parameter on Foreign welfare under the legal route. Therefore, the combination of welfare effects under the illegal and legal route is now

$$[\hat{\Omega}_x(\tau^E,\hat{\tau}^N) - \Omega_y(\tau^{*E},\tilde{\tau}^*)] - [\hat{\Omega}_x(\tau^E,\hat{\tau}^E) - \mu \cdot \Omega_y(\tau^{*E},\tau^{*R})],$$

where $\tilde{\tau}^* \in \{\tau^{*DSU},\tau^{*N}\}$, just as was discussed in subsection 4.1.1. If $\mu = 1$, we have the results of the GATT 1947 system, Proposition 4, and importantly, the continued Article XXVIII case where compensation is still necessary. On the other hand, setting $\mu = 0$ is equivalent to focusing on the other extreme, under the assumption that Home does not compensate Foreign if it follows the legal route. For illustrative purposes that is the case that we consider here.

Thus consider the case that $\mu = 0$, and note again that if $\gamma < \gamma^*$ the *DSU* constraint does not bind and Foreign retaliates under the illegal route with its Nash tariff. However, if $\gamma > \gamma^*$ the *DSU* constraint binds and Foreign retaliates under the illegal route with the tariff implicitly defined by equation (15). Building again from Observation 2, in this case we have that the legal and illegal tariffs are $\tau^L = \hat{\tau}^E, \tau^{*L} = \tau^{*E}, \tau^I = \hat{\tau}^N$, and $\tau^{*I} = \tilde{\tau}^*$, so if we assume $\mu = 0$ we can make the following:

Observation 7. If $\gamma < \gamma^*$, Home will follow the illegal route if

$$[\hat{\Omega}_x(\tau^E,\hat{\tau}^N) - \Omega_y(\tau^{*E},\tau^{*N})] - \hat{\Omega}_x(\tau^E,\hat{\tau}^E) > 0.$$

If $\gamma > \gamma^*$, Home will follow the illegal route if

$$[\hat{\Omega}_x(\tau^E,\hat{\tau}^N) - \Omega_y(\tau^{*E},\tau^{*DSU})] - \hat{\Omega}_x(\tau^E,\hat{\tau}^E) > 0.$$

We consider the effects that this has on the equilibrium with:

Proposition 5. With $\mu = 0$ indicating no Foreign retaliation under the legal route, there exists a $\bar{\gamma}^*$ such that we have the following:

- if $\gamma \in [1,\gamma^*)$, Home would proceed illegally;
- if $\gamma \in [\gamma^*,\bar{\gamma}^*)$, Home would proceed legally; and
- if $\gamma \in [\bar{\gamma}^*,3)$, Home would proceed illegally.

The intuition behind this result is more subtle than for the earlier cases. Again with $\gamma < \gamma^*$, Home's terms-of-trade effect dominates under the illegal route, and even though Home does not compensate Foreign under the legal route, the *legal* terms-of-trade and local effects are still small relative to the improved bargaining position that Home would be able to obtain when taking advantage of its dominant terms-of-trade effect when it proceeds illegally. The result is again a trade dispute.

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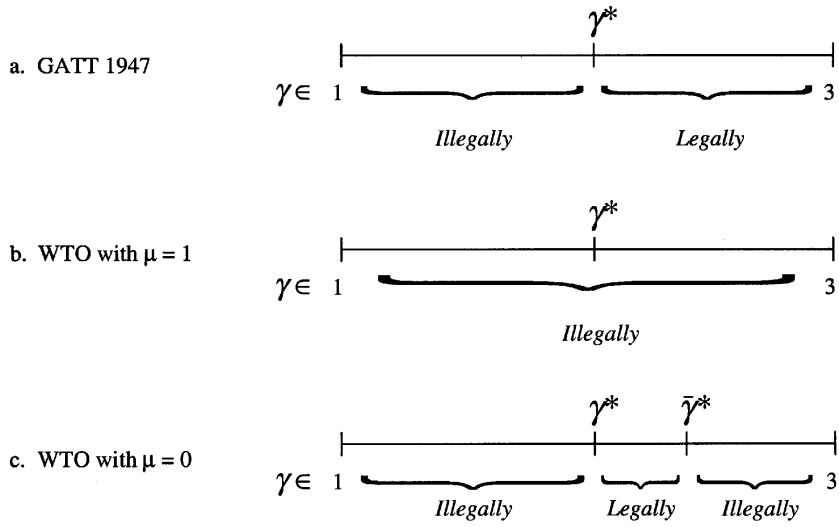

Figure 4. A comparison of results under the GATT and WTO.

