How Important can the Non-Violation Clause be for the GATT/WTO?*

Robert W. Staiger            Alan O. Sykes
Dartmouth and NBER           Stanford Law School

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Abstract

The “non-violation” clause of GATT is Exhibit A for the proposition that international trade agreements are incomplete contracts. The clause was a major focus of the drafters of GATT in 1947, and its relevance was reaffirmed with the creation of the WTO. According to the terms-of-trade theory of trade agreements, it underpins the success of the GATT/WTO’s “shallow integration” approach. Yet the observed role of the non-violation complaint is minimal. We develop a model of non-violation claims in trade agreements, demonstrate that it predicts a minimal on-equilibrium-path role for non-violation claims under reasonable parameter restrictions, and show that the non-violation clause may nevertheless play an important off-equilibrium-path role in the GATT/WTO.

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1. Introduction

The “non-violation” clause of the General Agreement on Tariffs and Trade (GATT) is Exhibit A for the proposition that international trade agreements are incomplete contracts. This provision, which is also included in GATT’s successor, the World Trade Organization (WTO), allows one GATT/WTO member government to seek compensation from another for adverse trade effects of the other’s policies, even though those policies do not violate specific GATT/WTO treaty obligations. The possibility of a GATT/WTO dispute featuring a non-violation complaint is explicit acknowledgment that the GATT/WTO contract does not expressly address all of the potential policy measures that might undermine the GATT/WTO bargain.

The non-violation clause is of interest not only because of its role in the international trading system, but also because it represents a remarkable real-world attempt to solve the broader problem of contractual incompleteness. No other treaty regime creates a legal cause of action against measures that do not violate the treaty but that nevertheless upset the reasonable expectations of the parties, and there are no clean analogues to non-violation claims in private contracts.\(^1\) If the non-violation clause plays an important role in the GATT/WTO system, the distinct possibility arises that similar provisions might have a useful role to play elsewhere.

The non-violation clause was an important focus of the drafters of GATT in 1947 (see for example Hudec, 1990), and its relevance was revisited and reaffirmed with the creation of the WTO in 1995 (see Petersmann, 1997). The terms-of-trade theory of trade agreements suggests that the non-violation clause plays a central role in facilitating the success of the “shallow integration” approach that the GATT/WTO has adopted.\(^2\) The growing list of empirical studies which support the terms-of-trade theory, such as Broda, Limao and Weinstein (2008), Bagwell and Staiger (2011), Bown and Crowley (2013) and Ludema and Mayda (2013), lend further credence to the view that the non-violation clause is an important component of the GATT/WTO architecture, reinforcing the expectation that non-violation complaints should be a staple of observed disputes in the world trading system.

In light of the prominence given to the non-violation clause by its drafters and legal schol-

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\(^1\)The closest analogies with any widespread significance are certain duties of “good faith performance” that are said to exist in international law generally, and in the law of private contracts. See Panizzon (2006); Uniform Commercial Code Section 1-304. Under GATT/WTO doctrine, however, successful non-violation claims do not require any showing of bad faith. See Staiger and Sykes (2013).

\(^2\)See for example Bagwell and Staiger (2001, 2002, 2006 and 2010) and Staiger and Sykes (2011). This role does not extend to other theories of trade agreements, such as those associated with commitment problems (see for example the discussion in Staiger, 2011) or offshoring (see Antras and Staiger, 2012a,b).
ars and suggested by economic theory, it is then puzzling that the non-violation complaint has served at best a minor role in observed GATT/WTO disputes. In particular, relative to GATT/WTO disputes that feature more traditional “violation” complaints (alleging a breach of treaty obligations), GATT/WTO disputes that feature non-violation complaints have been both rare and mostly unsuccessful. Of course, this is not necessarily a puzzle: observed disputes featuring non-violation complaints only reflect on-equilibrium impacts of the non-violation clause, and it is possible that the relatively minor on-equilibrium role of non-violation complaints belies an important role for the non-violation clause that occurs off equilibrium. But the minimal importance of non-violation claims in observed disputes does raise intriguing questions: Does the non-violation clause really play a useful role in a treaty system like the GATT/WTO? Or is it an aberration of little real significance to the study of incomplete contracts?

In this paper we take on these questions. Specifically, after describing the main institutional features and documenting the key stylized facts concerning the role that non-violation claims have played in GATT/WTO disputes, we ask: Can a model account for the relatively minor role of non-violation complaints in these disputes?; And if so, what does the model say about the implied (on- and off-) equilibrium impacts of the non-violation clause on the joint welfare of the GATT/WTO member governments?

To answer these questions, we develop a model of trade disputes in which both violation and non-violation complaints can arise in equilibrium. Our model combines features of Bagwell and Staiger (2001, 2006), where the non-violation complaint is modeled but all disputes are essentially off equilibrium, and Maggi and Staiger (2011), where disputes can arise in equilibrium but the possibility of non-violation complaints is not considered. More specifically, we adopt and extend the model of Maggi and Staiger to incorporate the possibility of non-violation claims, formalizing the non-violation claim along the lines of Bagwell and Staiger, and then use our model to consider the nature and potential importance of the role of the non-violation clause in the GATT/WTO.

As in Maggi and Staiger (2011), our model features an ex-ante incomplete contract between the governments of two trading nations, one of whom (the importing government) makes a policy choice ex post between laissez faire and intervention, and the other (the exporting government) who decides whether or not to initiate a dispute and challenge intervention in court. And as in Maggi and Staiger, when a dispute arises in our model it is because one of the parties acts opportunistically to exploit the absence of a complete contract and the potential inaccuracy
of the court rulings: either the exporting country is attempting to force liberalization with an incorrect court ruling when the importing country’s intervention is in fact globally efficient, or the importing country is attempting to “get away with” intervention with an incorrect court ruling when laissez faire is in fact the efficient policy.

However, to incorporate the possibility of non-violation claims and distinguish them from violation claims, we must extend the model of Maggi and Staiger (2011) along two dimensions. First, the importing government’s intervention options are necessarily more complex in our model. In particular, as its instrument of intervention we allow the importing government to choose between a border measure to which the ex-ante contract applies, and a domestic tax or regulatory policy that falls outside the contract altogether. Second, the exporting government’s decision is also necessarily more complex. In response to the importing government’s imposition of a border measure, the exporting government can lodge a violation complaint, a non-violation complaint, both or neither; while when the importing government intervenes with a domestic tax or regulatory policy, the options available to the exporting government are to lodge a non-violation complaint or do nothing. And while we follow Maggi and Staiger in assuming that the intervention must be removed in response to a successful violation claim, our modeling of the non-violation claim is different, and mirrors the approach to modeling the non-violation claim embodied in Bagwell and Staiger (2001): in response to a successful non-violation claim, we assume that the importer has the option of either removing the intervention or compensating the exporter with a reciprocal damage payment. As we describe further below, these new dimensions reflect ingredients that are essential to the study of the violation/non-violation distinction, and they introduce a rich and subtle array of strategic considerations into the government choices that determine the observed dispute behavior.

We also emphasize three additional features of the institutional and policy environment. A first is the degree of accuracy of court rulings. We model court accuracy (inversely) with a simple parameter that reflects the probability that the court rules in error. A second is the difficulty with which governments can make transfers to one another in the context of the resolution of trade disputes: as we describe below, this difficulty is manifested in the form that such transfers typically take, namely, highly inefficient “self-help” reciprocal tariff retaliation. We model the resulting deadweight loss associated with such government-to-government transfers with a parameter that reflects the “melt rate” of any transfer paid by the importing government to the exporting government in the context of a trade dispute. And a third feature is the degree
to which domestic policies can serve as close substitutes for border measures with respect to
ingstruments of terms-of-trade manipulation. We introduce a third parameter to capture this
degree of policy substitutability. In this way our model captures these additional features of
the institutional and policy environment with a few key parameters, and we establish that the
observed dispute behavior hinges on these parameters.

We show that the minor role of non-violation complaints in GATT/WTO disputes can be
understood according to our model as primarily attributable to two underlying forces, one
force that reflects a feature of the GATT/WTO institutional environment – the inefficiency of
government-to-government transfers – and a second force that reflects a feature of the policy
environment – the low degree of substitutability between border measures and domestic policies
as a means of terms-of-trade manipulation. The intuition derives from the fact that, as we
indicate above, disputes arise in our model when either the exporter government or the importer
government is behaving opportunistically. We demonstrate that the exporter’s incentive to use
the non-violation claim opportunistically against importer policies that are globally efficient is
kept in check by the inefficiency of government-to-government transfers. And the importer’s
incentive to use domestic tax and regulatory policies (which if used, could trigger a non-violation
claim) opportunistically for inefficient terms-of-trade manipulation is kept in check by the low
degree of substitutability between border measures and domestic policies for this purpose. We
further show that the relatively low success rate of non-violation claims as compared to violation
claims can be understood as a reflection of a dispute selection effect that works to raise the
success rate of violation claims but that is rendered inoperative when it comes to non-violation
claims as long as the court is sufficiently accurate.

Our model reveals that the paucity of GATT/WTO rulings on non-violation claims and
their limited success is not inconsistent with an important role for the non-violation clause
in the GATT/WTO. We establish this by comparing model outcomes with and without the
non-violation clause under the restricted set of model parameter values that would allow our
model (with the non-violation clause) to mimic the stylized facts of GATT/WTO disputes. We
find that according to our model, the minor on-equilibrium-path role of non-violation claims
is consistent with a world in which governments make efficient market access commitments
with contracts over border measures while preserving autonomy over domestic policies. In this
world, the non-violation clause functions mostly off-equilibrium, rerouting policy interventions
into forms that are explicitly addressed by the GATT/WTO contract and thereby preventing
the circumvention of these market access commitments, a function that is potentially important and in line with the role emphasized by economists and legal scholars and envisioned by the drafters of GATT. By showing how a minor on-equilibrium role of the non-violation clause and an important role off-equilibrium can coexist, our model therefore offers a resolution to the non-violation complaints puzzle we described at the outset.

In addition to the papers we have already mentioned, our paper is related to a larger literature on trade disputes (see for example Beshkar, 2010, 2011, Maggi and Staiger, 2013 and Park, 2011) and a larger literature that highlights the role of the non-violation clause in trade agreements (see for example Bajona and Ederington, 2012, Brou and Ruta, 2013 and Lee, 2007, 2014). But these literatures are silent on the questions we take on in this paper, because none of these papers develops a model that both highlights the role of the non-violation clause and predicts disputes in equilibrium, and so they cannot account for the observed patterns of violation and non-violation claims that we seek to understand and interpret.

The rest of the paper proceeds as follows. Section 2 provides the necessary institutional background and describes several stylized facts about non-violation claims in GATT/WTO disputes. Section 3 then presents the model setup, while section 4 derives the equilibrium outcomes and explores the ability of a restricted set of model parameter values to deliver model outcomes in line with the stylized facts identified in section 2. Section 5 then considers the potential impacts of the non-violation clause, and asks whether according to the model the non-violation clause could serve a valuable role in the GATT/WTO system under the restricted set of parameter values identified in section 4. Finally, section 6 concludes.

2. The Non-Violation Clause

We begin with a brief institutional overview of the non-violation clause and a description of several stylized facts concerning the role that non-violation claims have played in GATT/WTO disputes. This overview and description will guide the analysis in the following sections. In Staiger and Sykes (2013) we provide a more detailed legal and institutional discussion of these issues (see also Petersmann, 1997, and Hudec, 1990 and 1993).

The origins of the non-violation clause in GATT can be traced to the central purpose of the GATT/WTO itself, which is to facilitate market access integration among its member countries. To achieve this purpose, the GATT and (to a lesser extent) the WTO have taken
a “shallow” approach to integration, focusing primarily on the reduction of tariffs, with a set of attendant rules (e.g., non-discrimination as embodied in the national treatment obligation) that create an agreed code of conduct on non-tariff measures. But even with these rules, it was well-understood by GATT drafters (see Hudec, 1990) that the market access implications of tariff cuts could be nullified by behind-the-border policies that would not and could not be subjected to negotiations. It is for this reason that the non-violation clause was included in the original 1947 GATT dispute settlement articles and incorporated into the articles of the WTO.

The non-violation clause is contained in GATT’s Article XXIII:1 on “Nullification or Impairment,” which states:

If any contracting party should consider that any benefit accruing to it directly or indirectly under this Agreement is being nullified or impaired or that the attainment of any objective of the Agreement is being impeded as the result of

(a) the failure of another contracting party to carry out its obligations under this Agreement, or

(b) the application by another contracting party of any measure, whether or not it conflicts with the provisions of this Agreement, or

(c) the existence of any other situation,

the contracting party may [have recourse to the dispute resolution process]...

In principle, Article XXIII provides for a total of six possible “causes of action”: three for “nullification or impairment” of benefits, either for reasons of (a) “the failure...to carry out...obligations,” or (b) “the application by another...of any measure, whether or not it conflicts” with GATT, or (c) “the existence of any other situation;” and three where the “attainment of any objective...is being impeded” (as a result of any of the same three reasons).

The GATT negotiators were aware that this language is quite vague and open-ended in terms of the circumstances that might trigger a right to dispute resolution. But as Hudec (1990, chapter 4) explains, they chose to retain the “any measure” and “other situation” provisions, with the hope that the GATT membership would interpret these provisions sensibly over time. In practice, only two of the six actions provided in Article XXIII have proven significant in the context of GATT/WTO disputes, and they each focus on “nullification or impairment.” The so-called “violation” claims invoke Article XXIII:1(a), while “non-violation” claims proceed with respect to Article XXIII:1(b). All claims are made to a “panel” of judges consisting of
trade law experts who are not nationals of the disputants, and the panel issues a ruling (which under WTO procedures can be appealed to a higher level of judges). Henceforth we refer to the collection of judges in a GATT/WTO dispute as the “DSB” (dispute settlement body).

Violation claims are conceptually straightforward, and simply involve a claim by one government that another is violating its obligations under the agreement (with a presumption that such violations then nullify the complaining government’s benefits under the agreement). Non-violation claims, on the other hand, are less familiar, as they involve no claim that a government is actually violating any of its agreed obligations. Rather, non-violation claims target policies that have “frustrated the legitimate market access expectations” of the claimant under the agreement even if these policies have not violated any obligations under the agreement.

