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Trade disputes and the implementation of protection under the GATT: an empirical assessment

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Abstract

This paper is a first attempt to empirically determine why countries choose to violate or adhere to GATT rules when making trade policy adjustments between negotiating rounds. We use a previously unexploited set of data in which countries implemented two 'types' of protection under the GATT system between 1973 and 1994: (i) 'legal' protection in which countries utilized the GATT's safeguards provisions; and (ii) 'illegal' protection in which the protection was provided outside of the safeguards provisions, resulting in a formal trade dispute. We find substantial evidence that concerns for retaliation affect government policy decisions in ways which contribute to the explanation of the existence of trade disputes.

Keywords: Tariff retaliation; GATT/WTO; Trade disputes; Reciprocity

JEL classification: F13

1. Introduction

Amongst the recent developments in international trade research is the increased interest in the rules and incentives generated by the GATT and WTO institutions. Bagwell and Staiger (1999, 2001), for example, have argued that the GATT/WTO principle of reciprocity and its use of the most-favored nation (MFN) clause are efficiency-enhancing

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rules that countries use to overcome the *terms of trade*-driven prisoner's dilemma problem that would result from the imposition of unilaterally optimal trade policies. We question whether there is empirical evidence that countries respond to the economic incentives generated by the GATT/WTO rules and procedures, and whether countries are, in fact, influenced by terms of trade considerations in their trade policy decisions. Specifically, we analyze how the terms of trade motive affects a protection-implementing government's decision relating to *how* it will make a trade policy adjustment. We use information on formal GATT *trade disputes*, which is a rich source of data in which governments have made such trade policy adjustments, perhaps with the terms of trade motive in mind.

Another simple question that this paper looks to empirically address is, why are there disputes in the multilateral trading system? Our data collection efforts indicate that roughly 250 formal trade disputes were filed under the GATT regime from 1947 to 1994 (Bown, 2002), and over 250 trade disputes have been filed with the new WTO since its 1995 inception (WTO, 2002). Thus disputes occur despite the presence of a retaliation-based dispute settlement mechanism, which international trade theorists have identified as having a central purpose of dissuading countries from cheating. As surveyed by Staiger (1995, pp. 1519–1528), theorists typically model the GATT's dispute settlement mechanism as a trigger strategy in an infinitely repeated, noncooperative, tariff-setting game between countries. In most of the theoretical literature, however, trade disputes do not occur in equilibrium, as the trigger strategy successfully induces countries into cooperating in the imposition of low, enforceable tariffs. In the few papers in which disputes do occur their existence is not under analysis, so the dispute settlement process is often triggered randomly and is not due to a choice by a rational government.[1] We therefore reinterpret our earlier question as asking if actual trade disputes are simply random, or if there is evidence of a pattern to the economic activity underlying their existence.

To give the empirical investigation a framework from which to begin, we appeal to the setting in Bown (2002), who has proposed a theory to suggest conditions under which countries that seek flexibility in their trade policy will do so in knowing violation of GATT/WTO rules, leading to a formal trade dispute under the GATT's Article XXIII or the WTO's Dispute Settlement Understanding.[2] In particular, we use the implications of the theory to identify specific economic determinants of a country's choice between implementing the protection 'illegally,' even when it knows that it will be caught, in lieu of using what will be termed broadly as the GATT/WTO *safeguards provisions*[3] where additional import protection can be offered 'legally,' but through the adherence to GATT/WTO rules.

The necessary elements of the theory in Bown (2002) will be reviewed in detail in Section 2, but here we provide a basic discussion of the motivation and intuition. The

[1] For example, the trade disputes in Kovenock and Thursby (1992) are triggered by a GATT violation caused by a policymaker who is possessed by a 'demon'.

[2] Article XXIII served as the dispute settlement mechanism under the GATT regime from 1947 to 1994, while the DSU is a modified version of the earlier regime having taken over dispute resolution at the WTO's, 1995 inception. Our data covers a portion of the period that the GATT's Article XXIII was in effect.

[3] Under the GATT, countries offered legal protection predominantly under the 'escape clause' or Article XIX (for temporary protection) or Article XXVIII (for permanent protection), where under both provisions countries could raise their tariffs above the binding level that they had established in an earlier negotiating round.

theory is set in a simple political economy model of trade between two large, open economies. One country receives a shock that gives its government a legitimate efficiency reason to alter its GATT-negotiated tariff bindings. We assume that this policy adjustment takes place *in between* negotiating rounds and is subject to GATT rules and disciplines. The model identifies negotiations under the GATT/WTO dispute settlement mechanism as one route to follow as the country implements its trade policy adjustment: it alters its policy 'illegally,' without GATT notification, it is caught by the affected trading partners, and the dispute settlement mechanism serves as a forum of renegotiation between countries. The dispute settlement rules identify a level of GATT/WTO-authorizable tariff retaliation that serves as compensation if negotiations fail. This tariff then establishes a threat point, or a welfare benchmark for the countries to reference as they negotiate to the new efficiency frontier. We can compare this outcome to the alternative where, after the shock, the country chooses to adjust its policy *legally* under the GATT/WTO safeguards provisions. Under this 'legal' route, the rule of *reciprocity* defines an alternate GATT/WTO-authorizable tariff retaliation and identifies a comparison threat point for negotiations. The country then makes its 'illegal' or 'legal' *protection-implementation* decision based on a comparison of the threat points under the two fora of renegotiation. The primary implication of the theory under investigation is that the relative ability of each country to affect the *terms of trade* at the threat points affects the means by which a country implements protection.[4]

To clarify further, it is useful to link the theory under investigation here to related research. First, Kovenock and Thursby (1992) also provide a theory analyzing the conditions under which countries follow the trade policy 'rules' of the GATT system. However, they focus on the affected country within the trade dispute phase and the affected country's choice of whether to retaliate within or outside of the confines of the dispute settlement system. In contrast, we investigate the policy choice of the original *protection-implementing* country that must first decide whether to adhere to the GATT's rules on safeguards or to break those rules, thus leading to a dispute. Second, the theory under investigation here is reminiscent of the contribution of Copeland (1990) who considers a setting with two different means (one negotiable and one non-negotiable) of implementing protection. He finds that trade negotiations tend to substitute protection toward the non-negotiable, but less efficient instrument of protection. Our approach is different, however, in that tariff negotiations occur after implementation of both 'legal' and 'illegal' acts of protection; our theory allows for the compensation (or rules of retaliation) to be different under the two settings.[5]

The empirical trade policy literature is silent with regard to what factors influence the choice of *how* countries implement protection. However, in a related vein, there has been substantial research on the trade disputes that have originated under the United States'

[4] The theory that terms of trade motivations influence trade policy has a long history dating back to Torrens, and includes the seminal contribution by Johnson (1953–54) and the recent work of Bagwell and Staiger (1999, 2001).

[5] Whether or not there was a meaningful distinction between compensation rules under the legal and illegal settings is a matter of interpretive dispute; for a discussion, see Bown (2002, pp. 301–302). For arguments that retaliatory threats under the illegal setting were not constrained by GATT rules, see Hudec (1990a, p. 184) and Roessler et al. (1999, pp. 34–35).

Section 301.[6] Previous work on disputes has focused exclusively on the US cases and the determinants of *outcomes* of the petitions. Bayard and Elliott (1992, 1994) and Elliott and Richardson (1997), for example, have studied the effectiveness of Section 301 proceedings from the perspective of the negotiators and their constituents. Kherallah and Beghin (1998) likewise analyze which economic and political factors increase the likelihood of the petition ending in a trade war as opposed to an agreement. While an understanding of the economic factors that influence the outcomes of trade disputes is important, the central purpose of this paper is to investigate why trade disputes occur at all. We look to determine the economic factors that influence a country's *selection* of a policy that may either lead to or avoid a trade dispute. Hansen and Prusa (1995) is closest in spirit to our analysis. They analyze the decision of a particular *industry* of whether to persuade the US government to offer import relief through the use of antidumping or countervailing duty measures as opposed to the utilization of the US's escape clause. However, our structure is fundamentally different in that we address the policy choice of *governments*.

In order to assess the theory that a government's *protection-implementation* decision is influenced by terms of trade considerations, we generate a previously unexploited dataset of offerings of import protection under the GATT system. The data can be broken down into two parts: (i) trade dispute data, in which countries are assumed to have implemented protection illegally, and (ii) data from the utilization of the relevant GATT safeguards provisions, in which countries implemented protection legally. The data compiles instances in which governments offered such legal or illegal *import protection* between the years 1973 and 1994. We use data on the protection-affording country's imports from and exports to the prominent trading partners that are affected by the policy change (and are hence eligible for compensation), as well as the pre-existing levels of protection to proxy for the capacity of each country to affect welfare changes by manipulating the terms of trade.[7]

Our empirical results support the theory that the concern for retaliation influences policy choices, and that government choices on how to implement protection are responsive to the economic incentives generated under GATT rules. Conservative estimates suggest that when comparing trading partners that are eligible for compensation, those that receive a 50% greater share of the protection-implementing country's exports relative to the average face a 14–63% reduction in the likelihood that the adjustment will be carried out in a way that would lead to a trade dispute. We thus find evidence that GATT rules have a substantial effect on deterring GATT-illegal behavior, provided that the trading partners that would be affected by the policy change have the capacity to threaten a retaliation. However, our results also suggest that the dispute settlement rules are ineffective at deterring illegal activity when that activity affects trading partners that are bilaterally 'powerless.' Our results concerning 'power imbalances' relate to the work of

[6] Under Section 301 of the 1974 Trade and Tariff Act, US exporters can petition the government to conduct market-opening negotiations with foreign countries that they feel are unfairly impeding imports from the US. For a discussion, see Hudec (1990b).

[7] Notably absent from our discussion and from the analysis is data on trade elasticities, which are unfortunately too difficult to generate in this setting. Given the multilateral nature of the analysis, one would have to generate import demand and export supply elasticities for dozens of countries over hundreds of industries over 22 years, an exercise that is well beyond the scope of this analysis.

Maggi (1999), whose theory suggests that multilateral trade agreements (which can 'pool' retaliatory power) can support a lower level of cooperative tariffs than a collection of bilateral agreements. We return to this point in Section 5.

The rest of the paper proceeds as follows. Section 2 provides a review of the theory of trade disputes under the GATT as presented in Bown (2002). Section 3 illustrates the econometric model, presents the data, and discusses the issues involved in the estimation. Section 4 then presents the empirical results, and Section 5 concludes.