However, when $\gamma \geqslant \gamma^*$ there are two more cases to consider. The *Safeguards* reform eliminates Foreign compensation and improves Home's bargaining position (relative to the net effects of the illegal route), provided the two countries are not too asymmetric [i.e. provided $\gamma \in [\gamma^*, \bar{\gamma}^*)$]. Once Home's political economy weight crosses a threshold given by $\bar{\gamma}^*$, the constraint on Foreign's *DSU* tariff dominates, and the incentives become such that Home finds it preferable for it to proceed illegally.

Finally, in terms of the equilibrium transfers that are generated in this context, first note that when Home uses the legal route, because there is no compensation due, the transfer will be zero [i.e. for $\gamma \in [\gamma^*, \bar{\gamma}^*)$ we have $\hat{T}^L = 0$]. When Home utilizes the illegal route, just as in the GATT case, it will extract a transfer from Foreign in the negotiations back to efficiency.[38]

4.3 Comparing the GATT and WTO Systems

Consider finally Figure 4. When compared to the GATT 1947 system (panel a), the *DSU* constraint which limits Foreign retaliation serves to weaken the potential threat facing a country which proceeds illegally (panel b). While the reforms contained in the *Agreement on Safeguards* limit the necessary compensation under the legal route, this has only served to partially mitigate

[38] Under the illegal route, the equilibrium transfer when $\gamma < \gamma^*$ is equivalent to the level under the GATT, given by (14). On the other hand, when $\gamma \in [\bar{\gamma}^*, 3)$ the transfer is $\hat{T}^I = \frac{1}{2}[\hat{\Omega}_x(\hat{\tau}^E, \hat{\tau}^N) - \Omega_y(\tau^{*E}, \tau^{*DSU})] > 0$.

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this effect (panel c). As the asymmetry between countries increases, the *DSU* constraint dominates the reforms to the legal route, even with the elimination of all necessary compensation. The WTO reforms of the retaliatory rules under the *DSU* and *Agreement on Safeguards* can be interpreted as having opposing effects on the incentives facing countries that seek to make "between rounds" trade policy adjustments.

We highlight this result, as researchers such as Messerlin (2000) have called for the next negotiating round to consider reforms designed to make utilization of the safeguards provisions more appealing, especially in light of the proliferation in the use of antidumping measures. Our results suggest that in order to effectively induce countries to more frequently utilize the safeguards provisions, the WTO will need to simultaneously address the rules of retaliation under the trading system's dispute settlement mechanism. An important alternative to use of the safeguards provisions are countries implementing GATT/WTO-"illegal" policies. Rules which weaken the level of authorizable retaliation under the *DSU* create a disincentive for countries to utilize the safeguards provisions.

5. CONCLUSION

This paper is a first attempt at providing a theory to illustrate a motive for countries to implement GATT/WTO illegal trade policy adjustments that will knowingly lead to trade disputes. We model the dispute settlement mechanism as establishing a forum in which countries who have implemented an illegal trade policy negotiate with affected trading partners back to efficiency. Countries in need of trade policy flexibility are given the choice of implementing protection illegally or *legally*, where, in this second case, negotiations take place under the GATT/WTO's safeguards provisions.

We have shown that a country implements protection illegally, leading to a trade dispute, when it has the capacity to take advantage of its own terms-of-trade gains and when its trading partners do not have the potential to impose terms-of-trade losses through retaliation. On the other hand, consider a country that seeks a change in policy over a small volume of imports that are already protected with high tariffs. If the trade affects a partner who has the capacity to inflict damages through large changes in the terms of trade, then the country will be more likely to implement the necessary protection legally under the GATT/WTO safeguards provisions so as to avoid a dispute.[39]

Our model illustrates the WTO reforms as having altered the rules of retaliation on two fronts. First, we interpret the *DSU* reforms which limit retaliation as weakening the GATT system's disincentive facing countries which

[39] Empirical support for this initial proposition can be found in Bown (2001), which studies how countries implemented additional protection under the GATT 1947. The study utilizes a data set on the *illegal* and *legal* cases (broken down as in Table 3) under Articles XXIII, XIX, and XXVIII between 1973 and 1994.