Violation claims can therefore only be leveled at policies that have been contracted over (or that display features, e.g., discrimination, that have been contracted over). Non-violation claims, by contrast, can potentially be made against any policies, whether or not those policies have been contracted over (or display features that have been contracted over). And if it is contracted over, a single policy can be the subject of both a violation claim and a non-violation claim. In such a case, there is a typical hierarchy of claims: the DSB generally rules first on the violation claim, and only moves on to rule on the non-violation claim if it has ruled against the claimant on the violation claim. Hence, a non-violation claim can be aimed at policies that would otherwise be beyond the reach of the GATT/WTO contract; or it can be used as a “backup claim” to a violation claim concerning a contracted (or contracted feature of a) policy.

Finally, under a successful violation claim there is typically a legal presumption that the defendant will bring its policy into compliance with the agreement. But under a successful non-violation claim there is no such presumption. A successful non-violation claim only creates a legal right for the claimant to receive compensation from the defendant, which the defendant

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3An example of a non-violation claim aimed at a policy that would otherwise be beyond the reach of the GATT/WTO contract can be found in the 1984 GATT dispute Australia v. European Community: Operation of Beef and Veal Regime, where Australia invoked Article XXIII:1(b) to claim that the EC CAP regime subsidies on beef and veal were distorting world prices and eroding Australia’s ability to export to third markets (see Hudec, 1993, p. 521). An example of a non-violation claim used as a “backup claim” to a violation claim concerning a contracted (or contracted feature of a) policy can be found in the 1949 GATT dispute Chile v. Australia: Subsidy on Ammonium Sulfate, where Chile claimed that a domestic consumption subsidy granted to purchasers of ammonium sulfate fertilizer but not to purchasers of sodium nitrate fertilizer violated the most-favored-nation obligation (GATT Article I:1), and as a backup claim argued that the recent discontinuance of only the sodium nitrate subsidy program constituted Article XXIII:1(b) non-violation nullification and impairment of Australia’s recent tariff concessions (see Hudec, 1993, pp. 421-422).

4We discuss this further at later points in the paper (see especially note 14)
can either pay, or can avoid paying by removing the policy in question (or making other policy adjustments) so as to eliminate the nullification of benefits for the claimant.

With this institutional background in place, we next record a pair of stylized facts about the role that non-violation claims have played in GATT/WTO disputes.5 The first stylized fact can be seen as an implication of two features of the data on GATT/WTO disputes.

One feature is the paucity of GATT/WTO disputes in which the DSB has ruled on a non-violation claim. This is arguably true in absolute terms – over the more than 60 years that the GATT/WTO has been in operation, there have been only 20 disputes that involved a ruling on a non-violation claim – but the feature of the data that we emphasize here is the paucity of rulings on non-violation claims relative to the total number of disputes with DSB rulings: of the 232 GATT/WTO disputes initiated through the end of 2009 for which a ruling on any kind of claim occurred, the 20 disputes that involved a ruling on a non-violation claim represent a mere 8%, a number that would shrink to under 5% if it were limited to panel rulings on non-violation claims that were “adopted” as official by the wider GATT/WTO membership.6

A second feature is that the filing of non-violation claims – as distinct from DSB rulings on those claims – is not particularly uncommon: 20% (48 disputes) of the 232 GATT/WTO disputes initiated through the end of 2009 for which a ruling on any kind of claim occurred included a non-violation claim. In light of the first feature emphasized above, this implies a relatively low probability that non-violation claims are actually ruled upon. Indeed, if a non-violation claim is made in a GATT/WTO dispute that results in a ruling on any kind of claim, the non-violation claim is less than half as likely to be ruled upon by the DSB as compared to the DSB’s likelihood of ruling on a violation claim.

Hence, of those GATT/WTO disputes that resulted in a DSB ruling on any kind of claim, the fraction that involved a ruling on a non-violation claim is quite small, while the fraction that included a non-violation claim, whether or not that claim was ruled upon, is not particularly

5 The data behind the calculations we present below come from Hudec (1993) for the GATT-era disputes and from the World Bank’s WTO Dispute Settlement Database (see Horn, Johannesson and Mavroidis, 2011 for a description) and the WTO website for the WTO-era disputes. The compilation of this data is described more thoroughly in the Online Appendix to Maggi and Staiger (2013).

6 Panel rulings that were not adopted by the GATT membership in the GATT era or that were overturned on appeal in the WTO era do not have official status in GATT/WTO law, and so it may be appropriate to exclude such rulings from calculations like those we present here. Doing so would only provide further support for the features we emphasize. Also, as we discuss later (see notes 9 and 32), many GATT/WTO disputes settle before a ruling occurs, and so we focus here on the number of disputes for which a ruling on a non-violation claim occurred relative to the total number of disputes for which a ruling on a claim of any kind occurred.
small. Put differently, these first two features imply that, across GATT/WTO disputes in which a ruling of any kind occurs, there are substantial numbers of non-violation claims made but most of these claims are not ruled upon. This is the first stylized fact that we emphasize.

The second stylized fact is that, conditional on getting a DSB ruling, the success rate of non-violation claims is quite low, while that of violation claims is high. In particular, in GATT/WTO disputes initiated through the end of 2009 for which a DSB ruling on a non-violation claim occurred, the DSB ruled in favor of the claimant on the non-violation claim approximately 35% of the time. By contrast, over the same period the DSB ruled in favor of the claimant on (at least some portion of) violation claims approximately 73% of the time.\footnote{These calculations again include all DSB rulings, whether or not they were adopted by the GATT/WTO membership (see also note 6). The WTO reports related success rates that are somewhat higher (see WTO, 2007, p. 273) under a different criterion for the inclusion of rulings. The WTO report does not break out separate success rates for violation claims and non-violation claims as we do here. Hudec (1990, p. 278) reports success rates that are in line with the numbers we report in the text, though Hudec does not break out separate success rates for violation and non-violation claims either.}

We summarize with:

**Stylized Fact 1:** Across GATT/WTO disputes in which a ruling of any kind occurs, there are substantial numbers of non-violation claims, but most of these claims are not ruled upon.

**Stylized Fact 2:** Conditional on a ruling, the success rate of non-violation claims is low, both in absolute terms and relative to the high success rate of violation claims.

### 3. A Model of Violation and Non-Violation Claims

No existing model can account for the stylized facts on the use and outcomes of non-violation claims that we have described in the previous section, because no existing model that highlights the role of the non-violation clause also predicts disputes in equilibrium. In this section we develop a model that can account for these stylized facts. We build from the model of Maggi and Staiger (2011), who develop a two-country partial equilibrium model of dispute settlement in international trade agreements in which an importing government has a binary trade policy choice. Ex ante, before uncertainty over the value of trade policy commitments is resolved, the governments of the importing and exporting country can write an incomplete contract and exchange lump-sum transfers, and they can also set up a dispute settlement body (DSB) and define its mandate. Then ex post, once uncertainty is resolved, lump-sum transfers are no
longer available, the importing government makes its trade policy choice, and the exporting
government decides whether to initiate a dispute, which if initiated is resolved by the DSB
according to its given mandate. We extend this model in two directions. In addition to its trade
policy choice, we allow the importing government to make a domestic regulatory choice. And
in addition to the (violation) claim considered in Maggi-Staiger, we introduce the possibility of
bringing a non-violation claim.

Our setup is partial-equilibrium, and it focuses on a single industry in which the Home (im-
porting) government chooses a binary import policy $\tau \in \{FT, P\}$ (Free Trade or Protection)
and also makes a binary choice over a domestic regulation $r \in \{FT, R\}$ (Free Trade or Regu-
laration). The payoff of the Home government is $\omega(\tau, r; s)$, where $s \equiv (s_1, s_2, ..., s_N)$ is a vector
of state variables. Each state variable $s_i$ represents a binary event (such as “there is/is not
an import surge” or “the product does/does not contain asbestos”), with $p(s)$ the probability
that state $s$ occurs and $\Sigma$ the set of possible states. The Foreign (exporting) government has
no export policy in this industry, and its payoff is given by $\omega^*(\tau, r; s)$. To reduce the number
of cases, we assume that it is never internationally efficient or unilaterally optimal for Home to
set both $\tau = P$ and $r = R$ at the same time. Hence there are three relevant policy settings to
consider: $FT \equiv \{\tau = FT, r = FT\}$, $P \equiv \{\tau = P, r = FT\}$, and $R \equiv \{\tau = FT, r = R\}$.$^8$

We denote the impact of trade protection on Home payoffs by $\gamma^P(s) \equiv \omega(P; s) - \omega(FT; s) > 0$,
and the impact of domestic regulation on Home payoffs by $\gamma^R(s) \equiv \omega(R; s) - \omega(FT; s) > 0$.
These impacts may be thought of as arising from a combination of terms-of-trade and purely
domestic considerations. We assume that Foreign loses from Home policy intervention in all
states $s$; and for simplicity we fix the impact of Home intervention on Foreign payoffs in a given
state to be the same across both policies, and we denote this impact (defined positively) by
$\gamma^*(s) \equiv \omega^*(FT; s) - \omega^*(P; s) = \omega^*(FT; s) - \omega^*(R; s) > 0$: in effect, we are assuming that the
impact of Home policies on Foreign payoffs is transmitted through the trade effects of the Home
policy choice, and that in a given state $s$ the trade effects of $P$ and $R$ are the same. Finally, we

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$^8$Inclusion in our analysis of the fourth possibility, where Home sets both $\tau = P$ and $r = R$ at the same
time, would not alter our results in any substantive way, but would simply increase the number of cases to be
considered. By excluding this case we do miss the “intensive margin” possibility that Home might over-utilize
$R$ for protective purposes (by adding $P$). However, this possibility is more naturally captured in a continuous
policy setting where the stringency of $R$ can be adjusted upward for protective effect, and in Staiger and Sykes
(2011) we focus on that possibility (though in a model that does not produce disputes in equilibrium). In the
present paper we stick to dichotomous policy choices, and thereby restrict our focus to policy distortions at the
“extensive margin” that involve the choice of the wrong policy rather than over-utilization of the right policy.
rule out negotiations between governments at the ex-post stage (after the state $s$ is realized).  

Defining the “first-best” policy for a given state $s$ as the policy that maximizes the governments’ joint payoff $\Omega(\tau, r; s) \equiv \omega(\tau, r; s) + \omega^*(\tau, r; s)$, we partition the states of the world into three sets: those where the first-best involves no policy intervention, those where the first-best involves import protection and those where the first-best involves domestic regulation. Formally, we let $\Gamma^P(s) \equiv \gamma^P(s) - \gamma^*(s) = \Omega(P; s) - \Omega(FT; s)$ denote the joint (positive or negative) gain from protection relative to free trade for the two governments; and we let $\Gamma^R(s) \equiv \gamma^R(s) - \gamma^*(s) = \Omega(R; s) - \Omega(FT; s)$ denote the joint (positive or negative) gain from domestic regulation relative to free trade for the two governments. We may then use $\sigma^{FT}$, $\sigma^P$ and $\sigma^R$ to denote the sets of states for which the first-best policy is respectively $FT$, $P$ and $R$:

$$\sigma^{FT} \equiv \{ s \text{ such that } \max[\Gamma^P(s), \Gamma^R(s)] \leq 0 \},$$
$$\sigma^P \equiv \{ s \text{ such that } \Gamma^P(s) > \max[0, \Gamma^R(s)] \}, \text{ and}$$
$$\sigma^R \equiv \{ s \text{ such that } \Gamma^R(s) > \max[0, \Gamma^P(s)] \}.$$

We assume that the realized state $s$ is observed by the governments and by the DSB, while $\Gamma^P$ and $\Gamma^R$ are observed by the governments but not by the DSB (so that payoff levels are not verifiable and hence non-contractible).

In $\sigma^P$ where the first-best involves import protection, we impose the restriction that intervening instead with domestic regulation would be (jointly) worse than free trade, i.e., we assume $\Gamma^R(s) < 0$ for $s \in \sigma^P$. Similarly, in $\sigma^R$ where the first-best involves domestic regulation, we assume that intervening instead with import protection would be worse than free trade, i.e., we assume $\Gamma^P(s) < 0$ for $s \in \sigma^R$. While these two assumptions are not needed for our results, they reduce the number of cases we must consider.\(^9\) Finally, in $\sigma^{FT}$ where the first-best is free trade, it is natural to assume that Home would prefer import protection to domestic regulation – that is, $\gamma^P(s) > \gamma^R(s)$ for $s \in \sigma^{FT}$ – which, as both $P$ and $R$ are associated with the same

\(^9\)Maggi and Staiger (2011) also abstract from ex-post negotiations, with an assumption that effective ex-post transfers are not available to governments (see Maggi and Staiger on a justification for this assumption within the context of GATT/WTO disputes). As will become clear below, we can appeal to a similar assumption here, provided that the ex-post transfers that are available to governments in our model are sufficiently inefficient. Alternatively, sufficiently high ex-post bargaining frictions of any form would be sufficient for our purposes. In reality, many GATT/WTO disputes are in fact settled through ex-post negotiations, and Maggi and Staiger (2013) consider the intermediate case in which ex-post transfers are inefficient but not so inefficient as to preclude ex-post negotiation and settlement of disputes, although they do not focus on non-violation complaints as we do here. We leave the extension to that case as an important direction for future work (see also note 32).

\(^10\)In our working paper (Staiger and Sykes, 2013a) we relax these two assumptions and show that our main results are unchanged.
level of $\gamma^*(s)$, then implies $\Gamma^P(s) > \Gamma^R(s)$ for $s \in \sigma^{FT}$: this assumption is natural because, in a wide set of environments, the benefits to Home of intervening in $\sigma^{FT}$ where intervention is jointly inefficient are associated with terms-of-trade manipulation (see Bagwell and Staiger, 1999, 2001), and import protection (a tariff) is the first-best policy instrument for this purpose. To capture this we introduce a parameter $\theta \in (0, 1)$ to reflect the degree to which the policy $R$ is a good substitute for $P$ for the purpose of terms-of-trade manipulation, and we impose

$$\gamma^R(s) = \theta \cdot \gamma^P(s) \text{ for } s \in \sigma^{FT}. \quad \text{(Assumption 1)}$$

The policy substitution parameter $\theta$ will play a key role in our analysis.