2. The theory

To review the theory, we introduce a slightly modified version of the model of Bown (2002), whose structure is essentially derived from Bagwell and Staiger (2001). Assume the existence of a world with two countries, Home (no *) and Foreign (*). Home (Foreign) produces and consumes two goods, with x being its natural import (export) good and y being its natural export (import) good.

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 Foreign. Let $D(p_x) = 1 - p_x$ and $D(p_y) = 1 - p_y$ define Home's demand functions, and Foreign demand, $D(p_x^*)$ and $D(p_y^*)$, is symmetrically defined.

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 $\Pi_y^*(p_y^*) = p^{*2}_y/2$ and $\Pi_x^*(p_x^*) = p^{*2}_x/2 + p_y^*$.[8]

In order to focus exclusively on the provision of protection for import-competing industries 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). In the empirical application we will also allow for the presence of non-tariff barriers. Import demand and export supply for Home are $M(\hat{p}_x(\tau)) = 1 - 2\hat{p}_x(\tau)$ and $E(\hat{p}_y(\tau^*)) = 2\hat{p}_y(\tau^*)$, respectively, and the Foreign trade functions are symmetrically derived.

Finally, 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. We restrict each country's government to be politically motivated only with respect to its import-competing industry and define γ and γ^* (≥ 1) to be the political economy parameter on the surplus of the producers of x in

[8] It is straightforward to close the partial equilibrium model by adding a traded numeraire good, z. For example, see Bown (2002).

Home and the producers of y in Foreign, respectively. We also allow a secondary policy instrument, T, to facilitate the redistribution of income lump sum between Home and Foreign. T substitutes for a richer theoretical model which would explicitly allow for Home to alter the structure of a protectionist policy change from a tariff (say) to a VER in trade policy negotiations, in order to compensate Foreign by shifting quota rents. Formally, for the Home government, let its welfare function be defined as

$$W(\tau, \tau^*, T) = W_x(\tau) + W_y(\tau^*) + T,$$

where

$$W_x(\tau) = \int_{\hat{p}_x(\tau)}^{1} D(p_x)\, \mathrm{d}p_x + \gamma \cdot \Pi_x(\hat{p}_x(\tau)) + \tau \cdot M(\hat{p}_x(\tau)),$$

$$W_y(\tau^*) = \int_{\hat{p}_y(\tau^*)}^{1} D(p_y)\, \mathrm{d}p_y + \Pi_y(\hat{p}_y(\tau^*)).$$

The Foreign government's welfare function is given by

$$W^*(\tau, \tau^*, T) = W_x^*(\tau) + W_y^*(\tau^*) - T,$$

where

$$W_x^*(\tau) = \int_{\hat{p}_x^*(\tau)}^{1} D(p_x^*)\, \mathrm{d}p_x^* + \Pi_x^*(\hat{p}_x^*(\tau)),$$

$$W_y^*(\tau^*) = \int_{\hat{p}_y^*(\tau^*)}^{1} D(p_y^*)\, \mathrm{d}p_y^* + \gamma^* \cdot \Pi_y^*(\hat{p}_y^*(\tau^*)) + \tau^* \cdot M(\hat{p}_y^*(\tau^*)).$$

We start our analysis under the assumption that Home and Foreign have agreed to bind their tariffs at their jointly efficient levels (which maximize joint welfare, $W + W^*$) of

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

Given our starting point of the initial agreement, assume that the Home country receives a shock $\epsilon > 0$ to its political economy parameter which causes γ to increase to $\hat{\gamma} \equiv \gamma + \epsilon$, where we further require that the 'shock' be sufficiently small so that if $\gamma < \gamma^*$, then $\hat{\gamma} < \gamma^*$ as well. First, note that the shock affects Home's efficient tariff given by Eq. (1) so that Home and Foreign jointly prefer Home to raise its tariff to the new efficient level. We thus treat this problem as a trade policy adjustment that would occur *between* GATT negotiating rounds.

Home must decide how to implement the additional protection. Bown (2002) introduces a GATT-like setting in which Home has two routes from which to choose. It could offer the protection legally, by simply updating its tariff to the new efficient level and using the GATT's safeguards provisions to alert its trading partners that it has done so. In return, Home only has to offer enough compensation to the affected Foreign country to balance what are termed *substantially equivalent concessions* under the condition of

reciprocity. The theory draws on the interpretation and role of *reciprocity* in the GATT provided by Bagwell and Staiger (1999, 2001). Their definition states that, given the initial set of tariffs $\{\tau^E, \tau^{*E}\}$, if Home raises its tariff to $\hat{\tau}^E(\hat{\gamma})$, then Foreign's tariff response will satisfy the condition of reciprocity so long as it is limited to bringing about equal changes in the volume of each country's imports and exports, when valued at existing world prices. This reciprocity condition under the GATT's safeguards provisions allows Foreign to make a mitigated threat of an increase in its tariff to a level given by a well-defined reciprocity tariff, τ^{*R}.[9] While Bown (2002) formally illustrates the properties of the *reciprocity* tariff as it applies to this context, it is sufficient to note here that for the parameters of interest, the reciprocity condition has two important effects: (i) it (weakly) constrains Foreign to a threat of retaliation below the Nash level, and (ii) the reciprocity tariff neutralizes the terms of trade effect of Home's tariff increase to $\hat{\tau}^E$. The *legal* route tariff pair, $\hat{\tau}^E(\hat{\gamma}) = (\hat{\gamma} - 1)/(2(5 - \hat{\gamma}))$ and τ^{*R}, thus establishes one benchmark 'threat point' from which Home and Foreign reference in their negotiations to the new efficiency frontier.

Home's alternative is to implement the protection *illegally*, where we assume it imposes its Nash tariff over imports of x.[10] If Home acts illegally, we assume that it is 'caught' with certainty under the GATT's dispute settlement mechanism where it faces the threat of Foreign retaliation through its Nash tariff over its imports of y.[11] By working through each country's best response function we determine the Nash tariffs

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

The Nash tariff pair of Eq. (2) establishes the alternative, *illegal* benchmark 'threat point.' We reiterate that under both the legal and illegal routes Foreign retaliation is only used to establish a threat point from which countries commence compensation negotiations. In the final outcome of the model, countries do not retaliate and the result is always efficiency.

Under both the illegal and legal route we assume a simplified Nash bargaining procedure with equal bargaining power across countries to determine the ultimate negotiated outcome on the new efficiency frontier in welfare space. The equilibrium negotiated outcome is then solely determined by the relative positions of the threat point benchmarks. Home's ultimate policy choice of whether to implement the protection legally or illegally is thus dependent on which threat point provides it with the more favorable position from which to commence negotiations. Given this setting, we appeal to the fundamental result that will guide our empirical investigation.

[9] This is admittedly an abstraction as the theory assumes that there is an external enforcement mechanism that compels Foreign to respond with its *reciprocity* tariff when Home uses the legal route, even when Foreign would prefer to respond with its Nash tariff. Bown (2002) provides a further discussion.

[10] For the purposes of this exercise, we assume that the dispute settlement mechanism imposes no constraint on the permissible level of retaliation, thus resulting in the Nash retaliatory tariff serving to identify the threat point/benchmark in the negotiations. For an analysis of the complications introduced by relaxing this assumption, see Bown (2002).

[11] Kovenock and Thursby (1992) do allow for uncertainty that is not formally considered here. Introducing uncertainty into our model would likely increase the likelihood that Home will implement protection illegally. However, if we assume that the probability of detection is positively correlated with the size of the imports in the market being protected (or alternatively, negatively correlated with γ), introducing uncertainty should not change the qualitative pattern of the results.

Proposition 1. *At the illegal threat point, if the terms of trade gain to Home generated by reversion to $\hat{\tau}^N(\hat{\gamma})$ is larger than the terms of trade loss suffered by Home through Foreign's retaliatory reversion to $\tau^{*N}(\gamma^*)$, then Home will choose the illegal route and implement protection by circumventing the GATT rules, leading to a trade dispute. However, if the welfare effects of the terms of trade changes at the illegal threat point are reversed, a shock will cause Home to implement protection legally under the GATT's safeguards provisions.*

Proof. It is sufficient to show that if

$$1/2(\hat{\tau}^{\mathrm{N}} - \hat{\tau}^{\mathrm{E}})(1/2 - \hat{\tau}^{\mathrm{N}}) > 1/2(\tau^{*\mathrm{N}} - \tau^{*\mathrm{E}})(1/2 - \tau^{*\mathrm{N}})$$

[i.e., if Home's terms of trade gain through Nash reversion in x is larger than Foreign's terms of trade gain through Nash reversion in y, see Bown (2002, p. 293)], then $\hat{\gamma} < \gamma^*$. We can then rely on Proposition 2 of Bown (2002, p. 304) in order to prove that if $\hat{\gamma} < \gamma^*$ then Home implements protection illegally.

Suppose this were not the case, i.e. then $\hat{\gamma} \geq \gamma^*$. Then we derive a contradiction. First, clearly if $\hat{\gamma} = \gamma^*$, then by Eqs. (1) and (2):

$$1/2(\hat{\tau}^{\mathrm{N}} - \hat{\tau}^{\mathrm{E}})(1/2 - \hat{\tau}^{\mathrm{N}}) = 1/2(\tau^{*\mathrm{N}} - \tau^{*\mathrm{E}})(1/2 - \tau^{*\mathrm{N}}).$$

Otherwise, if $\hat{\gamma} > \gamma^*$, then by Eq. (2) $\hat{\tau}^{\mathrm{N}} > \tau^{*\mathrm{N}}$ so $(1/2 - \hat{\tau}^{\mathrm{N}}) < (1/2 - \tau^{*\mathrm{N}})$. Furthermore, $\partial(\hat{\tau}^{\mathrm{N}} - \hat{\tau}^{\mathrm{E}})/\partial\hat{\gamma} < 0$ for $\hat{\gamma} \in (1, 3)$, thereby proving the result. □

Home implements illegal protection when it enjoys a relative imbalance of power under the illegal route's threat point. What drives the result is that the illegal route's threat point is more 'power-oriented' than is the legal route's threat point, where only a constrained (reciprocity) tariff response by Foreign is allowed. When Home is able to take advantage of its 'power' (as measured by its relative ability to affect the terms of trade), it chooses to implement the protection illegally.

While data on a country's capacity to make terms of trade gains and suffer terms of trade losses is not readily available, we spend the rest of this section arguing that reasonable proxies can be constructed. We first illustrate how the capacity for a country to affect the terms of trade in the model is due to the *levels* of the underlying trade and protection variables.