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proceed illegally. Second, the reforms to the *safeguards* provisions that limit retaliation (or compensation) when a country proceeds legally does create an additional incentive for countries to follow the rules. However, our results indicate that the net result is only a partial offset of the effect induced by the *DSU* reforms, and therefore that the changes to WTO rules on retaliation have done little to decrease the likelihood that "strong" countries will proceed illegally.

This simplified approach is only a first step toward improving our understanding of the role of trade disputes in the international system. Certainly terms-of-trade considerations are not the only factor that can influence such policy decisions, as is evidenced by the fact that most trade disputes do not result from illegal import tariffs, but instead from quantitative restrictions, subsidies, domestic policies, or other NTBs. One could extend the model to include these alternative policies as well as perhaps time delays, the introduction of a cost for pursuing disputes, differences in bargaining powers across countries, and a positive probability of escaping detection.

Next, our modeling approach also does not allow for *retaliation through non-tariff barriers*. One example of NTB retaliation occurring in practice is Ecuador threatening to withdraw its TRIPs commitments as a means of retaliating against the EC for its refusal to bring its *Banana Regime* into compliance with its WTO obligations (WTO, 2001, p. 6). This issue should also be explored in future research. Nevertheless, it is our conjecture that the *capacity* for Foreign retaliation will remain a significant factor in a country's decision of how to proceed with "between rounds" policy adjustments.

Finally, as we have noted earlier, we have deliberately abstracted from issues of enforcement in this model. A next step would be to take this model and embed it into a dynamic model of self-enforcing trade agreements, in order to better address the *interaction* between Jackson's "rule integrity" and "conciliation and negotiation" approaches to understanding dispute settlement.

APPENDIX

Note that we simplify notation in the following manner. In terms of the levels of welfare, for Home let

$$\hat{W}^E \equiv W(\hat{\tau}^E, \tau^{*E}, \hat{\gamma}), \quad \hat{W}^N \equiv W(\hat{\tau}^N, \tau^{*N}, \hat{\gamma}), \quad \hat{W}^R \equiv W(\hat{\tau}^E, \tau^{*R}, \hat{\gamma})$$

and

$$\hat{W}^{DSU} \equiv W(\hat{\tau}^N, \tau^{*DSU}, \hat{\gamma}),$$

and for Foreign let

$$\hat{W}^{*E} \equiv W^*(\hat{\tau}^E, \tau^{*E}), \quad \hat{W}^{*N} \equiv W^*(\hat{\tau}^N, \tau^{*N}), \quad \hat{W}^{*R} \equiv W^*(\hat{\tau}^E, \tau^{*R})$$

and

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$$\hat{W}^{*DSU} \equiv W^*(\hat{\tau}^N, \tau^{*DSU}).$$

Second, whenever the initial efficient tariffs serve as the initial trade policy in (8) or (5) we will rewrite these welfare effects as $\hat{\Omega}_x^N \equiv \hat{\Omega}_x(\tau^E, \hat{\tau}^N)$, $\Omega_y^{*R} \equiv \Omega_y(\tau^{*E}, \tau^{*R})$, etc. For many of the proofs it is useful to have the following alternative formulations of (8) and (5):

$$\hat{\Omega}_x^1 = [(\tau^1 - \tau^E)(\tfrac{1}{2} - \tau^1)] + \frac{\varepsilon}{8}(\tau^1 - \tau^E)(1 + \tau^1 + \tau^E) + \frac{\gamma - 1}{8}(\tau^1 - \tau^E)^2 \tag{A1}$$

$$\hat{\Omega}_x^1 = \frac{\varepsilon}{8}(\tau^1 - \tau^E)(1 + \tau^1 + \tau^E) + \left[(\tau^1 - \tau^E)\left(\tfrac{1}{2} - \frac{9 - \gamma}{8}\tau^1 - \frac{\gamma - 1}{8}\tau^E\right)\right] \tag{A2}$$

$$\Omega_y^1 = [(\tau^{*1} - \tau^{*E})(\tfrac{1}{2} - \tau^{*1})] + \frac{\gamma^* - 1}{8}(\tau^{*1} - \tau^{*E})^2 \tag{A3}$$

$$\Omega_y^1 = \left[(\tau^{*1} - \tau^{*E})\left(\tfrac{1}{2} - \frac{9 - \gamma^*}{8}\tau^{*1} - \frac{\gamma^* - 1}{8}\tau^{*E}\right)\right]. \tag{A4}$$