We next discuss the contracting possibilities. Following Maggi and Staiger (2011), we assume that it is costless to describe the trade policy $\tau$ in a contract but prohibitively costly to describe precisely all the relevant state variables $(s_1, s_2, ..., s_N)$ that would be necessary to write a complete contingent contract covering $\tau$, and we focus instead on what Maggi and Staiger term a “vague contract” that takes the form “$\tau = P$ allowed if and only if $\nu$,” where $\nu$ is a vague sentence such as “there is serious injury to the domestic industry due to increased imports.” Vague contracts use “off the shelf” language and are essentially costless to write, but their meaning is ambiguous in some states of the world; and following Maggi and Staiger, in those states of the world where their meaning is unambiguous we assume that vague contracts are written so that they specify the first-best policy choice.

By contrast, we assume that writing $r$ in an ex-ante contract would itself be prohibitively expensive, reflecting the notion that $r$ could encompass any of a myriad of domestic regulations that might be implemented ex post. Hence, the vague contract cannot be written to cover $r$, nor for the same reason can any other ex-ante contract cover $r$. In short, due to prohibitively high writing costs, $r$ is left out of the ex-ante contract altogether. Or, using Maggi and Staiger’s (2011) terminology and as we discuss further below, $r$ is covered by the “empty contract.”

In addition to writing the ex-ante contract covering $\tau$, governments can introduce a court – the DSB – and can give the DSB a mandate to follow if it is invoked to settle a dispute ex post. Recall that the DSB is assumed to observe the realized state $s$ but not the values of $\Gamma^P$ and $\Gamma^R$; thus, the DSB does not know what the “best” (joint-payoff-maximizing) policy is for the realized state $s$. What role can the DSB play? Here we identify two possible roles: the DSB

\[11\text{In a richer model, more narrowly defined subsets of domestic policies (e.g., “subsidies”) which turn out to be relatively frequent targets of successful non-violation complaints might be later carved out and written in to the ex-ante contract, a possibility we discuss further in the Conclusion.} \]
can address a *violation complaint*, and/or the DSB can address a *non-violation complaint*.

A violation complaint occurs when Home selects $\tau = P$ in state $s$ and Foreign invokes the DSB, and claims that the contract specifies $\tau = FT$ in state $s$ and hence that the contract has been violated by Home’s policy choice. If the trade policy obligation specified in the contract ($\tau = FT$ or $\tau = P$) is unambiguous for state $s$, then the DSB simply enforces the contract, and we ignore such disputes in what follows.\(^\text{12}\) We focus instead on states $s$ where the obligation specified in the contract is ambiguous; and we assume that, if invoked in such a state, the DSB observes an unbiased but noisy signal of $\Gamma^P$, which can be thought of as the outcome of an independent investigation in which the DSB “interprets” the contract. The DSB then issues the ruling $\mathbf{r}^{DSB} = FT$ if its signal indicates $\Gamma^P \leq 0$ and $\mathbf{r}^{DSB} = P$ if its signal indicates $\Gamma^P > 0$. The DSB ruling in the case of a violation complaint can therefore be thought of as simply a policy determination that maximizes the expected joint payoff of the governments given the DSB signal.\(^\text{13}\) We assume that the ruling is automatically enforced.

In contrast to a violation complaint, a non-violation complaint does not involve a claim that a contractual obligation has been violated, and hence we assume (in line with GATT/WTO practice) that a non-violation claim can be brought either against $\tau$ (when Home sets $\tau = P$), which is covered by the ex-ante contract, or against $r$ (when Home selects $r = R$), which is not covered by any ex-ante contract. If the DSB rules on a non-violation complaint involving $\tau$, we again assume that the DSB observes an unbiased but noisy signal of $\Gamma^P$ and issues the ruling $\mathbf{r}^{DSB} = FT$ if its signal indicates $\Gamma^P \leq 0$ and $\mathbf{r}^{DSB} = P$ if its signal indicates $\Gamma^P > 0$; and similarly, if the DSB rules on a non-violation complaint involving $r$, we assume that the DSB observes an unbiased but noisy signal of $\Gamma^R$ and issues the ruling $\mathbf{r}^{DSB} = FT$ if its signal indicates $\Gamma^R \leq 0$ and $\mathbf{r}^{DSB} = R$ if the signal indicates $\Gamma^R > 0$. However, and unlike in a violation complaint, in the case of a non-violation ruling that goes against the Home government ($\mathbf{r}^{DSB} = FT$ or $\mathbf{r}^{DSB} = FT$), we assume (again in line with GATT/WTO practice) that Home is under no obligation to implement $FT$. Instead the non-violation complaint operates as a *liability rule*, in that Home has the option of either implementing the DSB policy determination or paying damages $b(s)$ to Foreign.\(^\text{14}\)

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\(^\text{12}\)Indeed, as we introduce just below a cost of disputes borne by each party, our model implies that no such disputes would ever arise in equilibrium.

\(^\text{13}\)Notice that under a violation complaint we have defined the DSB mandate to rule between the policy chosen by Home and the alternative of $FT$. Under our assumptions there is no benefit from having the DSB consider as well the alternative form of intervention as a possible ruling.

\(^\text{14}\)In this regard, there is an important question as to the practical distinction between violation and non-
What level of damages must the Home government pay if it wishes to keep its intervention in place when a non-violation ruling goes against it? We assume that the DSB sets damages at \( b(s) = \gamma^*(s) \), the level of harm done to the Foreign country; and hence we assume that \( \gamma^*(s) \) is observable to the DSB (but that \( \gamma^P(s) \) and \( \gamma^R(s) \) and therefore \( \Gamma^P \) and \( \Gamma^R \) are not). Below we will discuss the desirability/feasibility of setting damages in this way. Finally, we denote by \( b^*(s) \) the damages actually received by Foreign when Home pays \( b(s) \), and we assume that Foreign receives less than Home pays, reflecting the dead-weight loss associated with reciprocal tariff retaliation, the typical form of “self-help” compensation authorized in GATT/WTO disputes.\(^\text{15}\)

To capture this feature we introduce a parameter \( \delta \in (0, 1) \) to reflect (inversely) the extent of the inefficiency in government-to-government transfers in the context of GATT/WTO disputes, and we assume that \( b^*(s) \equiv \delta \cdot b(s) \). Summarizing, we record the following:

\[
b^*(s) = \delta \cdot b(s) \quad \text{and} \quad b(s) = \gamma^*(s) \quad \text{for} \ s \in \Sigma. \tag{Assumption 2}
\]

The transfer cost parameter \( \delta \) will play a key role in our analysis.

Notice that if Home sets \( \tau = P \), then Foreign may bring a violation complaint, a non-violation complaint, or bring both, or do nothing. We assume that if both a violation and non-violation claim are brought against Home’s selection of \( \tau = P \), the DSB first rules on the violation claim, and it proceeds to rule on the non-violation claim only if it has ruled for the Home country (i.e., determines \( \tau^{DSB} = P \)) in the violation claim. This is the sequencing followed in GATT/WTO practice, and it can be rationalized on grounds of “judicial economy.”\(^\text{16}\)

It will play an important role in our model’s account of the stylized facts associated with the use of non-violation claims in GATT/WTO disputes.

On the other hand, if Home sets \( \tau = R \), the possible responses of Foreign are to file a violation complaints in the GATT/WTO, in light of the fact that the same reciprocity-of-trade-effects rule generally guides the permissible retaliation for continued application of the intervention at issue in either case. This has fueled a debate among legal scholars about whether the typical violation complaint in a GATT/WTO dispute might be better interpreted as a liability rule, rather than as a “property rule” implying automatic enforcement as we have interpreted it above (see Jackson, 1997, and Schwartz and Sykes, 2002). And even setting aside this issue, there are some rule violations (e.g., the WTO rules on “actionable” subsidies) that operate as liability rather than property rules. We return to this issue in the Conclusion, and discuss there the case where both violation and non-violation claims are treated as liability rules.

\(^\text{15}\)See Maggi and Staiger (2013) for a discussion of methods of compensation in GATT/WTO disputes and the deadweight loss typically associated with these methods.

\(^\text{16}\)In particular, with the property rule/liability rule distinction across violation and non-violation claims (see note 14), the sequencing of rulings described in the text is in line with the principle of judicial economy, because a ruling against the Home government on the violation claim would render meaningless to the Foreign government a subsequent ruling on the non-violation claim.
non-violation claim or do nothing, as \( r \) is not covered in an ex-ante contract and so a violation claim cannot be brought. Hence, our model captures the idea that non-violation claims can serve as an alternative to violation claims for disciplining policies that would be too costly to describe in a contract, an idea that is well-reflected in the following quote from Hudec (1990) on the origins of the non-violation clause in GATT:

“The dominant purpose of a trade agreement was the exchange of tariff reductions. The concept of a balanced exchange [reciprocity] was central...Concern for reciprocity stimulated the general code of trade policy rules that traditionally went along with the exchange of tariff reductions. Tariffs were only one instrument of trade policy, and unless other trade policy measures were held in check, the commercial opportunity of a tariff reduction could easily be nullified by some other collateral measure. To maintain reciprocity, therefore, prohibitions against quantitative restrictions, discrimination, and the like were essential. Even so, it was impossible fully to guarantee reciprocity by means of legal commitments. The standard trade policy rules could deal with the common types of trade policy measure governments usually employ to control trade. But trade can also be affected by other “domestic” measures, such as product safety standards, that have nothing directly to do with trade policy. It would have been next to impossible to catalogue all such possibilities in advance. Moreover, governments would never have agreed to circumscribe their freedom in all these other areas for the sake of a mere tariff agreement. The shortcomings of the standard legal commitments were recognized in a report by a group of trade experts at the London Monetary and Economic Conference of 1933. The group concluded that trade agreements should have another more general provision which would address itself to any other government action that produced an adverse effect on the balance of commercial opportunity.” (pp. 19-20).\(^\text{17}\)

Notice also that, with damages in a successful non-violation complaint against Home set at \( b(s) = \gamma^*(s) \) by Assumption 2, it follows that when Home faces a successful non-violation claim.

\(^{17}\)The idea that non-violation claims can serve as an alternative to violation claims for disciplining policies that would be too costly to describe in a contract is also highlighted by Sykes (2005) in the context of disciplines on domestic subsidies: “A nice feature of the nonviolation doctrine is the fact that it does not require subsidies to be carefully defined or measured. A complaining member need simply demonstrate that an unanticipated government program has improved the competitive position of domestic firms at the expense of their foreign competition.”
complaint (concerning either $\tau$ or $r$) for $s \in \sigma^{FT}$, Home will comply with the policy determination ($FT$) rather than choose to maintain its policy and pay damages $b(s)$. But when Home faces a successful non-violation complaint over $\tau$ for $s \in \sigma^P$ it will choose to maintain $\tau = P$ and pay the damages $b(s)$; and similarly, when Home faces a successful non-violation complaint over $r$ for $s \in \sigma^R$ it will choose to maintain $r = R$ and pay the damages $b(s)$. In other words, as modeled, Home’s policy choices under the non-violation complaint have the flavor of those induced by an “efficient breach” rule.\footnote{See Schwartz and Sykes (2002) on an efficient-breach interpretation of GATT rules more generally, and see Grossman and Sykes (2010) for a discussion of some of the practical limitations associated with this interpretation. We say “the flavor of” efficient breach because by Assumption 2 the damage payment $b(s)$ made by Home carries with it a dead-weight loss so that Foreign receives $b^*(s) < b(s)$; and hence, while the policy choice mimics that of an efficient breach rule in the presence of lump-sum/efficient transfers, there are nonetheless inefficiencies associated with the transfer payments.}

We now pause to summarize how our modeling of trade disputes relates to the modeling of disputes in Maggi and Staiger (2011). Consider first violation complaints. In our model the approach to contracting over the import policy $\tau$ is analogous to the combination of a vague contract and an interpretive DSB mandate as introduced by Maggi and Staiger, and broadly echoes Posner’s (2005, p. 8) description of the interpretive role of courts: “Gap filling and disambiguating are both ‘interpretive’ in the sense that they are efforts to determine how the parties would have resolved the issue that has arisen had they foreseen it when they negotiated their contract.” Maggi and Staiger also consider other forms for the ex-ante contract and DSB mandate, optimize among the possible contract/DSB mandate pairings, and show that the vague contract and interpretive DSB mandate can be optimal provided that the noise in the DSB signal is relatively small. Rather than optimizing the contract/DSB mandate pair across a variety of options, in what follows we focus exclusively on the vague contract and interpretive DSB mandate for the import policy $\tau$ in order to emphasize different themes: nevertheless, as we describe further below, we will concentrate our attention on the relatively-small-DSB-noise environment where this contract/DSB mandate is likely to be optimal.\footnote{More specifically, as Maggi and Staiger (2011) demonstrate, when the noise in the DSB signal is in a small-to-intermediate range the vague contract and interpretive DSB mandate will be optimal, but if the noise in the DSB signal is sufficiently small the vague contract and interpretive DSB mandate can become dominated by other contract/DSB mandate pairings. However, this possibility is most likely to arise when there would be no observed disputes under the vague contract and interpretive DSB mandate, and so our focus below on parameter ranges which in combination with relatively small DSB noise yield observed disputes makes this possibility unlikely to arise in our environment.}

We can also now summarize how our approach to modeling the non-violation claim relates formally to Maggi and Staiger (2011) and to Bagwell and Staiger (2001). Relative to Maggi
and Staiger, our modeling of the non-violation claim in the context of the domestic regulatory policy is analogous to an empty contract (over $r$) paired with a mandate of the DSB to fill gaps (again along the lines described by Posner in the passage quoted above), except that in the setting of Maggi and Staiger the DSB announces a policy which would be automatically enforced (a “property rule”), whereas we model the non-violation claim as a liability rule, with the DSB announcing damages that must be paid by Home if it wishes to keep its policy choice. The liability rule, in turn, plays the role of the market access preservation rule which Bagwell and Staiger use to formalize the “reciprocity-preserving” feature of the non-violation complaint described by Hudec (1990) in the passage quoted above, in terms of the ability of this rule to induce efficient policy choices by the Home country without the need to contract directly over domestic regulatory policies.\textsuperscript{20} Relative to Maggi and Staiger, we also allow the non-violation complaint to be brought against the policy covered by the vague contract (the import policy $\tau$), and when it is brought in combination with a violation complaint the non-violation compliant serves here as a “back-up” complaint should the DSB fail to rule in favor of the Foreign exporter’s violation claim.\textsuperscript{21}

To complete the development of our model, we denote the probability that the DSB issues the “wrong” ruling by $q \in (0, 1/2)$, a parameter that applies to both violation and non-violation claims and captures (inversely) the overall quality of the DSB information.\textsuperscript{22} Implicit in this formulation is that the DSB investigation is better than a coin flip, and that the DSB is not an active player in the game between the Home and Foreign governments.\textsuperscript{23} If the DSB rules on

\textsuperscript{20}In Bagwell and Staiger (2001, see especially the discussion in section III.C), and similarly in Bagwell and Staiger (2006) and Staiger and Sykes (2011), there is no uncertainty at the time the agreement is negotiated, and so tariff negotiations in combination with a reciprocity-based market access preservation rule can induce the efficient choice of domestic (non-contracted) and trade (contracted) policies and achieve the efficient frontier. In those papers reciprocity can therefore be used to engineer a perfect “efficient breach” rule. When, as we allow here, there is ex-ante uncertainty at the time of contracting which is resolved ex post, the reciprocity-based market access preservation rule continues to display an efficient-breach-type property as we have observed, though now the efficiency properties are qualified (see note 18).