It is straightforward to show that if Home's terms of trade gain through $\hat{\tau}^{\mathrm{N}}(\hat{\gamma})$ is larger than its terms of trade loss through Foreign reversion to $\tau^{*\mathrm{N}}(\gamma^*)$ so that Home implements protection illegally, we have $\gamma < \gamma^*$. First rewrite the Home and Foreign pre-shock trade volumes as a function of the political economy weights:

$$M(p_x(\tau^{\mathrm{E}}(\gamma))) = \frac{3-\gamma}{5-\gamma} \quad \text{and} \quad E(p_y(\tau^{*\mathrm{E}}(\gamma^*))) = \frac{3-\gamma^*}{5-\gamma^*}. \tag{3}$$

When $\gamma < \gamma^*$ and Home implements protection illegally, Eq. (1) indicates that Foreign's efficient tariffs are already high and now by Eq. (3) its imports from Home

(equivalent to E) are low. Furthermore, a low value for γ implies that Home has a low pre-shock tariff from Eq. (1) and large pre-shock imports from Foreign, based on Eq. (3). The combination of: (i) Home taking advantage of its own (pre-shock) large imports and low tariffs and reverting to its Nash tariff, and (ii) Foreign being taken advantage of due to its small imports from Home and high (pre-shock) tariffs which limit its ability to retaliate, serves to then set the illegal route threat point in Home's favor.

How do we interpret the role of the *safeguards* provisions? Home will use the safeguards provisions and implement protection *legally*, avoiding a trade dispute, if $\gamma > \gamma^*$. Consider again the relationship between the political economy parameters and Eqs. (1) and (3) for the intuition: high (low) values of γ (γ^*) imply that Home (Foreign) has high (low) pre-existing tariffs and its imports are small (large). By choosing the *legal* route, Home prevents Foreign from implementing its Nash tariff thereby avoiding the threat of a large terms of trade loss in the y sector. Since Home's pre-shock tariff of Eq. (1) is already relatively high and its import volume small, ceteris paribus, any threat of welfare gains attainable through manipulation of the terms of trade by a Nash tariff reversion in the x sector are limited. Because it is concerned with the potential relative imbalance of power aligning in Foreign's favor under the illegal route threat point, Home chooses *not* to implement its Nash tariff and to instead use the GATT provisions to limit Foreign's threat of retaliation to that implied by the rule of reciprocity. Summarizing the results of this section:

Corollary 1. *Home will implement the protection illegally, leading to a trade dispute, when it enjoys a relative imbalance of power at the illegal route threat point due to the following:* (*i*) *higher pre-shock imports of x,* (*ii*) *a lower pre-shock tariff* (τ^E) *over imports of x,* (iii) *smaller Home pre-shock exports of y to Foreign, and* (iv) *a higher Foreign pre-shock tariff* (τ^{*E}) *over imports of y.*

The means by which we take the basic theory to the data in a multilateral, multiple import and export good setting are addressed in the following section.

3. The econometric model, data and estimation procedure

3.1. The binary choice model

To assess the implications of the model and the theory that governments make policy decisions on *how* to implement protection based on terms of trade considerations, we consider a Home government which finds itself receiving $n = 1, \ldots, N$ positive shocks to its political economy parameter.[12] Home then has an efficiency reason to address these

[12] While the Bown (2002) framework is a convenient setting to introduce our empirical exercise, the results should generalize to the realization of other types of 'shocks', so long as the shock provides an efficiency reason for the Home government to implement additional protection. Therefore, we do not attempt to empirically represent the shock in the estimation.

shocks by implementing additional protection. As discussed in Maddala (1986), we assume that there is an underlying response variable C_n^* which is defined by

$$C_n^* = Z_n' \theta + u_n,$$

where Z_n is a vector of covariates, θ is a vector of the parameters to be estimated, and u_n is the error term. In lieu of observing C_n^*, we observe the policy choice

$$C_n = 1, \quad \text{if } C_n^* > 0,$$
$$C_n = 0, \quad \text{otherwise},$$

where we let $C_n = 1$ represent the choice of implementing protection *illegally* and getting caught under the GATT's dispute settlement mechanism. Theory predicts that $C_n = 1$ when Home's capacity to make terms of trade gains outweighs the terms of trade losses it would suffer under a Foreign retaliation at the threat point (Proposition 1). Therefore, we have

$$\Pr(C_n = 1) = \Pr(u_n > -Z_n' \theta) = 1 - \Phi(-Z_n' \theta) = \Phi(Z_n' \theta), \tag{4}$$

where $\Phi(\cdot)$ is the cumulative distribution function for u, assuming that the shocks are independent and normally distributed so that $\Phi(\cdot)$ is the standard Gaussian cumulative distribution function, thus yielding the binomial probit model.[13] While this is the primary model of interest, after describing the data we return to the problem of sample selection bias and a further discussion of the econometric specification in Section 3.3.1 below.

3.2. Data and variable construction

As the theory is largely motivated by GATT practice and rules, we appeal to instances in which countries have implemented additional import protection under the GATT's safeguards provisions and the instances in which countries have implemented import protection in a way which either violated GATT rules or its GATT obligations, thus leading to a dispute. For reasons of data availability, we focus on offerings of such GATT-legal and GATT-illegal import protection between 1973 and 1994. As this is a new and previously unexploited dataset, we provide a thorough introduction to it here.

3.2.1. Affording protection: legally and illegally

We obtain data on instances in which countries have implemented *legal* protection under the safeguards provisions by compiling notifications to the GATT's Articles XIX and XXVIII, which is found in WTO (1995). The data published by the GATT/WTO includes such information as the country implementing the additional protection, a short list of the goods whose tariff bindings have been changed, the dates of the notification of

[13] So as to not violate the independence assumption in the implementation of the model, we omit from the data set all Article XXIII cases that were undertaken as a response to a country changing its policy in *retaliation* to a previous, illegal trade policy of a trading partner. To make this judgment on a case-by-case basis we rely on the case descriptions provided in Hudec (1993).

changes, and (potentially) a list of countries that were affected by the additional protection and who seek compensation.

It is not as straightforward to obtain data on the instances in which countries have implemented import protection *illegally* for two reasons. First, over the life of the sample, roughly 80% of the documented GATT trade disputes were instances in which countries were offering excessive *import* protection. We address this data sorting issue by broadly referring to the descriptions provided in Hudec (1993) and various panel reports. Most of the 20% of the excluded cases were dropped because they involved claims of excessive export promotion (usually through GATT-illegal subsidies), though we have excluded a handful of cases which were lodged on political grounds, or as a means of retaliation itself as an obvious 'tit-for-tat' response to an earlier dispute filed by a trading partner. We also exclude two disputes which were allegations of misuse of the safeguards provisions and a handful of other disputes where a panel determined the defendant to be 'innocent.'

The second, and more serious, problem derives from the structure of the GATT itself. Since it does not have independent prosecutors, the GATT dispute settlement provisions only kept track of instances in which a country went on record and filed a formal proceeding under Article XXIII. This side of the data set can thus not hope to include all cases of GATT-illegal import protection, but only those that were brought forward and addressed publicly. This has potential implications for the estimation results, which we discuss separately and in detail in Section 3.3.2 below.[14]

Our approach yields a sample of 245 instances between the period of 1973 and 1994 in which countries implemented additional protection beyond that which they had stipulated they would limit themselves in a prior GATT negotiating round. As Table 1 illustrates, in 40% (98/245) of the cases the protection was implemented illegally and the country was caught under the GATT's dispute settlement mechanism, Article XXIII. The other 60% of the protection observations are split fairly evenly under the two legal routes in our setting, Article XIX (29%) and Article XXVIII (31%). The most frequent defendants in the disputes are the US, EC, Canada and Japan—countries who have also frequently implemented protection legally as well.

3.2.2. Data of the protected industry

The theory assumes only one import and export good per country, a limitation we must address in the econometric specifications of the model. Therefore, let the industry over which Home offered the initial protection be denoted by x, and for later use let Home's exports to Foreign be indexed by y.

Reliable trade data is not available within all of the GATT-published cases, so for consistency we match the products of the cases to an established set of import and export data of multilateral trade flows. For this task we use the four-digit, SITC trade data available in Feenstra et al. (1997) to represent industry x, seeking to match the product description in the GATT case to the most disaggregated SITC data available. The trade data of product x is a key element in the exercise for a variety of reasons. First, since GATT dispute settlement proceedings in the illegal cases may occur many years after the initial

[14] We have also had to omit some 'legal' and 'illegal' observations concerning *developing* 'Home' countries given issues of data availability of some of the explanatory variables required in the estimation.

Table 1
Country involvement in the sample of GATT Article XIX, XXIII and XXVIII cases involving additional import protection, 1973–1994

	Illegal protection Article XXIII[a]		Legal protection			
			Article XIX		Article XXVIII	
	Defendant[b]	Eligible[c] for compensation	Taken action[b]	Eligible[c] for compensation	Taken action[b]	Eligible[c] for compensation
US	28	45	9	32	10	40
EC[d]	33	43	18	46	8	59
Japan	14	12	0	34	2	27
Canada	11	28	14	8	6	19
Argentina	2	19	0	1	0	5
Brazil	1	17	0	4	1	11
Australia	1	8	18	6	7	20
Austria	0	6	4	6	6	7
Finland	2	4	2	2	6	7
New Zealand	1	8	1	8	20	7
Norway	2	3	1	2	1	7
Sweden	1	6	0	8	4	10
Switzerland	0	3	1	2	2	9
Other[e]	2	150	3	87	3	125
Total	98	352	71	246	76	353

Sources: compiled by the author from WTO (1995, 1997) and Hudec (1993).

[a] Cases of excessive import protection falling under Article XXIII, the Tokyo Round Codes' dispute resolution fora, or other disputes as documented in Hudec (1993).

[b] 'Defendent' or countries who have 'taken action' are the instances in which a country acted as a 'Home', protection-affording country in the GATT sample of observations.

[c] A country is eligible for compensation in this table if it has at least a 10% share of the exports that are being restricted due to Homes increase in protection.

[d] 'EC' is entire EC or EC member country or group of EC member countries within the same action taken.

[e] 'Other' protection-affording countries in our dataset include India, Thailand, Poland, Hungary, and Morocco. There are too many 'other' elegible for compensation countries to list.

protection was offered, we use import data in years before and after the initiation of the case to better identify the timing of the initial 'shock,' if different from the year the case came before the GATT. Second, we illustrate in the next two sections how we use the trade data for industry x to identify the relevant affected Foreign countries from whom Home might fear retaliation.