Calculation of the Transfers under the GATT Equilibrium of Equations (13) and (14)

With the linear (with slope -1) efficiency frontier and the equal bargaining powers assumption (implying a negotiations "path" of slope $+1$ from the benchmark), calculation of the equilibrium level of welfare at the conclusion of the negotiations is very straightforward. For Home, the final equilibrium level of welfare under the illegal and legal routes' *settlement* (S), respectively, can be shown to be

$$\hat{W}^{S,I} = \tfrac{1}{2}\hat{W}^E + \tfrac{1}{2}[\hat{W}^{*E} + \hat{W}^N - \hat{W}^{*N}]$$

$$\hat{W}^{S,L} = \tfrac{1}{2}\hat{W}^E + \tfrac{1}{2}[\hat{W}^{*E} + \hat{W}^R - \hat{W}^{*R}].$$

Since Home's (pre-transfer) welfare at the newly efficient set of tariffs is given by $\hat{W}^E$, the transfers are

$$\hat{T}^I = \tfrac{1}{2}[(\hat{W}^N - \hat{W}^E) - (\hat{W}^{*N} - \hat{W}^{*E})]$$

and

$$\hat{T}^L = \tfrac{1}{2}[(\hat{W}^R - \hat{W}^E) - (\hat{W}^{*R} - \hat{W}^{*E})]$$

or expanding,

$$\hat{T}^I = \tfrac{1}{2}\{[(\hat{W}_x^N - \hat{W}_x^E) - (\hat{W}_x^{*N} - \hat{W}_x^{*E})] + [(W_y^N - W_y^E) - (W_y^{*N} - W_y^{*E})]\}$$

$$\hat{T}^L = \tfrac{1}{2}\{[(\hat{W}_x^R - \hat{W}_x^E) - (\hat{W}_x^{*R} - \hat{W}_x^{*E})] + [(W_y^R - W_y^E) - (W_y^{*R} - W_y^{*E})]\}.$$

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But note that $\hat{W}_x^R = \hat{W}_x^E$ and $\hat{W}_x^{*R} = \hat{W}_x^{*E}$ and by (8) and (5) we have the forms given in the text:

$$\hat{T}^I = \tfrac{1}{2}[\hat{\Omega}_x(\hat{\tau}^E,\hat{\tau}^N) - \Omega_y(\tau^{*E},\tau^{*N})]$$

$$\hat{T}^L = \tfrac{1}{2}[(W_y^R - W_y^E) - (W_y^{*R} - W_y^{*E})] = -\tfrac{1}{2}\Omega_y(\tau^{*E},\tau^{*R}).$$

Calculation of the Transfers under the WTO Equilibrium

With no compensation under the legal route in the WTO, $\hat{T}^L = 0$. Under the illegal route, the final equilibrium level of welfare under the *settlement* (S) is different depending on whether $\gamma < \gamma^*$, where the transfer would again be given by (14) or whether $\gamma \in [\bar{\gamma}^*,3)$, in which case we follow the same steps as above (except substituting τ^{*DSU} for τ^{*N}) yielding $\hat{T}^I = \frac{1}{2}[\hat{\Omega}_x(\hat{\tau}^E,\hat{\tau}^N) - \Omega_y(\tau^{*E},\tau^{*DSU})]$, which is the form given in footnote 38.

Proof of Proposition 1

Using the implicit function theorem, we find that $\partial\Delta^*/\partial\tau^E = -\Delta/(\frac{1}{2} - \tau^{*E} - 2\Delta^*) < 0$, provided τ^{*E} is not too large. *QED*

Proof of Proposition 2

Case (i) Claim: with $\gamma \leqslant \gamma^*$ Home prefers the illegal route.