\textsuperscript{21}Notice, too, the dual role of the terms-of-trade theory of trade agreements in our analysis: first, the terms-of-trade theory predicts that global inefficiencies in domestic policies will be absent as long as contracted tariff commitments do not induce governments to turn to domestic policies as second-best tools for terms of trade manipulation, and it thereby provides an intellectual foundation for the “shallow integration” focus on negotiated border measure commitments as a means to achieve globally efficient policies; and second, the terms-of-trade theory serves as the justification for our Assumption 1.

\textsuperscript{22}A natural extension would be to allow one DSB error rate for violation claims and another for non-violation claims and consider the possibility that the former is smaller than the latter. We discuss this extension briefly in the Conclusion.

\textsuperscript{23}For example, we are ruling out the possibility that the DSB might attempt to draw inferences about the appropriate ruling from the observed filing behavior induced by the actions of the two governments. Maggi and
both a violation and a non-violation claim in the same dispute, we assume that the error rate $q$ applies to each ruling independently: with this assumption we capture in a reduced form way the fact that the non-violation claim is a legally separate claim from the violation claim in the GATT/WTO, and so the DSB investigations of the two types of claims hinge on distinct legal issues.\textsuperscript{24} And finally, we assume that disputes are costly: if the exporter (complainant) invokes the DSB, then for each complaint that the exporter brings the exporter incurs cost $c^*$ and the importer (defendant) incurs cost $c$.

Formally, we consider the following timing:

Stage 0. The state $s$ is realized;

Stage 1. Home chooses $\tau \in \{FT, P\}$ and $r \in \{FT, R\}$;

Stage 2. Foreign makes its filing decision; it can choose to file a non-violation complaint against $R$, it can choose to file a violation and/or a non-violation complaint against $P$, or it can choose not to file a complaint at all;

Stage 3. If invoked for a violation complaint, the DSB issues a ruling $\tau^{\text{DSB}} \in \{FT, P\}$; if invoked for a non-violation complaint, the DSB issues a ruling $\tau^{\text{DSB}} \in \{FT, P\}$ or $r^{\text{DSB}} \in \{FT, R\}$; if invoked for both a violation and a non-violation complaint, the DSB issues a first (violation) ruling $\tau^{\text{DSB}} \in \{FT, P\}$, and issues a second (non-violation) ruling $\tau^{\text{DSB}} \in \{FT, P\}$ if and only if its first ruling is $\tau^{\text{DSB}} = P$;

Stage 4. If the DSB is invoked and issues a non-violation ruling that goes against Home, then Home chooses whether to revert to $FT$ or maintain its policy and pay damages $b(s)$; DSB violation rulings against Home are automatically enforced;

Stage 5. Payoffs are realized.

\textsuperscript{24}More specifically, in a richer model one could imagine a contract covering import protection that both featured vague phrases and contained gaps, and under such a contract violation claims would amount to asking the DSB to interpret vague phrases of the contract while non-violation claims would take aim at the contract gaps. Our simple parameterization of the DSB accuracy rate $(1 - q)$ can be thought of as a reduced form way of capturing the probability that the DSB rules for the right policy – whether for the right reason (e.g., finds a violation when in fact there was a violation of an appropriately interpreted vague phrase of the contract) or the wrong reason (e.g., finds a violation when in fact there was no violation but there was a non-violation) – when asked to evaluate a violation or a non-violation claim.
In what follows, we characterize the subgame perfect equilibrium of this game.

Finally, notice that according to the above sequence of moves, after observing Home’s policy choice Foreign does not have the option of a unilateral policy response of its own but instead submits to the limits on unilateral retaliation (as embodied in the damages $b(s)$) described by Stages 2 – 4. In effect, then, according to our model, as part of their ex-ante contracting governments agree to forgo “vigilante justice” and instead operate within the rule of law dictated by the DSB. As Petersmann (1997) explains, such institutional limits on retaliatory actions were the essence of what governments hoped to achieve with their design of the GATT dispute settlement procedures:

“The drafting history of Article XXIII:2 confirms that it was designed to limit the customary law right of unilateral reprisals, whose exercise had contributed so much to the ‘law of the jungle’ in international economic affairs during the 1930’s, and to introduce, as stated by one of the drafters, ‘a new principle in international economic relations. We have asked the nations of the world to confer upon an international organization the right to limit their power to retaliate. We have sought to tame retaliation, to discipline it, to keep it within bounds. By subjecting it to the restraints of international control, we have endeavoured to check its spread and growth, to convert it from a weapon of economic warfare to an instrument of international order.’ ” Petersmann (1997, p. 82)

As indicated by Petersmann and reflected in our formal model, disputes in the GATT/WTO therefore correspond not to non-cooperative “law-of-the-jungle trade wars,” but rather to instances in which the system of rules set up ex-ante to resolve disputes is utilized ex post.

4. Analysis

In this section we characterize the equilibrium policy choices and filing behavior in our model. We then identify restrictions on the parameters of our model under which the model can deliver outcomes in line with the stylized facts identified in section 2.

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25 Not explained by our model is why governments would wish to tame retaliatory actions in this way. A formal answer to this question is also outside the model of Maggi and Staiger (2011), but in their Conclusion they discuss a possible extension of their model to a multi-country world that could provide a formal answer. See also Bown (2005) who presents empirical evidence suggesting that governments have not been entirely successful in wringing vigilante justice from the GATT/WTO system.
4.1. Equilibrium Policy Choices and Filing Behavior

We begin by describing the equilibrium policy choices and filing behavior. Earlier we partitioned the states of the world $\Sigma$ into three sets: $\sigma^R$, those states for which the first-best policy is $R \equiv \{\tau = FT, r = R\}$; $\sigma^P$, those states for which the first-best policy is $P \equiv \{\tau = P, r = FT\}$; and $\sigma^{FT}$, those states for which the first-best policy is $FT \equiv \{\tau = FT, r = FT\}$. It is helpful to proceed first with states in $\sigma^R$, and then follow with states in $\sigma^P$ and finally $\sigma^{FT}$.

When the first-best policy is $R$ Consider a state $s \in \sigma^R$. We begin by deriving the Stage-2 filing behavior of Foreign conditional on a Home policy choice, and then derive the Stage-1 Home policy choice. We will establish below that in $\sigma^R$ the relevant policy choice for Home is either $R$ or $FT$. Given this, the relevant filing decision for Foreign is whether or not to file a non-violation claim with the DSB if Home chooses $R$. Foreign will do so if and only if the expected benefit to Foreign of filing exceeds its cost of filing, that is

$$\Pr(\text{DSB NV ruling is } r = FT \mid \sigma^R) \cdot b^*(s) > c^*,$$  \hspace{1cm} (4.1)

where here and throughout we let $\Pr(\cdot \mid \sigma^i)$ for $i \in \{R, P, FT\}$ denote the probability of an outcome conditional on $s \in \sigma^i$. Notice that (4.1) reflects the fact that, under Assumption 2, for states in $\sigma^R$ Home will not alter its policy choice of $R$ in response to a successful non-violation complaint against it by Foreign, but will instead pay damages $b(s)$ resulting in a payment $b^*(s)$ to Foreign. Note also that we have $\Pr(\text{DSB NV ruling is } r = FT \mid \sigma^R) = q$, and so using Assumption 2 we may rewrite (4.1) as

$$\gamma^R(s) > \frac{c^*}{\delta q} \text{ for } s \in \sigma^R. \hspace{1cm} (4.2)$$

Hence, Foreign files a non-violation claim against $R$ for $s \in \sigma^R$ if and only if the harm from $R$ suffered by Foreign exceeds the threshold described in (4.2).

Next consider the Home government’s Stage-1 policy choice for $s \in \sigma^R$. It is easy to see that Home will never choose $P$ for $s \in \sigma^R$. This is because by definition we have $\gamma^R(s) > \gamma^P(s)$ in $\sigma^R$, so the only reason that Home might wish to choose $P$ rather than $R$ would be to induce a more favorable expected dispute outcome. When (4.2) fails, this is clearly not possible, as the selection of $R$ does not result in a dispute. And when (4.2) holds and conditional on a dispute over $P$ occurring, the best that Home could hope for in selecting $P$ is that this policy selection would also trigger a non-violation claim, but facing such a claim it is easy to show
that Home’s expected payoff is higher under $\mathcal{R}$ than under $\mathcal{P}$. Hence, when (4.2) holds and Foreign would file a non-violation claim against $\mathcal{R}$, Home could only do better by selecting $\mathcal{P}$ if by doing so it could avoid a dispute altogether. But when (4.2) holds, Foreign is guaranteed to benefit from launching a dispute over $\mathcal{P}$ as well, and so Home cannot avoid a dispute with this policy selection.\footnote{Given our assumption that $\Gamma_p^s(s) < 0$ for $s \in \sigma^R$, Foreign’s expected payoff from filing a violation claim against $\mathcal{P}$ in $\sigma^R$ would be $(1 - q)\gamma^*(s) - c^*$, which is guaranteed to be positive under (4.2).} We may conclude that Home will never choose $\mathcal{P}$ for $s \in \sigma^R$.

This leaves two relevant Home policy options for $s \in \sigma^R$: either $\mathcal{R}$ or $\mathcal{F}\mathcal{T}$. And Home chooses $\mathcal{R}$ if either (4.2) fails – because then Home can choose $\mathcal{R}$ without triggering a dispute – or if (4.2) holds and the expected benefit to Home from choosing to implement domestic regulation exceeds the cost to Home of a DSB dispute:

$$\Pr(\text{DSB NV ruling is } r = R \mid \sigma^R)\gamma^R(s) + \Pr(\text{DSB NV ruling is } r = FT \mid \sigma^R)\left[\gamma^R(s) - b(s)\right] > c.$$  

To reduce the number of cases and focus on the more interesting ones, we will follow Maggi and Staiger (2011) and assume that for each disputant the cost of a dispute is relatively small. In particular, here we assume that even in the case of maximal DSB noise, i.e., $q \to 1/2$, the condition above is satisfied for $s$ in $\sigma^R$:\footnote{Using $b(s) = \gamma^*(s)$ and the fact that $\gamma^R(s) > \gamma^*(s)$ for $s \in \sigma^R$, it follows that Assumption 3 is sufficient for our purposes.}

$$\gamma^R(s) > 2c \text{ for } s \in \sigma^R. \quad (\text{Assumption 3})$$

Assumption 3 ensures that Home always chooses $\mathcal{R}$ for $s \in \sigma^R$ (i.e., when $\mathcal{R}$ is the first-best policy) whether or not this triggers a non-violation complaint by Foreign.

We may now state:

**Lemma 1.** For $s \in \sigma^R$ and under Assumption 1-Assumption 2 and Assumption 3, Home chooses $\mathcal{R}$: Foreign files a non-violation complaint when $\gamma^*(s) > \frac{c}{\delta q}$; otherwise Foreign does not file a complaint.

**When the first-best policy is $\mathcal{P}$** Next we turn to states in $\sigma^p$. Once again we first describe the Stage-2 filing behavior of Foreign conditional on a Home policy choice, and then describe the Stage-1 Home policy choice.\footnote{As we describe in section 3, the vague contract that covers $\tau$ will unambiguously allow $\tau = P$ in a subset of states in $\sigma^P$. For this subset of states, Home selects $\tau = P$ and there will be no equilibrium filing of either violation or non-violation claims by Foreign. For simplicity of exposition we ignore these states here and throughout, by in effect assuming that they constitute an insignificant number of states.}
If Home selects $\mathcal{P}$, Foreign can file with the DSB a violation claim, a non-violation claim, both or neither. If Foreign files a violation complaint alone it can expect the benefit

$$\Pr(\text{DSB V ruling is } \tau = FT \mid \sigma^\mathcal{P}) \cdot \gamma^*(s) - c^*;$$

if Foreign files a non-violation complaint alone, it can expect the benefit

$$\Pr(\text{DSB NV ruling is } \tau = FT \mid \sigma^\mathcal{P}) \cdot b^*(s) - c^*,$$

reflecting the fact that under Assumption 2 Home will choose to maintain $\mathcal{P}$ and pay damages under a successful non-violation complaint in $\sigma^\mathcal{P}$; and if Foreign files both a violation and a non-violation complaint against Home’s choice of $\mathcal{P}$ it can expect the benefit

$$\Pr(\text{DSB V ruling is } \tau = FT \mid \sigma^\mathcal{P}) \cdot \gamma^*(s) + \Pr(\text{DSB V ruling is } \tau = P \mid \sigma^\mathcal{P}) \cdot \Pr(\text{DSB NV ruling is } \tau = FT \mid \sigma^\mathcal{P}) \cdot b^*(s) - 2c^*.$$

These payoffs can be used to characterize the Foreign filing behavior if Home selects $\mathcal{P}$.

Alternatively, if Home selects $\mathcal{R}$, Foreign must choose whether to file a non-violation complaint or do nothing. Foreign can expect the benefit

$$\Pr(\text{DSB NV ruling is } r = FT \mid \sigma^\mathcal{P}) \cdot \gamma^*(s) - c^*$$

if it files a non-violation complaint. Reflected here is the fact that under Assumption 2 and with $\Gamma^\mathcal{R}(s) < 0$ for $s \in \sigma^\mathcal{P}$ Home will remove $\mathcal{R}$ under a successful non-violation complaint.