3.2.3. *Identifying affected foreign countries: the multilateral approach*

The next step is to empirically identify which of the countries affected by Home's implementation of additional protection are eligible for compensation. We cannot, as a general rule, appeal simply to the list of countries who self-report and who are detailed in WTO (1995), as this list is incomplete. First, it does not necessarily include the countries that Home *anticipated* would seek compensation when it made its protection-implementation decision. In fact, many of the safeguards cases of legal protection have no countries reporting to the GATT that they have been affected by the change in policy. Second, if we

went by the self-selection criterion, the illegal cases would, with few exceptions, have only one affected country, i.e. the plaintiff in the dispute. This would certainly bias the results of the estimation.

We use the legal interpretation of the statute with the trade data to rigorously identify which affected countries are eligible for compensation. Under the GATT's interpretation of one of our legal provisions, Article XXVIII, any country with a *principal supplying interest* can seek to negotiate compensation with a country that withdraws concessions by raising its tariff above the bound rate. In the legal interpretation, the principal supplying interest is generally defined as 10% of the total imports of the product in question.[15] Therefore, since a country always has the option of implementing protection under this provision, we take as our baseline specification the assumption that for all cases, with the exception of trade dispute claims of violation of the MFN clause, any country with a 10% share of the imports being restricted is eligible for compensation, and thus potentially retaliation. If the dispute was primarily caused by Home's violation of MFN, then we only identify one country (the plaintiff in that case) as being eligible for compensation. We return to the empirical implications of this issue in Section 4.3.

Table 1 also illustrates the frequency with which various countries are eligible for compensation under the 10% rule. Note that as a robustness check in the estimation, we also consider specifications in which we vary this identification criterion to other levels, such as 5 and 15%.

3.2.4. Identifying affected Foreign countries: the bilateral approach

While we feel that utilization of the principal supplier rule is the correct methodology to identify which affected Foreign countries may be authorized to seek compensation for Home's trade policy adjustment, for reasons to be discussed below, in some empirical specifications it is useful to control the *number* of affected Foreign countries in each case and to fix this number at one. We term this second approach to identifying a focal affected trading partner the 'bilateral approach.'

Under the bilateral approach we consider two different rules to select the one focal Foreign country from the set of affected trading partners that have been identified by the data: (i) identifying Home's 'most powerful' trading partner, or (ii) identifying Home's 'most affected' trading partner. Home's 'most powerful' trading partner will be defined as the trading partner (revealed by the data as exporting the protected product to Home) to whom Home sends the largest share of its exports. This focal country is interesting to analyze because it is the country from whom Home has the most to lose through retaliation. On the other hand, we define Home's 'most affected' trading partner as the country (revealed by the data as exporting the protected product to Home) who has the largest share of the Home import market of the protected good. This country is interesting because it has the most to lose from Home's initial act of protection. We will further motivate these distinctions in our discussion in Section 4.3 below.

[15] Specifically, the interpretation of Article XXVIII states, "[d]uring the meeting of the Committee on Tariff Concessions in July 1985, it was stated that the '10 percent share' rule had been generally applied for the definition of 'substantial supplier' " (WTO, 1995, p. 941).

3.2.5. Data of the protection-affording home country

We now turn to the construction of variables of the Home country that theory suggests influence its protection-implementation decision.

3.2.5.1. Home's imports of x. Suppose the protection is implemented so that imports are first restricted in year *t*. All of our variables will thus be the values taken in $t-1$. Theory suggests that Home is more likely to offer protection illegally when it is restricting what was (before the policy change) a large volume of imports of good *x*, so as to be able to threaten to enjoy potentially large terms of trade gains at the threat point. The theory only has a formal prediction for a cross-sectional relationship between one Home country and one trading partner. This affects the definition of the import variable for two reasons: (i) there is often more than one affected trading partner, and (ii) the data set contains heterogeneously sized 'Home' countries (see Table 1), where a given dollar value of trade may be large for one country and small with respect to another. Therefore, we would like to have a measure of imports that normalizes the 'size' of Home, while providing a measure of Home's capacity to affect the terms of trade in consumption of the *x* good. Our import variable is thus *IMP_SHARE*, which we define as Home's imports of the affected product, relative to the identified *affected countries*' total exports of the affected product to the world. As a robustness check in some specifications, we use an alternative variable which we term *REAL_IMP* and define as Home's (real $ value of) imports of the affected product *x*.

3.2.5.2. Home's tariff protection. In the theoretical model with political economy influences, when comparing two otherwise symmetric Home countries, the one with the lower pre-shock tariff is more likely to offer illegal protection. The theory suggests that the potential terms of trade gains are larger at the threat point because its efficient tariff is farther away from its Nash tariff. For the pre-shock tariff over good *x*, we use data from Anderson (1998). The ad valorem tariff data is at the four-digit Harmonized System code level, which we translate to four-digit SITC data by the concordance files in Feenstra (1996).

The Anderson tariff data is cross-sectional and typically available for only one year (usually 1988). Fortunately, tariff bindings were only modified once over the length of the sample, in 1979 at the end of the negotiations of the Tokyo Round. Thus in order to adjust the tariff data for this fact we use the Tokyo Round's 'Swiss Formula' to calculate the tariff bindings that were in place in the period before 1979.[16] Define Home's pre-shock tariff variable on imports of good *x* to be the level *HOME_TARIFF*.

[16] The 'Swiss Formula' is of the form $\tau_{TR} = \delta\tau_{1978}/(\delta + \tau_{1978})$, where τ_{1978} was the pre-1979 rate (to be calculated), δ was an agreed upon coefficient and τ_{TR} was the post-Tokyo Round tariff level (given by the Anderson data); see for example, GATT (1979, p. 46). The formula served to 'harmonize' tariff rates, and the cuts were also phased in gradually over 1979–1987, so we create tariff data sets from the Anderson data for cases before 1979, those in 1980, 1981,. . .,1987 and those in 1988 and after. The resulting 'time series' of tariff data is not perfect, however, as there were sectors that countries excluded from the Swiss Formula approach. We thus expect there to be considerable measurement error in both this variable and the Foreign measure of tariff protection that we introduce below.

3.2.6. Data on the eligible Foreign countries under the multilateral approach

Once we have formally identified the countries eligible for compensation via the 10% principal supplier rule, we construct a number of variables that influence these trading partners' capacity to threaten to retaliate against Home.[17] These variables include Home's exports to the affected countries and measures of the eligible countries' level of pre-shock protection.

3.2.6.1. Home's exports to the eligible Foreign countries. Theory suggests that if the countries identified as the principal suppliers of affected product *x* also serve as important markets for Home's exports, Home may be more likely to implement its protection legally so as to protect those exports and to mitigate the threat of retaliation. Note that the GATT does not identify specific sectors to which affected Foreign country retaliation should be limited, i.e. it does *not* state that if Home raised tariff bindings in industry *x* then Foreign retaliation should also occur in industry *x*. Hence there is no industry-specific component in Home's export variables.

For reasons analogous to those argued in Section 3.2.5, we also seek a measure of Home exports to its affected trading partners that both accounts for differences in the size of Home countries in the sample and also represents the Foreign countries' capacity to impose welfare losses on Home and affect its terms of trade through retaliation. Therefore, we define EXP_SHARE as the ratio of Home's exports that are sent to the affected countries to its total exports sent to the world.

3.2.6.2. The eligible Foreign countries' tariff and non-tariff protection. Theory also suggests that if the affected countries have high pre-shock tariffs, their capacity to threaten to retaliate is diminished and Home would be more likely to use the illegal route. For tariff data of the affected Foreign countries we also use that collected by Anderson (1998), where we again adjust for the pre-Tokyo Round tariffs via the 'Swiss Formula.'[18]

An additional issue in the generation of this variable is created by the need to average non-uniform tariffs over multiple industries and countries to find a single measure of 'Foreign' tariff protection. As discussed in Feenstra (1995), one typical problem is that industries protected with extremely high tariffs are generally accompanied with either zero or very low imports as their weight in the final trade-weighted average, essentially omitting the effect of prohibitively high tariffs in the average calculation. In order to address this concern we weight the industry tariffs with the *export* data of the protection-affording Home country instead of what is traditionally done, which is to weight it with the

[17] In the robustness checks reported in Section 4 in which we use the 5 and 15% principal supplier rules or the 'most powerful' or 'most affected' bilateral approaches, the data on the eligible Foreign countries is constructed analogously to that discussed in this section using the 10% rule.

[18] Another limitation to the protection data is that it is only available for 32 of the roughly 95 'Foreign' countries in our dataset. However, these 32 countries do make up 71% (676/951) of the GATT countries who we identified as eligible for compensation in our 245 legal and illegal cases. Thus we are making the implicit assumption that the 29% of the affected countries for whom we do not have protection data are similar in composition to the eligible countries in each case. The same point applies to our construction of the variable on Foreign non-tariff protection described below.

import data of the affected Foreign country. In addition to helping remedy the problem outlined above, this method serves to emphasize Home's most important exports in the measure of protection calculation. If $\tau^{*E}_{y,f}$ is affected Foreign country f's industry y tariff, then the affected Foreign trade (export)-weighted average tariff facing Home is defined as

$$AFFECTED\_TARIFF \equiv \frac{\sum_{f=1}^{F}}{F}\left[\frac{\sum_{y=1}^{Y}\tau^{*E}_{y,f}E_y}{\sum_{y=1}^{Y}E_y}\right],$$

where E_y are Home's exports of good $y = 1, \ldots, Y$ to the world, and F is the set of Home's affected trading partners identified by the 10% principal supplier rule.

While not in the simple theoretical model, it is also likely that the level of Foreign non-tariff protection would influence Home's policy choice, if instead the Foreign countries have substituted toward *non-tariff* barriers. Therefore, we control for the presence of non-tariff protection by using the NTB coverage ratios also found in Anderson (1998).[19] Let $I^*_{y,f}$ be the indicator that Foreign affected country f's industry y imports $M^*_{y,f}$ are covered by an NTB. Then we define the level of Foreign non-tariff protection as the average coverage ratio given by

$$AFFECTED\_NTB \equiv \frac{\sum_{f=1}^{F}}{F}\left[\frac{\sum_{y=1}^{Y}I^*_{y,f}M^*_{y,f}}{\sum_{y=1}^{Y}M^*_{y,f}}\right].$$

3.3. Additional estimation issues

Before proceeding to the estimation, we turn to a discussion of the two potential problems created by selection bias: one that can be addressed econometrically, and one that cannot.