By Observation 5 this requires showing that $[\hat{\Omega}_x^N - \Omega_y^N] - [\hat{\Omega}_x^E - \Omega_y^R] > 0$. By definition of τ^{*R}, the terms-of-trade effects under the legal route are neutralized by Observation 3. Applying this information to (A1) and (A3), the welfare effects under the legal route can be rewritten as:

$$\hat{\Omega}_x^E - \Omega_y^R = \frac{\varepsilon}{8}(\hat{\tau}^E - \tau^E)(1 + \hat{\tau}^E + \tau^E) + \left\{\frac{\gamma - 1}{8}(\hat{\tau}^E - \tau^E)^2 - \frac{\gamma^* - 1}{8}(\tau^{*R} - \tau^{*E})^2\right\}. \tag{A5}$$

By Corollary 1, $(\hat{\tau}^E - \tau^E) < (\tau^{*R} - \tau^{*E})$, so the term in curly brackets in (A5) is negative. Under the illegal route, we can use (A2) and (A4) to rewrite $[\hat{\Omega}_x^N - \Omega_y^N]$ as

$$\hat{\Omega}_x^N - \Omega_y^N = \frac{\varepsilon}{8}(\hat{\tau}^N - \tau^E)(1 + \hat{\tau}^N + \tau^E) + \left\{(\hat{\tau}^N - \tau^E)\left(\tfrac{1}{2} - \frac{\gamma - 1}{8}\tau^E - \frac{9 - \gamma}{8}\hat{\tau}^N\right) - (\tau^{*N} - \tau^{*E})\left(\tfrac{1}{2} - \frac{\gamma^* - 1}{8}\tau^{*E} - \frac{9 - \gamma^*}{8}\tau^{*N}\right)\right\}. \tag{A6}$$

With $\gamma \leqslant \gamma^*$ we have $(\hat{\tau}^N - \tau^E) > (\tau^{*N} - \tau^{*E})$ by Observation 4 and $\hat{\tau}^E > \tau^E$. It is then straightforward to show that the term in curly brackets in (A6) is non-negative and the first term of (A6) is larger than the first term of (A5), thereby proving the result.

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Case (ii) Claim: with $\gamma > \gamma^*$ Home prefers the legal route.

By Observation 5 this requires showing that $[\hat{\Omega}_x^N - \Omega_y^N] - [\hat{\Omega}_x^E - \Omega_y^R] < 0$. By Corollary 1, $(\hat{\tau}^E - \tau^E) > (\tau^{*R} - \tau^{*E})$, so equation (A5) is now positive. With respect to the illegal route, rewrite (A6) as

$$\Omega_x^N - \Omega_y^N = (\hat{\tau}^N - \tau^E)\left(\left[\frac{3+\hat{\gamma}}{8} - \frac{9-\hat{\gamma}}{8}\tau^E\right] - \frac{9-\hat{\gamma}}{8}\hat{\tau}^N\right) - (\tau^{*N} - \tau^{*E})\left(\left[\frac{3+\gamma^*}{8} - \frac{9-\gamma^*}{8}\tau^{*E}\right] - \frac{9-\gamma^*}{8}\tau^{*N}\right). \quad \text{(A7)}$$

Since $\gamma > \gamma^*$, we can show that $(\hat{\tau}^N - \tau^E) < (\tau^{*N} - \tau^{*E})$. It is then straightforward to show that the second term in square brackets in (A7) dominates the first term in square brackets provided that ε is sufficiently small, so (A7) is negative, proving the result. *QED*

Proof of Proposition 3

This requires showing $W(\hat{\tau}^E, \tau^{*E}, \hat{\gamma}) + \hat{T}^L > W(\tau^E, \tau^{*E}, \hat{\gamma})$, where $\hat{T}^L$ is defined by (13). But note that by (8) this implies that we will show that

$$W(\hat{\tau}^E, \tau^{*E}, \hat{\gamma}) - W(\tau^E, \tau^{*E}, \hat{\gamma}) > \tfrac{1}{2}\Omega_y(\tau^{*E}, \tau^{*R}). \quad \text{(A8)}$$

The left-hand side of (A8) is simply the change in Home welfare due to a unilateral increase in Home's tariff from τ^E to $\hat{\tau}^E$, which can be broken down into the components given in subsection 2.6 (i.e. the terms-of-trade effect, local effect, and a third deadweight loss term that does not "offset" in this case). Recall that $\Omega_y(\tau^{*E}, \tau^{*R})$ contains a term that is *twice* the terms-of-trade effect from an increase from τ^E to $\hat{\tau}^E$ (by definition of τ^{*R}), so these terms would cancel from each side of (A8) leaving

$$\frac{\hat{\gamma}-1}{8}(\hat{\tau}^E - \tau^E)\left[1 + \hat{\tau}^E - \frac{9-\hat{\gamma}}{\hat{\gamma}-1}\tau^E\right] - \tfrac{1}{4}(\hat{\tau}^E - \tau^E)^2 > \tfrac{1}{2}\left[\frac{\gamma^*-1}{8}(\tau^{*R} - \tau^{*E})^2\right].$$