We now describe the Foreign government’s Stage-2 filing behavior for $s \in \sigma^\mathcal{P}$. In effect, as $\gamma^*(s)$ rises, Foreign’s filing behavior becomes increasingly aggressive. In particular, using the conditions above, it is direct to establish the following: Foreign does not file against $\mathcal{P}$ or $\mathcal{R}$ for $\gamma^*(s) \leq \frac{c^*}{(1-q)}$; for $\gamma^*(s) \in \left(\frac{c^*}{(1-q)}, \frac{c^*}{q}\right)$ Foreign does not file against $\mathcal{P}$ but files a non-violation claim against $\mathcal{R}$; for $\gamma^*(s) \in \left(\frac{c^*}{q}, \frac{c^*}{\delta (1-q) q}\right)$ Foreign files a violation claim against $\mathcal{P}$ and files a non-violation claim against $\mathcal{R}$; and for $\gamma^*(s) \geq \frac{c^*}{\delta (1-q) q}$, Foreign files both a violation and a non-violation claim against $\mathcal{P}$ and files a non-violation claim against $\mathcal{R}$.

Consider next the Home government’s Stage-1 policy choice for states in $\sigma^\mathcal{P}$. As above to reduce the number of cases and focus on the more interesting ones, we assume that $c$ is sufficiently small so that, even in the case of maximal DSB noise, i.e. if the DSB flips a coin, Home would prefer $\mathcal{P}$ to $\mathcal{F}T$ for $s \in \sigma^\mathcal{P}$ (i.e., when $\mathcal{P}$ is the first-best policy) whether or not
this triggers a (violation or violation-plus-non-violation) complaint. It is straightforward to check that this is guaranteed by:

\[ \gamma^P(s) > 8c \text{ for } s \in \sigma^P. \]  
(Assumption 4)

With Assumption 4, the only question is then whether Home chooses \( P \) or \( R \) for states in \( \sigma^P \).

Home chooses \( P \) if \( \gamma^*(s) \leq \frac{c'}{q} \) because it can do so without triggering a dispute. But if \( \gamma^*(s) > \frac{c'}{q} \) then a choice of \( P \) would trigger a dispute, and whether or not Home might choose \( R \) to avoid a dispute over \( P \) depends on the aggressiveness of Foreign’s filing behavior. For \( \gamma^*(s) \in \left( \frac{c'}{q}, \frac{c'}{8(1-q)q} \right) \) a choice of \( P \) would be met by a violation claim while a choice of \( R \) would be met by a non-violation claim, but in this case (using \( \Gamma^R(s) < 0 \), which implies that Home would now remove \( R \) under a successful non-violation complaint) Home always chooses \( P \).

And for \( \gamma^*(s) \geq \frac{c'}{8(1-q)q} \) a choice of \( R \) would be met by a non-violation claim and a choice of \( P \) would trigger both a violation and a non-violation claim, implying that in this case (and using \( \Gamma^R(s) < 0 \) Home chooses \( P \) if \( \gamma^R(s) < \frac{(1-q)\gamma^P(s) - c - (1-q)q\gamma^*(s)}{q} \), and Home chooses \( R \) otherwise.

We may now state:

**Lemma 2.** For \( s \in \sigma^P \) and under Assumption 1-Assumption 2 and Assumption 4, Home chooses either \( P \) or \( R \):

- (a) if \( \gamma^*(s) \leq \frac{c'}{q} \) Home chooses \( P \) and Foreign does not file a complaint;
- (b) if \( \gamma^*(s) \in \left( \frac{c'}{q}, \frac{c'}{8(1-q)q} \right) \) Home chooses \( P \) and Foreign files a violation claim; and
- (c) if \( \gamma^*(s) \geq \frac{c'}{8(1-q)q} \) Home chooses \( P \) and Foreign files both a violation and a non-violation complaint when \( \gamma^R(s) < \frac{(1-q)\gamma^P(s) - c - (1-q)q\gamma^*(s)}{q} \), otherwise Home chooses \( R \) and Foreign files a non-violation complaint.

**When the first-best policy is \( FT \)** Finally, we turn to states in \( \sigma^{FT} \). Again we begin by deriving the Stage-2 filing behavior of Foreign conditional on a Home policy choice, and then derive the Stage-1 Home policy choice.\(^{29}\)

If Home chooses \( R \), the relevant filing decision for Foreign is whether or not to file a non-violation claim with the DSB. Foreign will do so if and only if the expected benefit to Foreign

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\(^{29}\)As discussed earlier, the vague contract that covers \( \tau \) will unambiguously oblige Home to \( \tau = FT \) in a subset of states in \( \sigma^{FT} \). For this subset of states, Home selects \( \tau = FT \) and there will be no equilibrium filing of either violation or non-violation claims by Foreign. As before, for simplicity of exposition we ignore these states here and throughout, by in effect assuming that they constitute an insignificant number of states.
of filing exceeds its cost of filing:

\[ \Pr(\text{DSB NV ruling is } r = FT \mid \sigma^{FT}) \cdot \gamma^*(s) > c^*. \]  

(4.3)

Notice that, contrary to (4.1) which applies for states in \( \sigma^R \), (4.3) reflects the fact that, under Assumption 2, for states in \( \sigma^{FT} \) Home will alter its policy choice of \( \mathcal{R} \) in response to a successful non-violation complaint against it by Foreign (rather than maintaining its policy and paying the required damages \( b(s) \)). Observing that \( \Pr(\text{DSB NV ruling is } r = FT \mid \sigma^{FT}) = (1 - q) \), we may rewrite (4.3) as \( (1 - q)\gamma^*(s) > c^* \). Again to reduce the number of cases we assume that filing costs for Foreign are sufficiently small so that it always files against \( \mathcal{R} \) for states in \( \sigma^{FT} \) (i.e., when \( \mathcal{F}T \) is the first-best policy), regardless of the noise in the DSB signal, or:

\[ \gamma^*(s) > 2c^* \text{ for } s \in \sigma^{FT}. \]

(Assumption 5)

On the other hand, if Home chooses \( \mathcal{P} \) for states in \( \sigma^{FT} \), then Foreign has more filing choices. But it is immediate that Foreign would never (strictly) prefer to file a non-violation claim against \( \tau = FT \) for states in \( \sigma^{FT} \) over a violation claim.\(^{30}\) Moreover, the payoff to Foreign from filing a violation complaint will be positive provided that \( \gamma^*(s) > \frac{c^*}{(1 - q)} \), which is guaranteed by Assumption 5. Hence, the relevant choice for Foreign when Home selects \( \mathcal{P} \) in \( \sigma^{FT} \) is whether to add a non-violation complaint to its violation complaint, which it does when

\[ \gamma^*(s) \geq \frac{c^*}{(1 - q)q} \text{ for } s \in \sigma^{FT}. \]

(4.4)

Consider next the Home government’s Stage-1 policy choice for states in \( \sigma^{FT} \). Here, if Home chooses \( \mathcal{R} \), it will face a non-violation complaint from Foreign and can expect the payoff

\[ \Pr(\text{DSB NV ruling is } r = R \mid \sigma^{FT}) \cdot \gamma^\mathcal{R}(s) - c. \]

On the other hand, if Home chooses \( \mathcal{P} \), then it will face a violation complaint from Foreign if (4.4) fails and can expect the payoff

\[ \Pr(\text{DSB V ruling is } \tau = P \mid \sigma^{FT}) \cdot \gamma^\mathcal{P}(s) - c, \]

\(^{30}\)In fact, Foreign is indifferent between a violation and a non-violation claim against \( \mathcal{P} \) in \( \sigma^{FT} \), and we break this indifference in favor of a violation claim. But Foreign’s preference for the violation claim in these states would be strict if it were assumed that the DSB had even slightly higher accuracy in evaluating violation claims than in evaluating non-violation claims (due perhaps to the extra guidance offered by the contract in the case of violation complaints). We choose to conserve on notation with the assumption that DSB accuracy is the same across violation and non-violation claims, and we then break the resulting Foreign indifference that arises for this case in favor of the violation claim.
while if (4.4) holds then Home will face both a violation and non-violation complaint from Foreign and can expect the payoff

\[ \Pr(\text{DSB V ruling is } \tau = P \mid \sigma^{FT}) \cdot \Pr(\text{DSB NV ruling is } \tau = P \mid \sigma^{FT}) \cdot \gamma^P(s) - 2c. \]

The above payoffs can be used to characterize the Home policy choice for states in \( \sigma^{FT} \). When (4.4) fails this characterization is particularly simple, because Home then faces the same consequences whether it chooses \( P \) or \( R \) (namely, the filing of a single complaint by Foreign which, if successful, will result in \( FT \)), and with Assumption 1 it then follows that Home chooses \( P \) and Foreign files a violation complaint if \( \gamma^P(s) > \frac{c}{q} \) and Home chooses \( FT \) otherwise.

When (4.4) holds, Home’s policy choice is more involved, and it is direct to show that this choice now hinges on the magnitude of \( \theta \), the parameter governing the attractiveness to Home of \( R \) relative to \( P \) in \( \sigma^{FT} \) in accordance with Assumption 1. When \( \theta \) is low, and specifically for \( \theta \in (0, \frac{q}{2}] \), Home will never choose \( R \) over \( P \) as a means of policy intervention in \( \sigma^{FT} \), even though Home’s choice of \( P \) will now trigger the filing of an additional (violation) claim by Foreign. At the other extreme, when \( \theta \) is high, and specifically for \( \theta \in [q, 1) \), Home will always prefer \( R \) to \( P \) because \( R \) is a means of policy intervention in \( \sigma^{FT} \) which can avoid the additional (violation) claim by Foreign that a choice of \( P \) would induce. Finally, for \( \theta \) in the intermediate range of \( \theta \in (\frac{q}{2}, q) \), Home’s preferred instrument of intervention in \( \sigma^{FT} \) varies with \( \gamma^P(s) \).

We may now state:

**Lemma 3.** For \( s \in \sigma^{FT} \) and under Assumption 1-Assumption 2 and Assumption 5,

(i) when \( \gamma^*(s) < \frac{c^*}{(1-q)q} \) Home chooses either \( P \) or \( FT \): Home chooses \( P \) and Foreign files a violation complaint when \( \gamma^P(s) > \frac{c}{q} \); otherwise Home chooses \( FT \).

(ii) when \( \gamma^*(s) \geq \frac{c^*}{(1-q)q} \):

(a) if \( \theta \in (0, \frac{q}{2}] \) Home chooses \( P \) and Foreign files both a violation and a non-violation complaint when \( \gamma^P(s) > \frac{2c}{q^2} \) and Home chooses \( FT \) otherwise;

(b) if \( \theta \in (\frac{q}{2}, q) \) Home chooses \( P \) and Foreign files both a violation and a non-violation complaint when \( \gamma^P(s) > \frac{c}{q(q-\theta)} \), Home chooses \( R \) and Foreign files a non-violation complaint when \( \gamma^P(s) \in (\frac{c}{q\theta}, \frac{c}{q(q-\theta)}) \), and Home chooses \( FT \) otherwise; and

(c) if \( \theta \in [q, 1) \) Home chooses \( R \) and Foreign files a non-violation complaint when \( \gamma^P(s) > \frac{c}{q\theta} \) and Home chooses \( FT \) otherwise.
Summary

Observe that, according to Lemmas 1-3, the outcome for a given state \( s \) is the first-best/efficient outcome if and only if there is no dispute in state \( s \), and there will be no dispute in state \( s \) if and only if the DSB is sufficiently accurate (low \( q \)). That is, as Lemmas 1-3 confirm, when a dispute arises in this model, it is because one of the parties is acting opportunistically to exploit the absence of a complete contract and the inaccuracy of the DSB rulings: either the Foreign country is attempting to force free trade (or the payment of compensation) with an incorrect DSB ruling when the Home-country intervention is in fact efficient, or the Home country is attempting to “get away with” intervention with an incorrect DSB ruling when free trade is in fact the efficient policy. An implication of this observation is that the clearest efficiency-enhancing role of the DSB occurs off-equilibrium.

In addition to the DSB error rate \( q \), note also that the dispute costs \( c \) and \( c^* \), the transfer cost parameter \( \delta \) and the policy substitution parameter \( \theta \) all help to determine our model’s predictions about the frequency of disputes and the kinds of claims filed. In the next section we investigate the range of values for these parameters that yield model predictions consistent with the stylized facts described in section 2, and thereby use our model to offer an interpretation of the stylized facts of violation and non-violation claims in GATT/WTO disputes.

4.2. Accounting for the Minor Role of Non-Violation Complaints

Armed with Lemmas 1-3, we now seek to identify restrictions on the model’s five parameters \( \delta, \theta, q, c^* \) and \( c \), under which the model can deliver outcomes in line with the stylized facts identified in section 2. For this purpose, we will make use of Figures 1, 2, 3(i) and 3(ii), which summarize the content of Lemmas 1, 2, 3(i) and 3(ii) respectively. Figure 1 displays \( \gamma^R(s) \) on the vertical axis and \( \gamma^*(s) \) on the horizontal axis, and depicts outcomes in \( \sigma^R \) for a given \( \gamma^P(s) \). Figure 2 displays \( \gamma^P(s) \) on the vertical axis and \( \gamma^*(s) \) on the horizontal axis, and depicts outcomes in \( \sigma^P \) for a given \( \gamma^R(s) \). And with \( \gamma^P(s) \) on the vertical axis and \( \theta \) on the horizontal axis, Figures 3(i) and 3(ii) depict outcomes in \( \sigma^{FT} \) for \( \gamma^*(s) < \frac{c^*}{(1-q)q} \) and \( \gamma^*(s) \geq \frac{c^*}{(1-q)q} \), respectively. Throughout we take the distributions of \( \gamma^*, \gamma^P \) and \( \gamma^R \) as fixed, with full support on the positive real line. And we assume that the distribution of \( \gamma^* \) is the same over the sets \( \sigma^R, \sigma^P \) and \( \sigma^{FT} \).

We begin with necessary conditions, and use our model to infer from the stylized facts

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31 We note as well that this property is shared by Maggi and Staiger (2011), conditional on the vague contract and interpretive DSB mandate, but Maggi and Staiger also emphasize that it need not hold globally once the choice of contract and DSB mandate is optimized with respect to \( q \).
of GATT/WTO disputes some basic restrictions on the relevant parameter space. We focus initially on Stylized Fact 1: across GATT/WTO disputes in which a ruling of any kind occurs, there are substantial numbers of non-violation claims, but most of these claims are not ruled upon. For our model to deliver outcomes in line with this pattern, there are two requirements.\(^\text{32}\)

The first requirement is that there must be significant numbers of state realizations that fall in \(\sigma^{FT}\) and where Home chooses \(\mathcal{P}\) and Foreign files both a violation and a non-violation complaint. This follows because (i) non-violation claims that are not ruled upon only arise in the model when Home chooses \(\mathcal{P}\), Foreign files both a violation and a non-violation complaint, and the DSB rules that \(\mathcal{P}\) violates the contract; and (ii) while such disputes can arise according to the model in both \(\sigma^{FT}\) and \(\sigma^{P}\), under our assumption that \(q < \frac{1}{2}\) the DSB would rule this way in the majority of disputes of this kind only for the set of these disputes that fall in \(\sigma^{FT}\).

