Legislated Protection and the WTO*

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Abstract

Tariff bindings and administered protection are two characteristics of the WTO that are little understood. Tariff bindings place a ceiling on tariffs that is not always reached, while administered protection ensures that all sectors have access to some minimum import protection, effectively creating a floor for protection. How do these policies affect applied MFN tariff rates that are enacted through the legislature? More specifically, can these policies embolden legislatures to enact lower applied tariffs? I address this question using a model of tariffs determined by a dynamic legislative process. I show existence of a set of symmetric Markov perfect equilibria in which a low level of protection is a possible outcome, and show that it is more difficult to achieve this outcome with tariff bindings and easier to achieve with administered protection, than it is under purely legislated protection.

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1 Introduction

How does the WTO affect tariffs that are enacted by a domestic legislature? The main objective of the WTO is to reduce tariffs among its member countries. It does this by facilitating the negotiation of tariff limits (or bindings) among members, and allowing domestic governments the freedom to set their applied MFN tariff rates within those limits. Since a high tariff in one industry benefits producers in that industry at the expense of all consumers, a broad-based tariff reduction can only come about through a compromise among industries. What effect does the WTO have on the ability of legislatures to reach the political compromise necessary to enact lower applied tariffs?

I first present a formal model of tariff determination through the legislative process and ask under what circumstances will the legislative process result in low applied MFN tariffs. I develop a dynamic model of a small open economy. Within the economy there are legislative districts that specialize in different industries. Individuals in each district are identical, so preferences of elected representatives reflect the preferences of all members of the district. These members have preferences for high tariffs on the good produced in their district and negative tariffs (import subsidies) on all other goods. In this model such preferences lead to dead-weight losses because of losses in consumer surplus, whereas free trade is the utilitarian optimum.

Each period trade policy is determined through the legislative process as a game among locally elected representatives. A trade policy vector is proposed by a randomly selected legislator and is passed by a majority vote. If the current period’s proposal fails to achieve a majority vote, the previous period’s tariff vector remains effective. This stylized legislative process is common in the literature on legislative bargaining. It was introduced by Baron and Ferejohn (1989) who argued that, with a large number of legislators, each seeking to put forward his own policy, a legislative process that does not favor a particular legislator will result in a randomly selected proposer each period. This is entirely appropriate in the context of trade policy, as legislators are constantly vying for protection for their industry. By modeling each district with a single industry I provide the starkest possible representation of trade policy conflict. In trade policy, a reversion to the status quo tariff reflects the fact

\footnote{Applied MFN (Most Favored Nation) tariffs are those generally applied to all members of the WTO by another WTO member.}
that trade policies remain effective until amendments are passed by the legislature.

I show that a set of equilibria exists in which low applied tariffs — defined as an outcome where all districts, except one, maximize their joint stage utility, resulting in low positive tariffs for all but a single industry — is a possible outcome of the legislative process. However this equilibrium is dependent on initial conditions. For initial conditions that closely resemble free trade, the outcome will be low applied tariffs, whereas for any other set of conditions the outcome will be a biased outcome — where each period a single industry receives high protection, and all other industries receive negative protection.\(^2\)

Given this model of legislated trade policy, I consider the impact on the equilibrium outcome of two characteristics of the WTO. The first is tariff bindings when they are set well above applied rates. This applies mainly to developing countries who negotiate tariff bindings well above applied rates to comply with WTO requirements. Negotiations over tariff bindings are usually conducted by an executive branch of the government, whereas applied MFN tariffs are set by a domestic legislature who view the tariff bindings as an exogenous ceiling. The second characteristic considered is administered protection, for example, anti-dumping duties. This ensures that all sectors have access to some minimum import protection, effectively creating a floor for applied tariffs. I show that tariff bindings decrease the set of initial conditions that result in low applied tariffs, but low levels of administered protection expands the set of initial conditions that results in low applied tariffs.

The intuition for the result is as follows. To sustain an equilibrium in which low applied rates are possible, there must be a threat of spiralling towards the biased outcome. The biased outcome therefore acts as a “punishment”, because it results in a lower long-run payoff than low applied tariffs.\(^3\) Tariff bindings essentially impose a ceiling on protection allowed to all industries thereby making the biased outcome less biased. This increases the expected payoff to the biased outcome hence increases the incentive to enact the biased tariffs versus low applied tariffs.

Administered protection, on the other hand, essentially imposes a floor on tariffs applied to any industry in equilibrium. In order to achieve a biased outcome, leg-

\(^2\)By a re-normalization, this can be interpreted as no protection.

\(^3\)Note that this is not a punishment in the traditional “trigger strategy” sense since it is the equilibrium outcome in some cases.
islators will cherry-pick minimum winning coalitions and freeze out the remaining legislators by reducing tariffs on their industries. Placing a floor on tariffs raises the cost of freezing out legislators, hence decreases the incentive to go to the biased outcome. It should be noted that if administered protection is sufficiently large, or tariff bindings sufficiently low, the equilibrium breaks down. This is consistent with the fact that bindings set low enough result in low applied tariffs trivially.