3.3.1. Is the sample of data used in the protection-implementation decision biased?

While we seek to identify what factors determine a government's *protection-implementation* decision, one concern is that this decision is really the second stage of a two-step process in which the government must first decide whether it should implement protection at all. In the estimation, we control for the possibility of second stage sample selection bias by formally introducing a first stage to the model, where we assume the government makes a {*Protect*, *Don't Protect*} decision. More formally, suppose that the Home government is faced with $m > n$ {*Protect*, *Don't Protect*} decisions, and let $B_m = 1$ represent the choice of implementing protection. Thus, in the first stage we estimate

$$\Pr(B_m = 1) = \Pr(a_m > -K'_m\psi) = 1 - \Phi(-K'_m\psi) = \Phi(K'_m\psi), \tag{5}$$

where K_m is a matrix of first staged covariates, ψ is a vector of parameters to be estimated, and again we assume $\Phi(\cdot)$ is the cumulative normal distribution function for the error term,

[19] The indicator in the data is a '1' if 75% or more of the six- or seven-digit tariff lines within a four-digit category contained an NTB. However, note again that this is a cross-section of NTB data for generally 1988, and unlike the tariff data we have no systematic means of adjusting the NTBs to reflect time series changes. Thus, we view this variable with substantial scepticism.

a_m, thus yielding the probit model in the first stage as well. The problem with estimating Eq. (4) alone is that if $\text{corr}(u, a) = \rho$, where $\rho \neq 0$, then we have sample selection bias and our second stage estimates will be inconsistent. Therefore, we use the Van de Ven and Van Praag (1981) probit application of the Heckman (1979) selection bias correction procedure. The result is maximum likelihood estimation of the following log likelihood function:

$$L = \left\{ \sum_{C_n=1} \ln[\Phi_2(Z_n'\theta, K_n'\psi, \rho)] + \sum_{C_n=0} \ln[\Phi_2(-Z_n'\theta, K_n'\psi, -\rho)] \right\} \tag{6}$$

$$+ \sum_{B_m=0} \ln[1 - \Phi(K_m'\psi)],$$

where $\Phi_2(\cdot)$ is the bivariate normal distribution. Maximum likelihood estimation of (6) provides consistent and asymptotically efficient estimates for the second stage parameters of interest.

However, in order to estimate the model, we require an additional set of data representing the instances in which the government did *not* implement protection. To generate such observations, we randomly sample from the (non-protected) four-digit SITC industries in the Feenstra et al. (1997) data set with respect to the relevant 'Home' countries over the years 1973–1994. Specifically, we randomly draw an additional 2700 observations from a set of all (non-protecting) four-digit SITC importing industries of the 'Home' countries in our sample. To replicate the over-representation of the US, EC, Canada and Japan in the randomly drawn sample, we force roughly 1800 of the 2700 random industries to be drawn from one of these four countries.[20] We further elaborate on the explanatory variables used in the estimation of the first stage {*Protect*, *Don't Protect*} decision in Section 4.1 below.

3.3.2. An additional potential bias: the 'illegal' side of the dataset

The self-reporting nature of 'illegal' cases generates a second potential sample bias problem. There are likely missing observations in which countries implemented illegal protection but were not brought to the GATT's dispute settlement mechanism. Unlike the earlier problem, here we have no formal knowledge of statistical characteristics regarding the missing data, thus bias correction techniques are of little additional assistance. The approach that we take is to first discuss our expansive effort to obtain as many 'illegal' observations as possible, and we then identify how our second stage estimates are likely to be biased if our sample is not fully representative of the underlying population.

[20] If our exercise were limited to the US, an alternative and more data intensive approach would be to look through the *rejected* antidumping, countervailing duty and Section 201 investigations as a means of identifying a particular sample of 'non-protected' industries. However, Hansen (1990) has shown that the sample of *petitions received* by the ITC in the US is biased, relative to the underlying population of import-competing industries. Therefore, we choose the approach discussed in the text, where we think of the randomly generated data as representing the average, non-protected, import competing industries in the relevant Home countries of the sample.

First, the illegal observations are *not* limited to cases in which countries initially liberalized and then imposed a second policy restricting trade. To obtain a set of 'illegal' activity that is both expansive and yet consistent with the fundamental features of the underlying model, we also include disputes in which Home *refused* to live up to liberalization commitments. Second, the 'illegal' observations are also not limited to cases in which Home was 'found guilty.' In the attempt to generate as many as possible legitimate allegations of illegal import protection, a case is included, regardless of how far it actually proceeded in the process. Third, the data set incorporates those illegal cases that were brought to the separate dispute settlement fora of the 1979 Tokyo Round Codes (WTO, 1997). This therefore brings into the sample all disputes relating to improper application of antidumping duties that would have been brought forward to the dispute settlement provisions of Tokyo Round's Antidumping Code, and not Article XXIII. Finally, we also include cases that were neither formal Article XXIII nor Tokyo Round Code violations but were disputes brought up in GATT ministerial meetings or other informal settings that were documented in the exhaustive compilation of Hudec (1993).

However, it is likely that some illegal activity has gone unreported, and here we discuss the expected impact that missing 'illegal' observations would have for our estimates. An expected-welfare maximizing Foreign country that has been injured by an 'illegal' observation would not pursue a case if the expected cost to pursuing the case is larger than the expected gains from prosecution. This is more likely if: (i) the gains to Foreign from winning the case are small, (ii) the likelihood of Home removing the 'illegal' policy is small, and (iii) the costs to Foreign pursuing a case are large. We consider the impact of each in turn.[21]

First consider (i) and the impact on the estimation if Foreign's expected gains to winning the case are small, which may occur if the imports affected by Home's policy adjustment were small. Recall that the theory predicts that Home implements illegal protection when the size of the imports affected is large. If, for self-reporting reasons, we systematically omit from the 'illegal' data instances in which these imports were small, we will tend to over-estimate the impact of the *IMP_SHARE* variable. However, this must be considered within the context of the data generating process discussed earlier, where, in order to keep as many 'illegal' observations as possible, we include not only disputes where Home initially liberalized, and then imposed a second policy restricting trade, but we also include disputes where Home has *refused* to live up to liberalization commitments. With respect to observations concerning this second type of illegal activity that are in the data set, it is likely that we will underestimate the impact of the *IMP_SHARE* variable.[22] Therefore, the overall expected bias on *IMP_SHARE* in the second stage is ambiguous.

[21] It is also possible that our data set may not pick up illegal activity if it involves countries colluding and agreeing not to report each other to the GATT. However, our data set will pick up such activity, provided the trade affected by the 'illegal' policy impacts a third country which does report it. A 1987 dispute between the EC and Japan over semi-conductors is a good example of this type of third country monitoring that has taken place in practice. In that dispute, Japan allegedly gave the US preferential (but GATT-illegal) market access as compensation for the termination of US antidumping investigations of Japanese firms. The dispute made it to the GATT as the preferential policy also affected EC trade. For a discussion, see Hudec (1993, p. 541).

[22] The problem is that the variable that we would like to identify is Home's market access commitment in the sector under dispute, but unfortunately we have to proxy for that with the size of *realized* imports.

The second potential bias relates to (ii) and (iii) and affects the *retaliation*, or Home's *export* side of the estimation. Recall that GATT rules of dispute settlement require Foreign to have the capacity to threaten retaliation in order to induce Home to remove its illegal policy. If the costs of prosecution are sizeable, Foreign may only initiate a dispute when it is likely that Home will liberalize, and this likelihood is smaller, the smaller is the Foreign capacity to retaliate. But since the theory suggests that Home is more likely to proceed illegally when Foreign shows little capacity to retaliate, our data on reported *illegal* activity may *underestimate* the impact of retaliation on the protection-implementation decision. Note, however, that this is tempered by the fact that the *legal* costs to initiating a dispute are very small, and the initiation of a dispute is all that is required for the illegal activity to become an observation in our dataset. Furthermore, countries may also have an incentive to initiate disputes even when it is known that its retaliatory capacity is insufficient to induce Home to comply, as failure of the dispute may be important to get 'on the record' to use as evidence to justify reform in the next negotiating round. However, with respect to (iii), the initiation of a dispute may cause potential plaintiffs to face other substantial, non-legal costs. For example, if Foreign is reliant on Home for *bilateral aid*, it may be hesitant to initiate a dispute as such an act could jeopardize its development assistance. To the extent that such a Foreign country also lacks the capacity to retaliate, this may further cause us to *underestimate* the impact of the export retaliation variables in the second stage.

To summarize the potential bias on the import variable of interest is ambiguous, given our data generating process. On the other hand, our estimates for the impact of the retaliation variables will be conservative, given the self-reporting nature of 'illegal' GATT activity.

3.4. Summary statistics

Table 2 presents summary statistics of the constructed variables that are used in the estimation procedure. Table 3 presents mean values for some of the key explanatory variables under the two different types of protection offered in the second stage. First note that, on average, Home receives a larger share of its affected trading partner's exports in the cases in which it implements protection 'illegally' as opposed to 'legally' (23.99% versus 11.27%), and the tariff over the protected industry is on average lower in the illegal observations as well (10.56% versus 13.91%). This is consistent with the theory that Home's decision of how to implement protection is influenced by consideration of the welfare gains from trade policy adjustments that would occur at the illegal threat point.