Working through some algebraic steps leaves us needing to show

$$[\hat{\tau}^E - \tau^E]\left\{\frac{\hat{\gamma}-1}{4} - \frac{3-\hat{\gamma}}{4}\hat{\tau}^E - \frac{7-\hat{\gamma}}{4}\tau^E\right\} > \left(\frac{\gamma^*-1}{8}\right)[\tau^{*R} - \tau^{*E}]\{\tau^{*R} - \tau^{*E}\}. \quad \text{(A9)}$$

But comparing the two sides of (A9), we have $1 > (\gamma^* - 1)/8$ and $[\hat{\tau}^E - \tau^E] > [\tau^{*R} - \tau^{*E}]$ by $\hat{\gamma} > \gamma^*$ and Corollary 1. With respect to the terms in curly brackets in (A9), it is straightforward to expand out the terms of the left-hand side and show that $\{(\hat{\gamma} - 1)/4 - (3 - \hat{\gamma})\hat{\tau}^E/4 - (7 - \hat{\gamma})\tau^E/4\} > (\hat{\tau}^E - \tau^E)$, and from there, again by Corollary 1, we have that $(\hat{\tau}^E - \tau^E) > (\tau^{*R} - \tau^{*E})$, thereby proving the result. *QED*

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Proof of Proposition 4

Case (i) Claim: with $\gamma \leqslant \gamma^*$ Home prefers the illegal route.

For $\gamma \leqslant \gamma^*$ the proof is identical to Proposition 2, since the *DSU* constraint does not bind.

Case (ii) Claim: with $\gamma > \gamma^*$ Home now also prefers the illegal route.

This requires showing that $[\hat{\Omega}_x^N - \Omega_y^{DSU}] - [\hat{\Omega}_x^E - \Omega_y^R] > 0$. By definition of τ^{*R} and τ^{*DSU}, the terms-of-trade effects under *both* the legal and illegal routes cancel, so the welfare effects under the illegal and legal routes can be rewritten, respectively, from (A1) and (A2) as

$$\hat{\Omega}_x^N - \Omega_y^{DSU} = \frac{\varepsilon}{8}(\hat{\tau}^N - \tau^E)(1 + \hat{\tau}^N + \tau^E) + \left[\frac{\gamma - 1}{8}(\hat{\tau}^N - \tau^E)^2 - \frac{\gamma^* - 1}{8}(\tau^{*DSU} - \tau^{*E})^2\right] \tag{A10}$$

$$\hat{\Omega}_x^E - \Omega_y^R = \frac{\varepsilon}{8}(\hat{\tau}^E - \tau^E)(1 + \hat{\tau}^E + \tau^E) + \left[\frac{\gamma - 1}{8}(\hat{\tau}^E - \tau^E)^2 - \frac{\gamma^* - 1}{8}(\tau^{*R} - \tau^{*E})^2\right]. \tag{A11}$$

If we subtract (A11) from (A10) and do some algebra we get

$$\begin{aligned}[\hat{\Omega}_x^N - \Omega_y^{DSU}] - [\hat{\Omega}_x^E - \Omega_y^R] = {} & \left\{\frac{\varepsilon}{8}(\hat{\tau}^N - \tau^E)(1 + \hat{\tau}^N + \tau^E) - \frac{\varepsilon}{8}(\hat{\tau}^E - \tau^E)(1 + \hat{\tau}^E + \tau^E)\right\} \\ & + \frac{\gamma - 1}{8}(\hat{\tau}^N - \hat{\tau}^E)[(\hat{\tau}^N - \tau^E) + (\hat{\tau}^E - \tau^E)] \\ & - \frac{\gamma^* - 1}{8}(\tau^{*DSU} - \tau^{*R})[(\tau^{*DSU} - \tau^{*E}) + (\tau^{*R} - \tau^{*E})]. \end{aligned} \tag{A12}$$