Turning to Figure 3(ii), we label by \(\{\mathcal{P}:\mathcal{V}&\mathcal{NV}\}\) the region of states that fall in \(\sigma^{FT}\) and lead Home to choose \(\mathcal{P}\) and Foreign to file both a violation and a non-violation complaint. It is then clear from Figure 3(ii) that for the model to meet this first requirement it must be that \(\frac{\epsilon^*}{(1-q)\eta}\) is sufficiently small, so that for states in \(\sigma^{FT}\) it is often Figure 3(ii) rather than Figure 3(i) that is relevant; and it must also be that \(\frac{\epsilon}{q\eta}\) is sufficiently small and \(\theta\) is sufficiently small. Together these first three conditions ensure that substantial numbers of states fall in the \(\{\mathcal{P}:\mathcal{V}&\mathcal{NV}\}\) region of Figure 3(ii); the first two of these conditions amount to upper limits on the size of dispute costs; and the small \(\theta\) makes \(\mathcal{R}\) unattractive to Home relative to \(\mathcal{P}\) as a means of terms-of-trade manipulation, which is needed (in particular a level of \(\theta < q\)) to create the possibility that for sufficiently high realizations of \(\gamma^P\) Home chooses to select \(\mathcal{P}\) and induce both a violation and a non-violation complaint even though Home could have chosen \(\mathcal{R}\) and thereby avoided the violation complaint. Finally it must be that \(q\) is sufficiently small. This fourth condition is needed to ensure that, in these disputes, the DSB is sufficiently likely to rule that \(\mathcal{P}\) violates the contract, thereby ensuring that the non-violation claim is not ruled upon.

\(^{32}\)As we have already observed (see note 9) and as Busch and Reinhardt (2000) emphasize, settlement is an important phenomenon in GATT/WTO disputes. It is therefore possible that the paucity of non-violation rulings as described in section 2 could be accounted for by higher settlement rates in disputes involving non-violation claims. In this regard, Maggi and Staiger (2013) provide evidence that, over the WTO-era, settlement rates have indeed been higher in disputes involving non-violation claims than for the typical violation claim; but they also provide evidence that during the GATT era, the reverse is true, with lower settlement rates in disputes involving non-violation claims than for the typical violation claim. Hence, the settlement margin cannot account for the paucity of non-violation rulings over the full GATT/WTO period. We therefore feel justified abstracting from settlement here in order to focus on other distinctive features of the comparison between violation and non-violation claims, though a more complete account would of course incorporate both of these distinctions.
The second requirement for our model to deliver outcomes in line with Stylized Fact 1 is that there cannot be significant numbers of state realizations where Home chooses \( R \) and Foreign files a non-violation complaint, because each of these disputes would lead to a ruling on the non-violation claim. This possibility arises for states in \( \sigma^R \), \( \sigma^P \) and \( \sigma^{FT} \), and corresponds to the region labeled \{R:NV\} in Figures 1, 2 and 3(ii) respectively. Nor can there be significant numbers of state realizations in \( \sigma^P \) where Home chooses \( P \) and Foreign files both a violation and a non-violation complaint (the region labeled \{P:V&NV\} in Figure 2), because with \( q \) small the majority of these disputes would lead to a ruling on the non-violation claim as well.

From Figure 3(ii) it is clear that this second requirement further tightens the small \( \theta \) condition (bringing the maximum permissible \( \theta \) closer to \( \frac{q}{2} \)). From Figure 1, it is also clear that a sufficiently large value of \( \frac{c}{\delta q} \) is needed (so that there is a low likelihood that \( \gamma^*(s) \) could be sufficiently large to fall in the \{R:NV\} region of Figure 1). But as we have already determined that \( \frac{c}{(1-q)q} \) must be sufficiently small to satisfy the first requirement, this second requirement in turn implies that we must have \( \delta \) sufficiently small. With \( \delta \) small, it is then assured that Foreign rarely responds to Home’s selection of \( R \) in \( \sigma^R \) by filing a non-violation complaint, because given that in \( \sigma^R \) Home would never remove \( R \) in response to a successful non-violation claim, the inefficiency of compensation implied by \( \delta \) small ensures that from Foreign’s perspective the claim is only worth filing in these circumstances when \( \gamma^*(s) \) is exceptionally high. Finally, as Figure 2 makes clear, the small-\( \delta \) condition also prevents significant numbers of state realizations in \( \sigma^P \) where Home chooses \( R \) and Foreign files a non-violation complaint or where Home chooses \( P \) and Foreign files both a violation and a non-violation complaint.

We turn next to Stylized Fact 2: conditional on a ruling, the success rate of non-violation claims is low, both in absolute terms and relative to the high success rate of violation claims. Are there any further restrictions on the relevant parameter space that we can infer from this second stylized fact?

Consider first the success rate of non-violation claims. With \( q \) low, non-violation claims in \( \sigma^R \) will mostly fail, and if ruled upon in \( \sigma^{FT} \) they will mostly succeed; and in \( \sigma^P \), non-violation claims will mostly succeed when brought against \( R \) and will mostly fail if ruled upon when brought against \( P \). For the model to deliver a low success rate for non-violation claims with \( q \) low, we must therefore have that the majority of the small number of rulings on non-violation claims that do arise occur in \( \sigma^R \) or in \( \sigma^P \) when \( P \) is chosen, not in \( \sigma^P \) when \( R \) is chosen or in \( \sigma^{FT} \). As can be confirmed with Figures 1 and 2, the small-\( \delta \) restriction can accommodate
a level of $\delta$ that generates a positive-but-small number of non-violation rulings in $\sigma^R$ and an arbitrarily high ratio of non-violation rulings in $\sigma^R$ relative to $\sigma^P$ as long as $q > 0$ (because $\frac{c}{\delta q} < \frac{c}{\delta q(1-q)}$ and, as we have assumed, the distribution of $\gamma^+$ is the same over the sets $\sigma^R$, $\sigma^P$); and Figure 3(ii) confirms that in $\sigma^{FT}$ the number of non-violation rulings can be brought arbitrarily close to zero with a sufficiently small $\theta$ (specifically, a level of $\theta \leq \frac{q}{2}$ will roll out the $\{R:NV\}$ region) and a sufficiently small level of $q$ (which will reduce toward zero the chance that a non-violation ruling will occur in the $\{P:V&NV\}$ region). Hence, no further parameter restrictions beyond a possible tightening of those we have already identified are implied by the low success rate of non-violation claims.

Consider next the success rate of violation claims. Violation claims can only arise in $\sigma^P$ and $\sigma^{FT}$. And with $q$ low, violation claims mostly fail in $\sigma^P$ and mostly succeed in $\sigma^{FT}$. So for the model to deliver a high rate of success for violation claims, we require that they mostly occur in $\sigma^{FT}$ rather than in $\sigma^P$. But as Figures 2 and 3(i) and 3(ii) confirm, within the range of parameters we have already identified a relatively high $c^*$ holds down the number of violation claims in $\sigma^P$ (as captured by the $\{P:V\}$ and $\{P:V&NV\}$ regions in Figure 2) and leads to greater numbers of violation claims in $\sigma^{FT}$ (as captured by the $\{P:V\}$ region in Figure 3(i) and the $\{P:V&NV\}$ region in Figure 3(ii)) provided that $\theta$ is sufficiently small; and within the range of parameters we have already identified a relatively low $c$ has an arbitrarily small impact on the number of violation claims in $\sigma^P$ but leads to greater numbers of violation claims in $\sigma^{FT}$.

Hence, we need $\frac{c^*}{c}$ sufficiently large to generate a dispute selection effect which can deliver the high success rate for violation complaints. An analogous condition is identified by Maggi and Staiger (2011) to explain the relatively high success rate of violation claims in GATT/WTO disputes. Importantly, however, notice that this condition is compatible with the parameter restrictions we have identified above that deliver a low success rate of non-violation claims. Therefore, our discussion here reveals that the high-$\frac{c^*}{c}$ condition leads to a difference in the success rates for violation and non-violation claims: in effect, the relatively low success rate of non-violation claims as compared to violation claims can be understood in our model as a reflection of a dispute selection effect that raises the success rate of violation claims but that is rendered inoperative when it comes to non-violation claims as long as the court is sufficiently accurate, due to the sequencing of DSB rulings on violation and non-violation claims and the implied censoring of DSB rulings on non-violation claims that occurs when the DSB rules that the contract has been violated (obviating the need for a ruling on the non-violation claim).
We conclude that an additional necessary condition for our model to mimic as well Stylized Fact 2 is that $\frac{c^*}{c}$ is sufficiently large. We can now summarize with:

**Proposition 1.** For fixed distributions of $\gamma^*, \gamma^P$ and $\gamma^R$, the following conditions are necessary for the model to generate (a) substantial numbers of non-violation claims, most of which are not ruled upon, and (b) low success rates of non-violation claims conditional on a ruling, both in absolute terms and relative to the high success rate of violation claims: (i) $\delta$ is sufficiently small; (ii) $\theta$ is sufficiently small; (iii) $q$ is sufficiently small; (iv) $\frac{c^*}{(1-q)q}$ is sufficiently small; (v) $\frac{q}{q}$ is sufficiently small, and (vi) $\frac{c^*}{c}$ is sufficiently large.

According to Proposition 1, the minor role of non-violation complaints in GATT/WTO disputes as summarized in Stylized Facts 1 and 2 can be understood through the lens of our model as primarily attributable to two underlying forces, one force that reflects a feature of the GATT/WTO institutional environment – the inefficiency of government-to-government transfers – and a second force that reflects a feature of the policy environment – the low degree of substitutability between border measures and domestic policies as a means of terms-of-trade manipulation. The intuition derives from the fact that, as we have observed above, disputes arise in our model when either the exporter government or the importer government is behaving opportunistically. The exporter’s incentive to use the non-violation claim opportunistically against importer policies that are globally efficient is kept in check by the level of compensation specified under GATT/WTO rules (self-help reciprocity) and the inefficiency of GATT/WTO compensation mechanisms (low $\delta$). And the importer’s incentive to use domestic tax and regulatory policies (which if used, could trigger a non-violation claim) opportunistically for inefficient terms-of-trade manipulation is kept in check by the low degree of substitutability between border measures and domestic policies for this purpose (low $\theta$).

Together these features help to keep the frequency of non-violation rulings low. And given these features, the relatively common occurrence of non-violation claims filed as opposed to ruled upon then reflects the relatively low dispute costs (low $c$ and low $c^*$) and relatively high DSB accuracy (low $q$), which together ensure that there are substantial numbers of GATT/WTO disputes that involve opportunistic policy intervention (the use of $P$, in $\sigma^{FT}$) and elicit the filing of both violation and non-violation claims which usually result in a (correct) DSB ruling in favor of the violation claim and no ruling on the non-violation claim. The high success rate of violation claims then reflects the high accuracy of the DSB (low $q$) and the
relatively high dispute costs faced by the exporter in filing a case (large \( \frac{c}{e} \)), which ensures that most violation claims do not reflect opportunistic behavior on the part of the exporter in \( \sigma^P \) but rather are filed in response to opportunistic behavior by the importer in \( \sigma^{FT} \). And this dispute selection effect is inoperative for rulings on non-violation claims – and so the success rate of non-violation claims conditional on a ruling remains low – as long as the court is sufficiently accurate (low \( q \)), due to the sequencing of DSB rulings on violation and non-violation claims and the censoring of DSB rulings on non-violation claims when violation claims are upheld.

Proposition 1 describes a set of necessary restrictions on parameters that can be inferred from Stylized Facts 1 and 2 according to our model. We next describe additional restrictions on model parameters that together with those described in Proposition 1 are \textit{sufficient} to generate outcomes that mimic these stylized facts. In particular, for fixed distributions of \( \gamma^*, \gamma^P \) and \( \gamma^R \), and beginning from parameter values that meet the restrictions described in Proposition 1, we can set \( \delta > 0 \) but sufficiently small to drive arbitrarily close to zero the probability of state realizations in the \{R:NV\} region of Figure 1 and in the \{P:V&NV\} and \{R:NV\} regions of Figure 2. And by setting \( \theta \leq \frac{q}{2} \), it is then clear from Figure 3(ii) that non-violation claims will arise with positive probability only in the \{P:V&NV\} region of Figure 3(ii), where the probability that these claims are ruled upon can then be brought arbitrarily close to zero by setting \( q > 0 \) but sufficiently small. And finally, with an appropriate choice of \( \delta \) and \( q \) within these ranges, we can then achieve both an arbitrarily small probability of non-violation rulings \textit{and} a success rate for non-violation claims conditional on ruling that is arbitrarily close to \( q \), the success rate for non-violation claims in the \{R:NV\} region of Figure 1 (and with a sufficiently high \( \frac{c}{e} \) still ensuring that the success rate of violation claims remains high).

We may therefore state:

\textbf{Proposition 2.} \textit{For fixed distributions of} \( \gamma^*, \gamma^P \) \textit{and} \( \gamma^R \), \textit{and within the set of parameters described by Proposition 1, if} \( \theta \leq \frac{q}{2} \), \textit{then there exist sufficiently small but strictly positive values for} \( \delta \) \textit{and} \( q \) \textit{such that the model generates (a) both violation and non-violation claims with strictly positive probability, (b) a probability of rulings on the non-violation claims that is arbitrarily close to zero, and (c) a success rate for non-violation claims conditional on rulings that is arbitrarily close to} \( q \) \textit{while the success rate of violation claims remains high.}

In the next section we will use the parameter restrictions described by Proposition 2 as a benchmark for our assessment of the importance of the non-violation clause.
5. Assessing the Importance of the Non-Violation Clause

We next make use of our model to assess the importance of the non-violation clause to the GATT/WTO system as we have modeled it. We do this by comparing model outcomes with and without the non-violation clause under the restricted set of model parameter values described in Proposition 2 that allow our model (with the non-violation clause) to mimic the stylized facts of GATT/WTO disputes.\(^{33}\)

Formally, we now consider the following timing for the model absent the non-violation clause:

Stage 0. The state \(s\) is realized.