With respect to the export variables in the analysis, in the lower segment of Table 3 we consider three different rules to identify the Foreign trading partners from whom Home might fear retaliation. Under all three rules, Home sends a smaller share of its exports to the relevant trading partner(s) when it proceeds 'illegally' versus when it does so 'legally.' As a specific example, on average, Home sends only 25.84% of its exports to its 'most powerful' affected trading partner when it proceeds illegally, whereas it sends 36.28% to its 'most powerful' affected trading partner when it proceeds legally. Furthermore, Home's affected trading partner(s) also have a higher percentage of imports covered by NTBs in the illegal cases than in the legal cases under all three rules, as predicted by the theory. The

Table 2
Summary statistics for the variables used in the estimation

Explanatory variables	Mean	Standard deviation	Minimum	Maximum
First stage selection equation				
(expected sign when $B_m = 1$ is 'protection')				
REAL_IMP [a] (+)	0.0016	0.0068	0.0000	0.1538
IMP_GROWTH (+)	−0.6349	4.3922	−38.3577	30.9806
HOME_TARIFF (+)	0.0683	0.1248	0	1.7199
REAL_EXP [b] under 10% principle supplier rule (−)	0.0690	0.0621	0.0000	0.3497
REAL_EXP [b] to Home's 'most powerful' affected trading partner (−)	0.0534	0.0388	0.0000	0.1473
REAL_EXP [b] to Home's 'most affected' affected trading partner (−)	0.0352	0.0364	0.0000	0.1473
Second stage protection decision				
(expected sign when $C_n = 1$ is 'illegal protection')				
Home's import variables				
IMP_SHARE (+)	0.1636	0.1873	0.0021	0.9791
REAL_IMP [a] (+)	0.0016	0.0050	0.0000	0.0579
HOME_TARIFF (−)	0.1257	0.2027	0	1.7199
Home's export variables				
EXP_SHARE under 10% principal supplier rule (−)	0.4096	0.2518	0.0035	0.9354
EXP_SHARE to Home's 'most powerful' affected trading partner (−)	0.3202	0.1970	0.0043	0.8004
EXP_SHARE to Home's 'most affected' affected trading partner (−)	0.2298	0.2210	0.0009	0.8004
AFFECTED_TARIFF under 10% principal supplier rule (+)	0.1001	0.0727	0.0065	0.4434
AFFECTED_TARIFF of Home's 'most powerful' affected trading partner (+)	0.0642	0.0744	0.0065	0.3003
AFFECTED_TARIFF of Home's 'most affected' affected trading partner (+)	0.0886	0.1062	0	0.5573
AFFECTED_NTB under 10% principal supplier rule (+)	0.1232	0.1205	0	0.8935
AFFECTED_NTB of Home's 'most powerful' affected trading partner (+)	0.1523	0.1429	0	0.8935
AFFECTED_NTB of Home's 'most affected' affected trading partner (+)	0.1075	0.1595	0	0.9869
Other variables				
URUGUAY Round dummy variable (+)	0.3387	0.4743	0	1

Notes: omitted summary statistics for *REAL_EXP*, *EXP_SHARE*, *AFFECTED_TARIFF* and *AFFECTED_NTB* under the 5 and 15% Principal Supplier Rules are available on request.

[a] Scaled so that 0.0016 is $1.6 billion in constant $ 1995.

[b] Scaled so that 0.069 is $69 billion in constant $ 1995.

Table 3
Comparison of mean values of explanatory variables across types of second stage protection

Explanatory variable	All cases (%)	'Illegal' protection cases (%)	'Legal' protection cases (%)
IMF_SHARE	16.36	23.99	11.27
HOME_TARIFF	12.57	10.56	13.91
Under 10% principal supplier rule			
EXP_SHARE	40.96	32.28	46.76
AFFECTED_TARIFF	10.01	9.86	10.10
AFFECTED_NTB	12.32	17.94	8.57
Under 'most powerful' trading partner rule			
EXP_SHARE	32.02	25.84	36.28
AFFECTED_TARIFF	6.42	5.40	7.12
AFFECTED_NTB	12.53	17.97	13.34
Under 'most affected' trading partner rule			
EXP_SHARE	22.98	19.86	24.91
AFFECTED_TARIFF	8.86	8.11	9.33
AFFECTED_NTB	10.75	15.38	7.87

Notes: 10% principal supplier rule identifies the affected Foreign exporters as those who have at least a 10% market share of Home's protected import market, 'most powerful' trading partner is the Foreign exporter of the protected product to whom Home sends the largest share of its exports and 'most affected' trading partner is the Foreign exporter of the protected product with the largest share of Homes protected market.

one variable that systematically goes against the theoretical prediction is *AFFECTED_TARIFF*, though under all three rules the difference in the means of the affected trading partner's average tariff across the 'illegal' and 'legal' cases is small.

Thus Table 3 provides suggestive evidence that Home's decision of whether to make an 'illegal' or 'legal' trade policy adjustment is influenced by the threat point welfare gains and losses that are predicted by theory. In the next section we estimate a formal econometric model to determine which, if any, of these variables are statistically and economically significant.

4. Empirical results

To formally address our empirical question, we use maximum likelihood estimation of the log-likelihood function of Eq. (6). We break up our discussion into five parts. First, we discuss the specification of the first stage's {*Protect, Don't Protect*} decision in Section 4.1, before we turn to the second stage estimates of interest. In Section 4.2 we discuss estimates of the second stage of the model using the 'multilateral approach' to identifying which foreign countries are eligible for compensation. We then turn to an estimation of the model using the 'bilateral approach' which we report in Section 4.3 before finally commenting on the economic significance of our results in Section 4.4.

4.1. The first stage decision

In this section we briefly discuss the estimation of the first stage selection equation. In the estimation we include a set of covariates that have been shown elsewhere (see, for example, Blonigen and Bown, 2003) to be determinants of a government's {*Protect, Don't Protect*} decision. First, we use the size (real $ value) of the SITC imports (*REAL_IMP*), suspecting that additional protection is more likely, the larger are the industry imports. We also include the growth in Home's imports of the disputed product from the previous year (*IMP_GROWTH*), as industries that experience a 'surge' in imports may be more likely to receive protection, ceteris paribus. We also include the average tariff in the industry (*HOME_TARIFF*), as industries that are more highly protected have a greater likelihood of receiving additional protection, for reasons of political economy. In addition to the *HOME_TARIFF* variable we also include its square, in order to capture the notion that the impact of the tariff may be non-linear as industries with *prohibitively* high tariffs are unlikely to receive additional protection. Next, we expect that industries are *less likely* to obtain any form of protection the larger are Home (real $ value of) exports (*REAL_EXP*) to the potentially affected trading partners. We also use Home country fixed effects, and finally we include year dummies to control for protection that may be driven by common macroeconomic fluctuations.[23]

The top section of Tables 4 and 5 presents estimates of the marginal effects of variables used in the first stage selection equation. The resulting estimates on many of the first stage covariate control variables are of the theoretically predicted sign and are statistically significant. The *IMP_GROWTH*, *HOME_TARIFF*, and *REAL_EXP* variables are all economically significant as well, with a one standard deviation change away from the mean of each variable affecting the predicted probability of receiving protection by more than 75%.[24]

4.2. The second stage decision: the multilateral approach

The middle rows of Table 4 present estimates of the marginal effects of the variables that the theory has identified as affecting the Home government's second stage *protection implementation* decision, while the bottom rows provide additional statistical information regarding the performance of the models. With respect to the columns, models (1) through (3) use the 10% principal supplier rule to determine which Foreign trading partners were affected, model (4) uses the 5% rule, and model (5) uses the 15% rule to provide a check on

[23] In unreported results we first estimated the models of Eqs. (5) and (4) using the Vella (1992) probit application of the familiar Heckman two-step estimator. We found the estimate on the bias parameter in the second stage equation to be statistically significant, providing evidence of sample selection bias. Therefore, we chose to proceed with the more efficient Van de Ven and Van Praag (1981) maximum likelihood estimator discussed in Section 3.3.1.

[24] Estimates of the first stage, selection equation probability changes analogous to those presented for the second stage in Table 6 are available from the author upon request. Also note that while not reported here, we have also experimented with alternative specifications for the first stage selection equation, for example substituting *EXP_SHARE* for *REAL_EXP*, dropping *REAL_IMP* or the squared *HOME_TARIFF* term, and these yield second stage results that are not qualitatively different from those reported in the text.

the sensitivity of the results. The second stage dependent variable takes on a value of 1 if Home has implemented the protection *illegally*, each specification that we consider uses 'Home' country fixed effects, and we also include squared terms for each of the tariff variables to capture possible non-linear effects.

Table 4
Estimates of the marginal effects: the multilateral approach

	10% Principal supplier rule			5% Principal supplier rule	15% Principal supplier rule	10% Principal supplier rule
	All countries	Alternative terms of trade gain variable	EC, US, Japan and Canada only	All countries	All countries	MFN violations dropped
	(1)	(2)	(3)	(4)	(5)	(6)
First stage selection equation ($B_m = 1$ is 'protection')						
REAL_IMP	−0.038	−0.038	−0.177	−0.028	−0.009	0.146
	(0.452)	(0.452)	(0.438)	(0.452)	(0.455)	(0.410)
IMP_GROWTH	0.016**	0.016**	0.015**	0.015**	0.015**	0.015**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
HOME_TARIFF	0.374**	0.374**	0.286**	0.386**	0.375**	0.368**
	(0.052)	(0.053)	(0.061)	(0.053)	(0.052)	(0.049)
HOME_TARIFF^2	−0.124**	−0.120**	−0.069	−0.133**	−0.123**	−0.120**
	(0.061)	(0.061)	(0.054)	(0.061)	(0.059)	(0.056)
REAL_EXP	−0.472**	−0.472**	−0.459**	−0.454**	−0.383**	−0.210**
	(0.101)	(0.101)	(0.095)	(0.088)	(0.112	(0.086)
Home country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Second stage protection decision ($C_n = 1$ is 'illegal protection')						
IMP_SHARE	0.193	–	0.079	0.415	0.328	0.188
	(0.285)		(0.269)	(0.291)	(0.309)	(0.278)
REAL_IMP	–	7.291	–	–	–	–
		(6.925)				
HOME_TARIFF	−0.324	−0.275	−1.895**	−0.221	−0.195	−0.828**
	(0.419)	(0.419)	(0.920)	(0.418)	(0.448)	(0.397)
HOME_TARIFF^2	0.481	0.438	4.639**	0.562	0.312	0.593**
	(0.393)	(0.384)	(1.818)	(0.438)	(0.447)	(0.275)
EXP_SHARE	−0.809**	−0.850**	−0.513*	−0.754**	−1.094**	−0.278
	(0.217)	(0.172)	(0.258)	(0.232)	(0.225)	(0.238)
AFFECTED_TARIFF	−1.759	−1.698	−3.031*	−2.315	0.951	−2.745**
	(1.430)	(1.394)	(1.601)	(1.817)	(1.260)	(1.289)
AFFECTED_TARIFF^2	−1.004	−1.043	2.050	2.680	−9.295**	3.065
	(3.773)	(3.858)	(4.167)	(5.763)	(3.678)	(3.011)
AFFECTED_NTB	2.638**	2.650**	2.492**	1.597**	2.304**	2.693**
	(0.479)	(0.655)	(0.446)	(0.457)	(0.501)	(0.418)
URUGUAY	0.240**	0.242**	0.176*	0.184**	0.259**	0.123
	(0.089)	(0.089)	(0.099)	(0.086)	(0.092)	(0.092)