Clearly the term in curly brackets in (A12) is positive. With regards to the other terms, with $\gamma > \gamma^*$, by Corollary 2 $(\hat{\tau}^N - \tau^E) > (\tau^{*DSU} - \tau^{*E})$, and by Corollary 1 $(\hat{\tau}^E - \tau^E) > (\tau^{*R} - \tau^{*E})$. In order to show that $(\hat{\tau}^N - \hat{\tau}^E) > (\tau^{*DSU} - \tau^{*R})$, subtract the left-hand side (right-hand side) of the *DSU* reciprocity condition (15) from the left-hand side (right-hand side) of the GATT reciprocity condition (9) and expand out the terms yielding

$$\begin{aligned}(\hat{\tau}^N - \hat{\tau}^E)[(\tfrac{1}{2} - \hat{\tau}^N) - (\hat{\tau}^E - \tau^E)] = {} & \\ (\tau^{*DSU} - \tau^{*R})[(\tfrac{1}{2} - \tau^{*DSU}) - (\tau^{*R} - \tau^{*E})]. \end{aligned} \tag{A13}$$

Therefore, with $\gamma > \gamma^*$ we must have $(\hat{\tau}^N - \hat{\tau}^E) > (\tau^{*DSU} - \tau^{*R})$ in order for the equality of (A13) to hold. Thus (A12) > 0 thereby proving the result. *QED*

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Proof of Proposition 5

Case (i) With $\gamma < \gamma^*$ Home prefers the illegal route.

Note then that $\tilde{\tau}^* = \tau^{*N}$ and let $\Lambda \equiv [\hat{\Omega}_x^N - \Omega_y^N] - \hat{\Omega}_x^E$. Rearranging the elements of Λ yields

$$\Lambda = (\hat{\tau}^N - \hat{\tau}^E)\left[\frac{3+\hat{\gamma}}{8} - \frac{9-\hat{\gamma}}{8}\hat{\tau}^N - \frac{9-\hat{\gamma}}{8}\hat{\tau}^E\right] - (\tau^{*N} - \tau^{*E})\left[\frac{3+\gamma^*}{8} - \frac{9-\gamma^*}{8}\tau^{*N} - \frac{9-\gamma^*}{8}\tau^{*E}\right]. \tag{A14}$$

To show that $\Lambda > 0$ from (A14), recall that $\hat{\gamma} < \gamma^*$ implies $(\hat{\tau}^N - \hat{\tau}^E) > (\tau^{*N} - \tau^{*E})$ from Observation 4. It is then straightforward to show that the terms in the first square brackets are larger than those in the second, thereby proving the result.

Case (ii) With $\gamma = \gamma^*$ Home prefers the legal route.

In order to show that $\Lambda < 0$, note that since $\gamma^* = \gamma$, (A14) turns into

$$\Lambda = (\hat{\tau}^N - \hat{\tau}^E)\left[\frac{3+\hat{\gamma}}{8} - \frac{9-\hat{\gamma}}{8}\hat{\tau}^N - \frac{9-\hat{\gamma}}{8}\hat{\tau}^E\right] - (\tau^N - \tau^E)\left[\frac{3+\gamma}{8} - \frac{9-\gamma}{8}\tau^N - \frac{9-\gamma}{8}\tau^E\right], \tag{A15}$$

with $\hat{\gamma} > \gamma$, $(\hat{\tau}^N - \hat{\tau}^E) < (\tau^N - \tau^E)$, and it is straightforward to show that the terms of the second square brackets of (A15) are larger than those of the first, showing that (A15) < 0 and giving us the result.

Case (iii) There exists a $\bar{\gamma}^*$ such that with $\gamma \in [\gamma^*, \bar{\gamma}^*)$ Home prefers the legal route, and $\gamma \in [\bar{\gamma}^*, 3)$ Home prefers the illegal route.