Stage 1. Home chooses \(\tau \in \{FT, P\}\) and \(r \in \{FT, R\}\).

Stage 2. Foreign decides whether to file a violation complaint with the DSB.

Stage 3. If invoked, the DSB issues a ruling \(\tau^{DSB} \in \{FT, P\}\).

Stage 4. Payoffs are realized.

As before, we characterize the subgame perfect equilibrium of this game.

Following analogous steps to those described in the derivations of Lemmas 1-3, it is direct to establish:

**Lemma 4.** Absent the non-violation clause, under Assumption 1-Assumption 5 the equilibrium policy choices and filing behavior are as follows:

(i) For \(s \in \sigma^R\) Home chooses \(R\), and Foreign does not file a complaint.

(ii) For \(s \in \sigma^P\) Home chooses either \(P\) or \(R\): if \(\gamma^*(s) \leq \frac{c}{q}\) Home chooses \(P\) and Foreign does not file a complaint; if \(\gamma^*(s) > \frac{c}{q}\) Home chooses \(P\) and Foreign files a violation complaint when \(\gamma^R(s) < (1-q)\gamma^P(s) - c\), otherwise Home chooses \(R\) and Foreign does not file a complaint.

(iii) For \(s \in \sigma^{FT}\) Home chooses either \(P\) or \(R\): if \(\gamma^P(s) > \frac{c}{(q-\theta)}\) Home chooses \(P\) and Foreign files a violation complaint; otherwise, Home chooses \(R\) and Foreign does not file a complaint.

\(^{33}\)To be clear, our goal is not to quantify the value of the non-violation clause, along the lines for example of the quantification exercise in Ossa (2011). Rather our goal here is simply to assess whether an important role for the non-violation clause could be consistent with its weak observed performance measures.
These outcomes are intuitive. In $\sigma^R$ Home always chooses $R$ and Foreign has no basis to file a complaint. In $\sigma^P$ Home chooses $P$ when the harm to Foreign is insufficient to generate a dispute, but when a dispute over $P$ would arise Home switches to a choice of $R$ to avoid the dispute as long as Home’s payoff from $R$ is above a threshold level. And in $\sigma^{FT}$ Home chooses $P$ and triggers a dispute as long as Home’s payoff from $P$ is above a threshold level, while below this level Home chooses $R$ to avoid the dispute.

Notice that, in contrast to Lemmas 1-3 where the non-violation claim is available, Lemma 4 implies that the absence of a dispute in a state is no longer sufficient to indicate that the first-best outcome has been achieved for that state. In particular, when the non-violation claim is unavailable, the absence of a dispute in $\sigma^{FT}$ – and sometimes in $\sigma^P$ – is simply an indication that Home has chosen to avoid a dispute with the selection of $R$ which, without the possibility that Foreign could bring a non-violation claim, Home can do with impunity.

A comparison of Lemmas 1-3 with Lemma 4 reveals a rich set of potential on- and off-equilibrium impacts that the ability to bring non-violation claims can have according to our model. We first catalog and interpret these impacts, beginning with states in $\sigma^R$.

As Lemmas 1 and 4(i) confirm, for states in $\sigma^R$ the impact of the non-violation clause is only present when a non-violation claim is actually filed (i.e., the impact is only on-equilibrium), which occurs whenever $\gamma^*(s) > \frac{c}{s}$. In such states, Foreign will file a non-violation complaint against Home’s choice of $R$ when it has the ability to do so (i.e., in the presence of the non-violation clause), at a cost to joint surplus of $[q(1-\delta)\gamma^*(s) + (c + c^*)] > 0$, reflecting the possibility that the DSB will rule in error and compensation will be paid $(q(1-\delta)\gamma^*(s))$ as well as the direct costs of the dispute $(c + c^*)$. Figure 4(i) depicts, for a given $\gamma^P(s)$, the outcomes described by Lemmas 1 and 4(i) for the relevant range of $\gamma^R(s)$ (on the vertical axis) and $\gamma^*(s)$ (on the horizontal axis). For comparison, outcomes in the presence of the non-violation clause (Lemma 1 outcomes) are displayed inside curly brackets, while outcomes in the absence of the non-violation clause (Lemma 4(i) outcomes) are displayed in square brackets. As depicted, when $\gamma^*(s) \leq \frac{c}{s}$ the first best is achieved in $\sigma^R$ whether or not the non-violation clause is present, but when $\gamma^*(s) > \frac{c}{s}$ the introduction of the non-violation clause leads to filing of non-violation complaints against $R$ and an associated loss in joint surplus.

Consider next states in $\sigma^P$. Here a comparison of Lemma 2 with Lemma 4 (ii) indicates the subtle array of both on- and off-equilibrium impacts of the non-violation clause that are possible in $\sigma^P$ depending on parameters. With $\gamma^R(s)$ on the vertical axis and $\gamma^*(s)$ on
the horizontal axis, Figure 4(ii) depicts these possibilities for a given $\gamma^P(s)$, again using the
convention that outcomes in the presence of the non-violation clause (Lemma 2 outcomes)
are displayed inside curly brackets, while outcomes in the absence of the non-violation clause
(Lemma 4(ii) outcomes) are displayed in square brackets.

As Figure 4(ii) depicts, for $\gamma^*(s) \leq \frac{c^*}{q}$, the first best is achieved in $\sigma^P$ whether or not the
non-violation clause is available. For $\gamma^*(s) \in \left(\frac{c^*}{q}, \frac{c^*}{\delta q(1-q)}\right)$, the first best is not achieved but
the outcome is again the same whether or not the non-violation clause is available, with the
exception of states that also satisfy $\gamma^R(s) \in \left(((1-q)\gamma^P(s) - c, \gamma^*(s))\right)$. Notice that for these states,
the non-violation clause has an interesting off-equilibrium impact: it converts what would have
been an undisputed choice of $R$ into a choice of $P$ that results in a violation complaint. In this
way the non-violation clause can serve a *complementary* role to violation claims (i.e., there are
states of the world in which violation claims are made which would not have been made in the
absence of the non-violation clause), for the simple reason that the presence of the non-violation
clause can cause the Home government to *substitute* into choices over contracted policies which
are themselves susceptible to violation complaints. The associated impact on joint surplus of
this off-equilibrium effect is given by $\left[(1-q)\Gamma^P(s) - \Gamma^R(s) - (c + c^*)\right]$, which can be positive or
negative in $\sigma^P$ but is guaranteed to be positive when $q, c$ and $c^*$ are each sufficiently small.

Figure 4(ii) also depicts the various impacts of the non-violation clause that arise in $\sigma^P$ when
$\gamma^*(s) \geq \frac{c^*}{\delta q(1-q)}$. The possibilities over this parameter range all involve on-equilibrium impacts
of the non-violation clause in which, when it is available, the non-violation complaint is used.
Figure 4(ii) catalogs four distinct on-equilibrium impacts, of which two have a negative impact
on joint surplus (the two for which Home would choose $P$ in the absence of the non-violation
clause) and two can have either a positive or negative impact on joint surplus depending on
parameters (the two for which Home would choose $R$ in the absence of the non-violation clause).
Intuitively, in $\sigma^P$ the on-equilibrium impact of the non-violation clause must reduce joint surplus
if Home would have chosen $P$ in the absence of the non-violation clause, because the non-
violation clause in this case can only work against the chance that the first-best policy will
be implemented; and the on-equilibrium impact of the non-violation clause can increase joint
surplus if Home would have chosen $R$ in the absence of the non-violation clause, because then
the non-violation clause can be used to help secure a policy which is more efficient ($\mathcal{FT}$).

Consider now states in $\sigma^{\mathcal{FT}}$. Here the relevant comparison is between Lemma 3 – the
outcomes in $\sigma^{\mathcal{FT}}$ with the non-violation clause – and Lemma 4(iii) – the outcomes in $\sigma^{\mathcal{FT}}$
without the non-violation clause. We begin by comparing Lemma 3(i), where $\gamma^*(s) < \frac{c^*}{(1-q)q}$, with Lemma 4(iii). For this range of parameters the introduction of the non-violation clause changes outcomes only when it is also the case that $\gamma^P(s) < \frac{c}{(q-\theta)}$ and by Lemma 4(iii) Home would choose $R$ in the absence of the non-violation clause. For this parameter range, only off-equilibrium impacts of the non-violation clause can arise, and there are two possibilities depending on whether $\gamma^P(s) \leq \frac{c}{q}$ or $\gamma^P(s) > \frac{c}{q}$. In the former case, the introduction of the non-violation clause converts an undisputed choice of $R$ into a first-best choice of $FT$ with associated gain in joint surplus equal to $-\Gamma^R(s)$ which is strictly positive in $\sigma^{FT}$; and in the latter case the introduction of the non-violation clause converts an undisputed choice of $R$ into a choice of $P$ that results in a violation complaint, with associated impact on joint surplus given by $[q\Gamma^P(s) - \Gamma^R(s) - (c + c^*)]$ which can be positive or negative but is guaranteed to be positive when $q$, $c$ and $c^*$ are each sufficiently small. Notice that in this latter case, as in $\sigma^P$, the non-violation clause again plays a complementary role to violation claims, in the sense that there are states of the world in which violation claims are made which would not have been made in the absence of the non-violation clause.

When $\gamma^*(s) \geq \frac{c^*}{(1-q)q}$ it is a comparison of Lemma 3(ii) with Lemma 4(iii) that reveals the impacts of the non-violation clause in $\sigma^{FT}$. Here the impact hinges on the value of the parameter $\theta$ in addition to the level of $\gamma^P(s)$. With $\gamma^P(s)$ on the vertical axis and $\theta$ on the horizontal axis, Figure 4(iii) illustrates how the impacts of the non-violation clause vary with $\gamma^P(s)$ and $\theta$ in $\sigma^{FT}$. As before, outcomes in the presence of the non-violation clause (Lemma 3 outcomes) are displayed inside curly brackets, while outcomes in the absence of the non-violation clause (Lemma 4(iii) outcomes) are displayed in square brackets; and for each case, the first entry displays the outcome when $\gamma^*(s) < \frac{c^*}{(1-q)q}$, which we have described just above, and the second entry (after the semi-colon) displays the outcome when $\gamma^*(s) \geq \frac{c^*}{(1-q)q}$. As the second entries reveal, when $\gamma^*(s) \geq \frac{c^*}{(1-q)q}$ both on-equilibrium and off-equilibrium impacts of the non-violation clause are possible in $\sigma^{FT}$, depending on the values of $\gamma^P(s)$ and $\theta$.

Specifically, when $\gamma^*(s) \geq \frac{c^*}{(1-q)q}$ there are now two possible off-equilibrium impacts in $\sigma^{FT}$. One is the same as the first off-equilibrium impact described just above: as Figure 4(iii) depicts, for $\gamma^P(s) \leq \min[\frac{c}{(q-\theta)}, \frac{c}{q\theta}]$, the introduction of the non-violation clause converts an undisputed choice of $R$ into a first-best choice of $FT$ with associated gain in joint surplus equal to $-\Gamma^R(s)$ which is strictly positive in $\sigma^{FT}$. The second possible off-equilibrium impact occurs when $\gamma^P(s) \in (\frac{c}{(q-\theta)}, \min[\frac{2c}{qq}, \frac{c}{q\theta}])$. For this parameter range, the introduction of the non-violation
clause converts a choice of $\mathcal{P}$ that results in a violation complaint into a first-best choice of $\mathcal{FT}$ with associated gain in joint surplus equal to $[-q\Gamma^\mathcal{P}(s) + (c + c^*)]$ which is strictly positive in $\sigma^\mathcal{FT}$. Notice that here the non-violation clause now acts as a substitute for violation claims, in the sense that there are states of the world in which violation claims would have been made in the absence of the non-violation clause but are not made in its presence.

And finally, there are three possible on-equilibrium impacts of the non-violation clause when $\gamma^* (s) \geq \frac{c^*}{(1-q)q}$ in $\sigma^\mathcal{FT}$. A first converts a choice of $\mathcal{P}$ that results in a violation complaint into a choice of $\mathcal{P}$ that results in both a violation and non-violation complaint. As Figure 4(iii) depicts, this possibility occurs for $\theta < q$ when $\gamma^\mathcal{P}(s) \geq \max\left\{\frac{2q}{qq}, \frac{c}{q(q-\theta)}\right\}$, resulting in an impact on joint surplus given by $[-(1-\theta)q\Gamma^\mathcal{P}(s) - (c + c^*)]$ which can be positive or negative, but which approaches 0 when $q$, $c$ and $c^*$ are each sufficiently small. A second possibility converts a choice of $\mathcal{P}$ that results in a violation complaint into a choice of $\mathcal{R}$ that results in a non-violation complaint (and here again the non-violation clause acts as a substitute for violation claims). As Figure 4(iii) depicts, this possibility occurs for $\theta \in (\frac{q}{2}, q)$ when $\gamma^\mathcal{P}(s) \in \left(\max\left\{\frac{c}{q(q-\theta)}, \frac{q}{q(q-\theta)}\right\}, \frac{c}{q(q-\theta)}\right)$, resulting in an impact on joint surplus given by $[-q(1-\theta)\gamma^\mathcal{P}(s)]$ which is strictly negative. And a third possibility converts an undisputed choice of $\mathcal{R}$ into a choice of $\mathcal{R}$ that results in a non-violation complaint. As Figure 4(iii) depicts, this possibility occurs when $\gamma^\mathcal{P}(s) \in (\frac{q}{q\theta}, \frac{c}{q(q-\theta)})$, resulting in an impact on joint surplus given by $[-(1-\theta)\Gamma^\mathcal{R}(s) - (c + c^*)]$ which can be positive or negative in $\sigma^\mathcal{FT}$ but is guaranteed to be positive when $q$, $c$ and $c^*$ are each sufficiently small.