(continued on next page)

Table 4 (*continued*)

	10% Principal supplier rule			5% Principal supplier rule	15% Principal supplier rule	10% Principal supplier rule
	All countries	Alternative terms of trade gain variable	EC, US, Japan and Canada only	All countries	All countries	MFN violations dropped
	(1)	(2)	(3)	(4)	(5)	(6)
Home country dummies	Yes	Yes	Yes	Yes	Yes	Yes
First stage observations	2634	2634	1745	2637	2617	2610
Second stage observations	245	245	151	247	240	221
Second stage predicted correctly	190	190	110	175	188	174
Second stage constant only prediction	147	147	84	149	144	147
Log-likelihood	−806.55	−806.24	−514.03	−819.04	−795.61	−755.52
Wald χ^2	80.09	82.59	43.13	110.09	90.08	65.55

Notes: (i) 10% Principal supplier rule identifies the affected Foreign exporters as those who have at least a 10% market share of Home's protected import market, while 5 and 15% rules are analogously defined. (ii) In assessing the significance of the Wald statistic, for the 'all countries' specifications there are 16 second stage explanatory

Consider first the baseline 10% rule and column (1). The estimates for the marginal effects of the variables of the protected import sector (*IMP_SHARE*, *HOME_TARIFF* and its square) are of the theoretically predicted signs, though they are not statistically significant. On the other hand, the estimates for two of the retaliation variables, *EXP_SHARE* and *AFFECTED_NTB*, are statistically significant and of the theoretically predicted sign. The effect of the *AFFECTED_TARIFF* variable is negative though it is not statistically significant. Finally, the *URUGUAY* variable is a dummy indicating that the act of protection occurred during the Uruguay Round negotiations. The theory is that, ceteris paribus, countries may be more likely to implement protection illegally during a negotiating round in a particular sector, to put that sector onto the *negotiating agenda*. Its estimate is also statistically significant and positive, as the theory would suggest. To summarize, each of the estimated parameters is of the predicted sign, with the exception of the Foreign average tariff variable, and this is a feature common to most of the specifications of Table 4. In model (1) we can also reject the hypothesis that the estimated values for the parameters aside from the constant are jointly zero, as the Wald statistic yields a value of 80.09. This hypothesis can in fact be rejected for all specifications of the model that we report.

The alternative specifications of Table 4 provide a variety of robustness checks. In model (2) we assess the robustness on the import variable by substituting *REAL_IMP* for *IMP_SHARE*. The estimate for this variable is also positive, though also statistically insignificant.[25] In column (3) we include only the data of the four countries who account for 62% of the instances in which GATT protection was afforded in our data set. One

[25] In unreported results we interact *REAL_IMP* with *IMP_SHARE* under the theory that what matters is the combination of the size of Home's imports of the affected product *and* Home's share of its trading partners exports of the affected product, but these results were also not significant.

noteworthy feature of this specification is that the *HOME_TARIFF* variables are statistically significant in the second stage. Also statistically significant—but again of the wrong sign—is the *AFFECTED_TARIFF* variables. We can provide no alternative theoretical explanation as to why the estimate on *AFFECTED_TARIFF* is negative and significant except to point to our earlier discussion of possible measurement error due to the means by which the tariff data was constructed. Overall, model (3) provides evidence that our results are not generated by differences between the primary users of GATT provisions (the US, EC, Canada and Japan) and all of the other 'Home' countries in the sample. Specifications (4) and (5) illustrate further robustness checks to the baseline model where we use the

Table 5
Estimates of the marginal effects: the bilateral approach

	Home's 'most powerful' trading partner only		Home's 'most affected' trading partner only			
	All countries	EC, US, Japan and Canada only	All countries	EC, US, Japan and Canada only	*IMP_SHARE* minus *EXP_SHARE*	*IMP_SHARE* only
	(7)	(8)	(9)	(10)	(11)	(12)
First stage selection equation (B_m=*1* is 'protection')						
REAL_IMP	−0.048	−0.217	0.085	−0.063	0.098	0.124
	(0.414)	(0.415)	(0.360)	(0.335)	(0.362)	(0.367)
IMP_GROWTH	0.015**	0.015**	0.012**	0.012**	0.012**	0.012**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
HOME_TARIFF	0.398**	0.324**	0.334**	0.277**	0.333**	0.326**
	(0.052)	(0.064)	(0.050)	(0.057)	(0.050)	(0.050)
HOME_TARIFF^2	−0.138**	−0.087*	−0.100*	−0.020	−0.100*	−0.089*
	(0.060)	(0.055)	(0.058)	(0.047)	(0.058)	(0.057)
REAL_EXP	−0.889**	−1.178**	−0.339**	−0.316**	−0.345**	−0.367**
	(0.248)	(0.249)	(0.154)	(0.138)	(0.156)	(0.157)
Home country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Second stage protection decision (C_n=*1* is 'illegal protection')						
IMP_SHARE	0.442*	0.171	0.178	0.093	–	0.307
	(0.285)	(0.252)	(0.258)	(0.278)		(0.241)
HOME_TARIFF	−0.907*	−1.419**	−1.331**	−3.187**	−1.338**	–
	(0.542)	(0.694)	(0.607)	(0.864)	(0.810)	
HOME_TARIFF^2	1.233**	2.513*	2.815**	8.407**	2.816**	–
	(0.591)	(1.385)	(1.081)	(1.647)	(1.092)	
EXP_SHARE	−0.995**	−1.388**	−0.571**	−0.888**	–	–
	(0.319)	(0.514)	(0.212)	(0.289)		
IMP_SHARE− *EXP_SHARE*	–	–	–	–	0.422**	–
					(0.156)	
AFFECTED_TARIFF	4.514	−23.112**	−2.054*	0.349	−2.056*	−1.145
	(3.691)	(7.305)	(1.140)	(1.320)	(1.160)	(1.067)
AFFECTED_TARIFF ^{2}	−29.802**	216.606**	1.693	−6.728**	1.748	0.367
	(13.989)	(54.187)	(2.487)	(3.263)	(2.515)	(2.433)

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Table 5 (*continued*)

AFFECTED_NTB	1.040**	3.247**	0.720**	1.118**	0.670**	0.763**
	(0.382)	(0.885)	(0.266)	(0.390)	(0.252)	(0.253
URUGUAY	0.307**	0.224**	0.244*	0.165*	0.238**	0.213**
	(0.084)	(0.074)	(0.089)	(0.090)	(0.085)	(0.083)
	Home's 'most powerful' trading partner only		Home's 'most affected' trading partner only			
	All countries	EC, US, Japan and Canada only	All countries	EC, US, Japan and Canada only	*IMP_SHARE* minus *EXP_SHARE*	*IMP_SHARE* only
	(7)	(8)	(9)	(10)	(11)	(12)
Home country dummies	Yes	Yes	Yes	Yes	Yes	Yes
First stage observations	2630	1748	2597	1719	2597	2597
Second stage observations	240	153	209	126	209	209
Second stage predicted correctly	184	116	176	109	179	164
Second stage constant only prediction	142	84	129	69	129	129
Log-likelihood	−810.87	−520.11	−734.94	−454.93	−735.49	−742.45
Wald χ^2	60.72	34.95	56.75	43.37	54.22	54.81

alternative 5 and 15% principal supplier rules, respectively. The estimates of the marginal effects on the variables of interest and the statistical fit of the models are quite similar across specifications.

We have found little evidence thus far that countries are influenced by the *terms of trade gain* motive at the threat point, as the estimates on the *import* variables used in the estimation are not (systematically) statistically different from zero. This is perhaps not surprising, given that Home countries often implement protection illegally through the use of *non-tariff barriers*, where potential welfare gains are smaller as governments do not capture tariff revenue. However, the evidence suggests that countries are motivated by the concern for retaliation, as the estimates on the *EXP_SHARE* and *AFFECTED_NTB* variables used in the estimation are of the theoretically predicted sign and are statistically significant throughout specifications (1) through (5).

In specifications (1) through (5) we have relied on a legal interpretation of the GATT statute (and minor adjustments thereof) which use the principal supplier rule and the 'multilateral approach' to identifying which of the affected trading partners are eligible for compensation in trade policy renegotiations. However, a non-trivial (24 out of 98) number of cases on the *illegal* side of the data set involved allegations of violations of MFN, where the set of affected trading partners is, by definition, the one plaintiff country. It would not be proper to expand the set of affected countries in these MFN cases to those outside of the plaintiff, as additional Foreign countries have *not* been adversely affected by Home's MFN violation. Nevertheless, as the result of model (6) in Table 4 illustrates, under the 10% principal supplier rule and the full sample of countries, when we drop the 24 MFN violation observations from the sample, the estimate on *EXP_SHARE* is no longer

statistically significant. For example, compare (6) with model (1) of Table 4 which is an otherwise identical specification. The question that we take up in the next section is whether these 24 MFN cases are driving our results.

4.3. The second stage decision: the bilateral approach

Are the MFN-violation cases driving our 'retaliation' results, or is there evidence that the threat of retaliation matters when we use alternatively defined variables on the *export* side of the data set? To address this issue, we follow the procedure outlined in Section 3.2.4. We continue to use the data on Home's imports of the affected product to *identify* the set of affected trading partners in the non-MFN (both illegal and legal) cases. However, to make a direct comparison to the MFN cases, we pull only one country from that set, so that we control the *number* of affected Foreign countries in every observation and fix this number at one. As suggested in Section 3.2.4, we then consider two different rules to select the *one focal* Foreign country from this set of affected trading partners: (i) identifying Home's 'most powerful' trading partner, or (ii) identifying Home's 'most affected' trading partner. In the 24 illegal cases where Home's violation was MFN, the one Foreign country is simply the plaintiff. We focus next on the implications for estimates on the *EXP_SHARE* variable.