Note here that the constraint binds so $\tilde{\tau}^* = \tau^{*DSU}$. Now under the illegal route the terms-of-trade effects cancel and Home proceeds legally if

$$\begin{aligned}[\hat{\Omega}_x^N - \Omega_y^{DSU}] - \hat{\Omega}_x^E = {} & \frac{\hat{\gamma}-1}{8}(\hat{\tau}^N - \tau^E)\left[1 + \hat{\tau}^N - \frac{9-\hat{\gamma}}{\hat{\gamma}-1}\hat{\tau}^E\right] \\ & - \frac{\gamma^*-1}{8}(\tau^{*DSU} - \tau^{*E})^2 \\ & - (\hat{\tau}^E - \tau^E)\left[\frac{3+\hat{\gamma}}{8} - \frac{9-\hat{\gamma}}{8}\hat{\tau}^E - \frac{9-\hat{\gamma}}{8}\tau^E\right] < 0.\end{aligned} \tag{A16}$$

With no analytical formula for τ^{*DSU} we lack a formal means to characterize the last solution, so we appeal to Figure A1. There we plot the three effects identified in equation (A16) (the Home and Foreign illegal local effects and the

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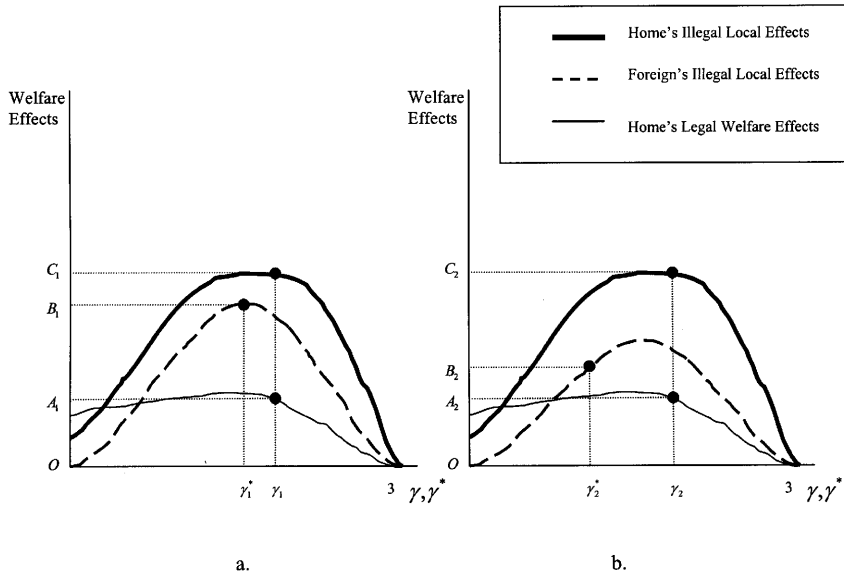

a. b.

Figure A1. WTO welfare effects when $\mu = 0$.

Home welfare effects of the legal route) as a function of γ and γ^*. In panel a we consider the case for Home and Foreign in which they are fairly symmetric [i.e. $\gamma \in [\gamma^*, \bar{\gamma}^*)$], in which case it is reasonable to substitute in $\tau^{*DSU} \approx \tau^{*N}$. Take a pair of political-economy parameters that are not too asymmetric, such as γ_1^* and γ_1, and locate the associated welfare effects. The difference between the Home and Foreign local effects under the illegal route is given by $\overline{B_1C_1}$, while the welfare effects under the legal route are the distance $\overline{OA_1}$, which is clearly larger.

Consider panel b and suppose we increase the asymmetry between the political-economy parameters [to $\gamma \in [\bar{\gamma}^*, 3)$] and take the pair $\gamma_2^* \ll \gamma_2$. As γ^* falls relative to γ, the first thing to note is that τ^{*DSU} is further constrained below τ^{*N} shifting in the $[(\gamma^* - 1)/8](\tau^{*DSU} - \tau^{*E})^2$ function. Thus, in panel b the difference between the Home and Foreign local effects under the illegal route is now $\overline{B_2C_2}$, which is larger than the welfare effects under the legal route, given by the distance $\overline{OA_2}$. *QED*

ACKNOWLEDGMENTS

I gratefully acknowledge financial support from the Mellon Foundation through an Economics Department Granick Fellowship at the University of Wisconsin. I would like to thank Robert Staiger for his advice and Peter Rosendorff, Wolfgang Keller, Robert Baldwin, Gregory Shaffer, Alan Sykes, David

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Vanness, Mikhail Klimenko, two anonymous referees, and seminar participants at the University of Wisconsin, the University of California-Santa Cruz, and Brandeis University for helpful comments. All remaining errors are my own.

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