With the set of potential on- and off-equilibrium impacts of the non-violation clause now described, we next impose the parameter restrictions suggested by the observed GATT/WTO dispute behavior according to Proposition 2 to identify those impacts whose significance is consistent with the observed dispute behavior. Two of these parameter restrictions have especially important impacts on the implied value of the non-violation clause. The first is that $\delta$ is sufficiently small to drive arbitrarily close to zero the probability of state realizations in the $\{R:NV\}$ region of Figure 1 and the $\{P:V&NV\}$ and $\{R:NV\}$ regions of Figure 2. But as Figure 4(i) illustrates, with this restriction on the level of $\delta$ we may then conclude that the non-violation clause has no first-order impact on expected joint surplus for states in $\sigma^\mathcal{R}$; and as Figure 4(ii) illustrates, in $\sigma^\mathcal{P}$ the first-order impact on expected joint surplus of the non-violation clause is then restricted to the set of states defined by

$$\sigma^\mathcal{P}_1 \equiv \{s \in \sigma^\mathcal{P} \text{ such that } \gamma^*(s) \in \left(\frac{c^*}{q}, \frac{c^*}{\delta q}\right) \text{ and } \gamma^\mathcal{R}(s) \in ((1-\theta)\gamma^\mathcal{P}(s) - c, \gamma^*(s))\},$$

where what would have been an undisputed choice of $\mathcal{R}$ is converted into a choice of $\mathcal{P}$ that
results in a violation complaint.

The other parameter restriction described in Proposition 2 that is especially important is that \( \theta \leq \frac{q}{2} \). As Figure 4(iii) illustrates, with this restriction on the level of \( \theta \), in \( \sigma^{FT} \) we may then conclude that the impact on expected joint surplus of the non-violation clause is attributable to the impact in five sets of states. Two sets of states, where what would have been an undisputed choice of \( R \) is converted into a first-best choice of \( FT \), are defined by

\[
\sigma_1^{FT} \equiv \{ s \in \sigma^{FT} \text{ such that } \gamma^P(s) \leq \frac{c}{q} \} \quad \text{and} \\
\sigma_2^{FT} \equiv \{ s \in \sigma^{FT} \text{ such that } \gamma^P(s) \in \left( \frac{c}{q}, \frac{c}{q(q - \theta)} \right) \text{ and } \gamma^*(s) \geq \frac{c^*}{(1 - q)q} \}.
\]

A third set of states, where what would have been an undisputed choice of \( R \) is converted into a choice of \( P \) that results in a violation complaint, is defined by

\[
\sigma_3^{FT} \equiv \{ s \in \sigma^{FT} \text{ such that } \gamma^P(s) \in \left( \frac{c}{q(q - \theta)}, \frac{c}{q} \right) \text{ and } \gamma^*(s) < \frac{c^*}{(1 - q)q} \}.
\]

A fourth set of states, where what would have been a choice of \( P \) that resulted in a violation complaint is converted to a first-best choice of \( FT \), is defined by

\[
\sigma_4^{FT} \equiv \{ s \in \sigma^{FT} \text{ such that } \gamma^P(s) \in \left( \frac{c}{q(q - \theta)}, \frac{2c}{qq} \right) \text{ and } \gamma^*(s) \geq \frac{c^*}{(1 - q)q} \}.
\]

And a final set of states, where what would have been a choice of \( P \) that resulted in a violation complaint is converted to a choice of \( P \) that results in both a violation and a non-violation complaint, is defined by

\[
\sigma_5^{FT} \equiv \{ s \in \sigma^{FT} \text{ such that } \gamma^P(s) \geq \frac{2c}{qq} \text{ and } \gamma^*(s) \geq \frac{c^*}{(1 - q)q} \}.
\]

Using these sets and the associated joint surplus measures described above, and recalling that \( p(s) \) denotes the probability that state \( s \) occurs, we now have:

**Proposition 3.** Under the parameter restrictions described in Proposition 2, the impact of the non-violation clause on expected joint surplus is given by

\[
\nabla E[\Omega] \equiv \sum_{s \in \sigma_1^P} p(s)((1 - q)\Gamma^P(s) - \Gamma^R(s) - (c + c^*)) + \sum_{s \in \sigma_4^{FT} \cup \sigma_5^{FT}} p(s)[-\Gamma^R(s)] + \sum_{s \in \sigma_3^{FT}} p(s)[q(\gamma^P(s) - \Gamma^R(s) - (c + c^*)) + \sum_{s \in \sigma_4^{FT}} p(s)[-q\gamma^P(s) + (c + c^*)] + \sum_{s \in \sigma_5^{FT}} p(s)[-((1 - q)q\gamma^P(s) - (c + c^*)].
\]
Together the terms in the expression in Proposition 3 describe four impacts of the non-violation clause whose potential significance is consistent with the observed behavior of GATT/WTO disputes, three off-equilibrium impacts and one on-equilibrium impact. The three off-equilibrium impacts are that, what would have been an undisputed choice of $R$ is converted either to a choice of $P$ that results in a violation complaint (for $\sigma_1^P$ and $\sigma_3^{FT}$) or to a first-best choice of $FT$ (for $\{\sigma_1^{FT} \cup \sigma_2^{FT}\}$); and that, what would have been a choice of $P$ resulting in a violation complaint is converted to a first-best choice of $FT$ (for $\sigma_4^{FT}$). The on-equilibrium impact is that, what would have been a choice of $P$ resulting in a violation complaint is converted to a choice of $P$ that results in both a violation and a non-violation complaint (for $\sigma_5^{FT}$).

The on-equilibrium impact described just above and the first of the described off-equilibrium impacts can either increase or reduce expected joint surplus, while the second and third described off-equilibrium impacts must strictly increase expected joint surplus. Hence, despite the paucity of DSB rulings on non-violation claims and their low rate of success, Proposition 3 indicates that these observed features of GATT/WTO disputes are not inconsistent with a valuable role for the non-violation clause. A stronger conclusion can be stated under further parameter restrictions, which we record in the following:

**Corollary.** Under the parameter restrictions described in Proposition 2 and for $q$, $c$ and $c^*$ sufficiently small, the impact of the non-violation clause on expected joint surplus is strictly positive, and is approximated by

$$\nabla E[\Omega] \cong \sum_{s \in \sigma_1^P} p(s) \cdot [\gamma_P(s) - \gamma_R(s)] + \sum_{s \in \{\sigma_1^{FT} \cup \sigma_2^{FT} \cup \sigma_3^{FT}\}} p(s) \cdot \gamma^*(s) > 0.$$  

Notice that under the conditions of the Corollary, the on-equilibrium impact of the non-violation clause on expected joint surplus goes to zero, and all that is left is a set of off-equilibrium impacts, which under these conditions must be strictly positive, and could potentially be large. These off-equilibrium impacts reflect the set of states for which what would have been an undisputed choice of $R$ in the absence of the NV clause is, in the presence of the NV clause, converted to a choice of $P$ that results in a violation complaint (in $\sigma_1^P$ and $\sigma_3^{FT}$, which under these conditions then secures the first-best policy with near certainty and insignificant dispute costs) or converted directly to a first-best choice of $FT$ (in $\{\sigma_1^{FT} \cup \sigma_2^{FT}\}$).

In effect, then, the Corollary to Proposition 3 describes a world consistent with the observed features of non-violation claims in GATT/WTO disputes and in which the non-violation clause
can nevertheless have important impacts. In this world, governments make efficient market access commitments with contracts over border measures while preserving policy autonomy over domestic taxes and regulations, and the non-violation clause functions mostly off-equilibrium to reroute policy interventions into forms that are explicitly addressed by the GATT/WTO contract and to thereby prevent the circumvention of these market access commitments, a function that is in line with the role emphasized by economists (see, e.g., Bagwell and Staiger, 2001, and Staiger and Sykes, 2011) and legal scholars (see, e.g., Petersmann, 1977, p. 172) and envisioned by the drafters of GATT (see, e.g., Hudec, 1990).

6. Conclusion

The non-violation claim was a major focus of the drafters of GATT in 1947, and its relevance was revisited and reaffirmed with the creation of the WTO in 1995. According to the terms-of-trade theory of trade agreements, it has an important role to play in facilitating the success of the “shallow integration” approach that the GATT/WTO has adopted. Yet despite the prominence given to non-violation claims by the GATT drafters and suggested by economic theory, in practice the observed performance of the non-violation complaint has been weak. In this paper we have developed a model of non-violation claims in trade agreements, demonstrated that it can account for the observed features of the use and outcomes of non-violation claims, and shown that the weak performance measures of observed non-violation claims are not inconsistent with a valuable role for the non-violation clause in the GATT/WTO.

To derive these results we have simplified along a number of important dimensions. In this light, we conclude by discussing some of the most important directions for future work.

We have relied on salient institutional features of the GATT/WTO to guide our modeling of violation and non-violation claims, but we have not shown that these features could be optimal in the environment that we consider. An important direction for future work is to push in this direction. For example, in our model as in the GATT/WTO dispute system, the Foreign government (complainant) is allowed to choose both whether to file against a Home government policy and what claims to bring. Given that in our model the Foreign government knows more in any state about the true payoff level of the Home government than does the DSB, and therefore knows more in any state about the likely Home policy response to a successful non-violation (liability rule) claim, it seems possible that it could indeed be optimal to delegate these decisions to the complainant (rather than, for example, letting the complainant make the
decision of whether or not to initiate a dispute but allowing the DSB to choose the claims to investigate). The optimality of these and other features are worthy of formal investigation.

We have ruled out the use of ex-post transfers to settle disputes. As we have indicated however (see notes 9 and 32), while efficient transfer mechanisms in the context of GATT/WTO dispute resolution are typically unavailable, settlement is nevertheless an important part of the GATT/WTO dispute resolution process in practice. Moreover, as Maggi and Staiger (2015) have shown, allowing for ex post renegotiation in the presence of costly transfers can generate interesting predictions about the optimality of liability versus property rules in the GATT/WTO system. Hence, both because settlement features prominently in GATT/WTO dispute resolution, and because allowing for settlement in the model could pave the way for establishing conditions under which it would be optimal to design certain (violation) claims as property rules and other (non-violation) claims as liability rules, the introduction of settlement possibilities into our model is an important if challenging direction for future research.

As we have indicated (see note 14), we have modeled violation complaints as property rules, but in reality the distinction for violation complaints in the GATT/WTO between property and liability rules is less clear cut than we have assumed. Thus, an important question is how our results might change under the alternative assumption that both non-violation and violation claims were treated as liability rules. Here it is straightforward to show that nothing would change under this alternative assumption for states in \( \sigma^R \) or \( \sigma^{FT} \). And for states in \( \sigma^P \), we can show that the probability of states in the \{R:NV\} region must drop under this alternative, for the intuitive reason that in the range of states where only one claim would be filed there is now no benefit for Home to switch to \( R \) so as to avoid a violation claim on \( P \), and similarly in the range of states where \( P \) would induce the filing of both a violation and non-violation claim there is now less of a reason for Home to switch to \( R \). And if the DSB is accurate enough, we

\[ ^{34}\text{Intuitively, the Foreign government uses its knowledge of the Home government payoff from protection in a given state in deciding whether or not to add a non-violation claim on top of the violation claim, and the Foreign government therefore tends to tilt its use of the non-violation claim toward states where protection is inefficient (and hence where a successful non-violation claim would result in the removal of protection) and away from states where protection is efficient (and hence where a successful non-violation claim would simply result in compensation), something that the DSB would not be capable of doing on its own.} \]

\[ ^{35}\text{A related question is whether the institution we have considered would dominate simple alternative contracting options under reasonable conditions. Here again it is plausible that the answer could be yes. For instance, in the low-}\ (c, c^*, q, \delta) \text{ environment that we emphasize, our institution would dominate a simple liability-rule type contract of the form “make any domestic regulatory choices you want but if you regulate you must compensate.” Similarly, our institution would dominate a blanket laissez faire rule of the form “no domestic regulation allowed” provided that the set } \sigma^R \text{ is large.} \]
can show that this is sufficient to ensure that the success rate of non-violation claims is higher when the violation claim is also modeled as a liability rule. Hence, while a complete exploration of this extension is beyond the present paper, our preliminary investigation indicates that it yields some interesting further predictions.\(^{36}\)

As we discuss in more detail in Staiger and Sykes (2013), our formal model is too narrow to capture a number of additional avenues that may be important for understanding the observed performance of non-violation claims in the GATT/WTO. These include the possibility of adding policies to the contract over time (as well-illustrated by the evolution of the treatment of domestic subsidies in the GATT/WTO—see Sykes, 2005), allowing the level of DSB accuracy to depend on the level of guidance given to it by the contract (so that DSB accuracy in the context of violation claims might be naturally higher than DSB accuracy in the context of non-violation claims), and considering in depth both the optimality and the practicality of setting the level of damages equal to the harm suffered by the claimant in the dispute. We see each of these avenues as representing a promising direction for future research.

And finally, as we observed in the Introduction, from the broader perspective of contract incompleteness non-violation claims are remarkable in part because they appear to be unique to the GATT/WTO system and absent from other treaty regimes and private contracts. Our finding that the non-violation clause may well play an important role in the GATT/WTO despite the minor role of non-violation claims in observed disputes therefore raises the question whether such clauses could be useful as a response to contract incompleteness in other contexts, and if not, why not. This, too, seems an important topic for future research.

7. References


\(^{36}\)For example, the success rate of non-violation claims appears to have been higher in the GATT era than it has been since the creation of the WTO; and many legal scholars (e.g., Jackson, 2007) argue that GATT violation claims were treated as liability rules at least in the early GATT era but transitioned largely to a system of property rules by the WTO era. The finding we have just described could thus contribute to a possible explanation for this evolution in the success of non-violation claims in the GATT/WTO.


Figure 1: \( s \in \sigma^R \) for fixed \( \gamma^P(s) \)
Figure 2: \( s \in \sigma^P \) for fixed \( \gamma^P(s) \)
Figure 3(i): $s \in \sigma^{FT}$ for $\theta \in (0,1)$ and $\gamma^* < \frac{c^*}{(1-q)q}$
Figure 3(ii): $s \in \sigma^{FT}$ for $\theta \in (0,1)$ and $\gamma^* \geq \frac{c^*}{(1-q)q}$
Figure 4(i): $s \in \sigma^R$ for fixed $\gamma^P(s)$
Figure 4(ii): $s \in \sigma^P$ for fixed $\gamma^P(s)$
Figure 4(iii): \( s \in \sigma^{FT} \) for \( \theta \in (0,1) \)

Note: the entry before the semi-colon displays the outcome when \( \gamma^* (s) < \frac{c^*}{(1-q)q} \) and the entry after the semi-colon when \( \gamma^* (s) \geq \frac{c^*}{(1-q)q} \).