First consider Home's 'most powerful' trading partner, which we again identify as the trading partner affected by Home's policy change to whom Home sends the largest amount of exports. Results of the estimation for this bilateral relationship are illustrated in models (7) and (8). Furthermore, note that the definitions of the variables on the 'import' side of the analysis (e.g. *IMP_SHARE*, *HOME_TARIFF*) continue to be defined as they were in Table 4. In specification (7) the estimate on the key variable whose definition has been changed in order to address the MFN problem, i.e. *EXP_SHARE*, is negative and it is again statistically significant. As a robustness check, in specification (8) we only include the observations in which the EC, US, Canada and Japan were the 'Home' countries, and this result is unchanged. In specifications (9) through (12) we consider Home's export variables with respect to its 'most affected' trading partner, which we define to be that country which had the largest pre-shock exports to Home (of x) that were affected by Home's act of protection. First consider models (9) and (10), which are specifications using the full sample of data and the four Home country subsample of data, respectively. Again, the estimate on *EXP_SHARE* is negative and statistically significant. Thus the results of columns (7) through (10) are consistent with the theory that Home's second stage decision of how to implement protection is influenced by the retaliatory capacity of its 'most powerful' and 'most affected' trading partners, respectively.[26]

Recall finally the theory underlying these empirical specifications. The model predicts that Home's protection-implementation decision is determined by the relative 'imbalance of power' at the illegal route's threat point, which is determined by the relative ability of each country to affect the terms of trade. Given the theory and our results thus far, one suggestion is that what matters is the *difference* between the *IMP_SHARE* and *EXP_SHARE* variables, under the hypothesis that if Home is strong in this relationship,

[26] In unreported results, we have also substituted REAL_EXP for EXP_SHARE and find qualitatively similar results.

it is more likely to proceed illegally. Indeed, specification (11) includes as a regressor only the *difference* between *IMP_SHARE* and *EXP_SHARE*, as opposed to entering each regressor independently. The estimate on the marginal effect of this *difference* variable is statistically significant and positive, as the theory predicts.

Given the result of specification (11), how do we reconcile the fact that the *difference* between *IMP_SHARE* and *EXP_SHARE* is significant, whereas the *IMP_SHARE* variable on its own is almost never significant?[27] We would like to know whether this *difference* variable is significant due to the strength of the *EXP_SHARE* variable, or whether the reason why the estimate on the *IMP_SHARE* variable is rarely significant is potentially due to collinearity concerns which are eliminated when we include only the difference variable (*IMP_SHARE* − *EXP_SHARE*) as a regressor. To address this question, consider specification (12) in which we drop the *HOME_TARIFF* variables as well as *EXP_SHARE* in order to eliminate regressors that may be systematically correlated with *IMP_SHARE*.[28] Dropping these variables has a minimal statistical (and economic) impact on the size of the estimate of *IMP_SHARE*, suggesting no collinearity problem.

We therefore conclude that while the result of specification (11) is consistent with the theory that the relative imbalance of power at the illegal route's threat point in the negotiations determines Home's protection implementation decision, the results of our other specifications provide evidence that Home's concern for retaliation (through EXP_S *HARE*) drives this result. Regarding the asymmetry that the fear of retaliation rather than terms of trade gains appears to influence policy decisions, one potential explanation can be motivated by Kovenock and Thursby's (1992) cost of 'international obligation.' For reasons of international political economy or 'goodwill,' it may be more costly for Home to illegally impose a policy that leads to *large* welfare gains to itself and large losses to Foreign relative to one in which the gains and losses are small.

4.4. Economic significance

Given the statistical significance of our results, our next question concerns their *economic* significance. In this section we refer to Table 6 where we report results of an exercise in which we consider, one at a time, changes to the explanatory variables of interest in the second stage decision, and we calculate the relative change in the conditional probability of an illegal act of protection. For comparison purposes across subsamples of data, we use a 50% increase above the mean value of the explanatory variable under consideration. As can be verified from Table 2, a 50% increase is always less than one standard deviation. The initial conditional probability of 'illegal' protection was determined from the mean values of the data in the relevant sample.

First consider a 50% increase in the size of the *share* of Home country's exports to its affected trading partners and use Home's 'most powerful' trading partner rule and the

[27] The exception is that *IMP_SHARE* is marginally significant in specification (7), though this is not robust to the subsample analysis of specification (8).

[28] In unreported results we have considered specifications where we drop only *EXP_SHARE* and then where we also drop the *AFFECTED_TARIFF* variables and the results on the significance of the estimates on *IMP_SHARE* are unchanged.

Table 6
Estimated probability changes due to changes in the explanatory variables of interest

Hypothetical change	Change in conditional probability of Home imposing protection *Illegally*
(A) Sample: Home's 'most powerful' trading partner rule	
Increase in share of Home exports to its 'most powerful', trading partner...	
...to 48.03% from the sample mean of 32.02%	−62.61%$^{(7)}$
...to 42.05% from the sample mean of 28.35%	−36.49%$^{(8)}$
Increase in the 'most powerful' trading partner's average NTB coverage ratio...	
...to 22.85% from the sample mean of 15.23%	20.69%$^{(7)}$
...to 28.18% from the sample mean of 18.79%	19.78%$^{(8)}$
Increase in Home's tariff in the protected industry...	
...to 19.29% from the sample mean of 12.86%	−11.71%$^{(7)}$**
...to 15.26% from the sample mean of 10.17%	−6.39%$^{(8)}$**
(B) Sample: Home's 'most affected' trading partner rule	
Increase in share of Home exports to its 'most affected', trading partner...	
...to 34.47% from the sample mean of 22.98%	−19.75%$^{(9)}$
...to 29.85% from the sample mean of 19.90%	−13.75%$^{(10)}$
Increase in (IMP_SHARE−EXP_SHARE) to 8.06% from the sample mean of −7.36%	17.86%$^{(11)}$*
Increase in the 'most affected' trading partner's average NTB coverage ratio...	
...to 22.85% from the sample mean of 10.75%	10.61%$^{(9)}$
...to 21.60% from the sample mean of 14.40%	9.42%$^{(10)}$
Increase in Home's tariff in the protected industry...	
...to 18.54% from the sample mean of 12.36%	−11.59%$^{(9)}$**
...to 15.22% from the sample mean of 10.15%	−19.10%$^{(10)}$**

Notes: (i) hypothetical changes are 50% higher than the mean value and are within one standard deviation of the mean of the underlying data. See Table 2 for more detailed summary statistics. *The exception is the increase in (*IMP_SHARE − EXP_SHARE*) which is 50% of a one standard deviation increase. (ii) $^{(N)}$Indicates based on model *N*, for example $^{(8)}$ is based on model specification (8) of Table 5. (iii) **Measures the overall effect of the increase of *HOME_TARIFF* and its squared term in the estimation equation.

results in Table 6A. A Home country which faces two otherwise identical trading partners in the average case will be 62.61% less likely to impose illegal protection when it is with respect to a partner that receives 48.03% of its exports as opposed to the mean of case of 32.02% of its exports.[29] Under the 'most powerful' rule, a 50% increase in the size of the

[29] For example, in model (7) the probability that Home will implement protection illegally when evaluated at the means of the data was 34.17%. Ceteris paribus, a 50% increase in EXP_SHARE from the mean of 32.02 to 48.03% causes the probability that Home will impose the protection illegally to fall to 18.27%.

affected trading partner's NTB coverage ratio from the mean value will make it 20–21% more likely that Home will implement the protection illegally. Finally, consider the economic significance of the *HOME_TARIFF* variable. A 50% increase in the tariff from its mean makes it 6–12% less likely that Home will implement the protection illegally.

Consider next the economic significance of the estimates in the specifications using the 'most affected' rule in Table 6B, where the estimates of the three variables discussed so far also appear to be economically significant. The one new variable is the regressor of interest in specification (11) of Table 5, which is the *difference* between *IMP_SHARE* and *EXP_SHARE*. This variable is economically significant as well, as one half of a standard deviation increase above the mean value of the differenced variable increases the likelihood that Home will proceed illegally by nearly 18%.

In summary, we find that not only are the estimates for the retaliation variables statistically significant, but they are economically significant as well. As we have discussed in Section 3.3.2, our presentation of the economic significance of these results is likely on the conservative side as the estimates of the marginal effects of these variables may be biased toward zero, due to the self-reporting nature of the trade dispute data.

5. Conclusion

This paper provides a rigorous empirical analysis of the GATT caseload of countries who have implemented additional import protection between the years 1973 and 1994. We use the theory presented in Bown (2002) to identify the key variables of trade that serve to influence a country's choice between implementing additional protection legally, through adherence to GATT rules, or illegally, which will ultimately lead to a trade dispute.

The empirical results provide evidence to support the theory that economic variables which determine a country's capacity to retaliate influence how countries implement protection under the rules of the GATT/WTO system. Specifically, illegal policies are more likely when the prominent trading partners that have been affected by the policy change have highly protected import-competing industries (through non-tariff barriers) and receive few of the protection-affording country's exports, and when the protection-implementing country's protected sector has low pre-existing tariff barriers. Our evidence also suggests that a country implements protection *legally*, under the rules of the GATT's safeguards provisions, when it is necessary to shield oneself from a trading partners' substantial capacity to threaten retaliation were an avoidable trade dispute to arise.

Our evidence that the 'bilateral imbalance of power' affects how a country implements protection also perhaps highlights the importance of Maggi's (1999) results. If a goal of the dispute settlement system is to discourage the implementation of trade barriers which violate a country's GATT/WTO obligations, a more pronounced role for 'power-sharing' may be required to overcome the effect of potential bilateral power imbalances at the illegal route's threat point.

It is important to reiterate that we do not rule out other theories behind the existence of trade disputes with our empirical exercise, as we are not familiar with other testable theories that justify their existence. Therefore, we do not formally 'test' our model and only compare the consistency of the evidence with the theory presented. Nevertheless, it is

clear that an understanding of trade disputes and their role in the GATT system is of increased importance, especially with the marked increase in the caseload since the WTO's (1995) inception. It may thus be useful to re-evaluate this exercise in the future, as more WTO dispute data becomes available and researchers develop further theories and insight into the rules and procedures of the institution.

This is simply a first step in empirically addressing the role and importance of terms of trade considerations, trade disputes and trade policy flexibility under the GATT/WTO system. It would also be useful to evaluate, via the welfare and trade effects, the different *outcomes* of the cases in which countries implemented protection illegally and negotiations occurred under Article XXIII, versus those cases in which countries followed the rules and implemented protection in accordance with the safeguards provisions. It is likely that terms of trade motivations influence not only the path that countries take in implementing their additional protection but also the *outcomes* of the negotiations as well. Furthermore, we would also like a better understanding of the theoretical and empirical motivations for why countries differentiate between the various safeguards provisions, at some instances using the *temporary* protection of Article XIX and others the *permanent* protection of Article XXVIII, an issue that we have ignored. Finally, given our results on the importance of MFN violations, further empirical investigations into why countries implement protection on an MFN versus non-MFN basis may provide additional insight. We leave these areas for future research.

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