Little formal work has been done to examine the equilibrium effects of administered protection and tariff bindings, and even less has been done to look at protection as an outcome of the legislative process. Mayer (1984) looks at tariff determination through direct democracy, where citizens vote directly over the formation of tariff policy rather than having elected representatives decide it through a dynamic legislative process. He focuses on the effects of voter eligibility rules and shows how actual tariff policy may reflect the preferences of a small minority of well-endowed citizens. Anderson (1992) considers the impact of the prospect of administrative protection on a country’s incentives to export, and the protectionist response of the exporting country. Thus Anderson (1992) argues that administrative protection in the domestic country may have the adverse effect of encouraging protectionism in the exporting country. Bagwell and Staiger (1990) develop a model that explains administered protection. They consider two countries’ governments setting trade taxes to maximize national welfare, and show that when future trade volumes are uncertain, equilibrium tariffs will be high when trade volumes are high. I do not provide here a model that explains the existence of administered protection and tariff bindings. I provide a model that determines MFN tariffs as decided through the legislative process, and assess the effect of temporary administered protection and tariff bindings on applied MFN tariffs. Grossman and Helpman (2004) discuss the protectionist bias of majoritarian politics, but focus on intra-party incentives to maintain protection. This paper argues, conversely, that a legislative process characterized by a majority voting rule can sustain low tariff levels, and need not be biased towards protectionism. When combined with administered protection, the legislation may in fact have a greater likelihood of maintaining low tariffs.

Anderson (1992) and Bagwell and Staiger (1990) consider the effect of administered protection on the non-cooperative interaction between two countries while Grossman and Helpman (2004) consider trade policy determination as the result of interaction within political parties. This paper is a first attempt to model trade pol-
icy determination as the outcome of a legislative process combined with administered protection, and tariff bindings.

Kucik and Reinhardt (2007), in a recent empirical paper consider evidence for what they call the “efficient breach” hypothesis. This is in a sense what Bagwell and Staiger (1990) find theoretically. When states can temporarily be excused from contractual obligations, it promotes greater cooperation. He further shows that WTO members with stronger anti-dumping laws in place sustain lower applied tariffs. This mirrors the result I show for administered protection.

The model of the legislative process I follow is similar to that in Baron and Ferejohn (1989), Dixit, Grossman and Gul (2000), Kalandrakis (2003), Kalandrakis (2004), and Bowen and Zahran (2009). Policies in these papers are purely distributive, allocating a share of a fixed surplus each period to legislators. Trade policy, in contrast, is a multi-dimensional public good. A positive tariff on any good imposes negative externalities on all industries through losses in consumer surplus, but creates a benefit to the industry on which the tariff is applied through gains in producer surplus. This paper is therefore the first to show that an equilibrium exists in a dynamic status quo game for a multi-dimensional public good. Baron (1996) showed the existence of an equilibrium with a single-dimensional public good.

The remainder of the paper is organized as follows: Section 2 presents the model of a dynamic endowment economy and derives preferences of individuals in different legislative districts over trade policies. Section 3 specifies the legislative process, and section 4 characterizes a Markov perfect equilibrium of the game. In sections 5 and 6 I modify the model to introduce the effects of tariff bindings and administered protection, and present the main propositions. Section 7 concludes.

2 The Economy

A small open economy produces \( K + 1 \) goods, \( k = 0, 1, \ldots, K \) each period over an infinite horizon. Let \( y_k \) be the total output in sector \( k \) in each period. The production technology is such that one unit of each good requires one unit of a sector specific factor, hence \( y_k \) is also the total endowment of the factor used specifically in sector \( k \) in each period. All goods are traded. Good zero is the freely traded numeraire with price, \( p_0 = 1 \). All other goods, \( k = 1, \ldots, K \), have world price \( p_k^* \). These prices
are exogenously given and constant each period. The domestic price of each of the non-numeraire goods is the world price, \( p^*_k \), plus a specific tariff, \( \tau^t_k \), so \( p^t_k = p^*_k + \tau^t_k \). The vector of specific tariffs in period \( t \), \( \tau^t \), is determined by the legislative process at the beginning of the period, and once a tariff policy is selected, individuals make consumption decisions.

There are \( N \) citizens in the economy who live in \( K \) legislative districts, each having an equal number of citizens. A citizen in legislative district \( k \) is endowed with \( \frac{y_0}{N} \) units of the factor used in the numeraire sector and \( \frac{u_k K}{N} \) units of the factor used in non-numeraire sector \( k \) each period. Hence legislative district \( k \) is the exclusive producer of non-numeraire good \( k \). To simplify the calculations, I assume that the legislative districts are symmetric.

**Assumption.** Legislative districts are symmetric such that,

(a) output in each legislative district is \( y_k = y \) for all \( k \),

(b) the world price of each good is \( p^*_k = p^* \) for all \( k \).

Consumption of good \( j \) is given by \( c_j \). Each period, a citizen’s quasi-linear preferences are given by

\[
U(c) = c_0 + \sum_{j=1}^{K} u(c_j),
\]

with \( u(c_j) = \beta c_j - \frac{1}{2} c_j^2 \) and \( \beta \) is an exogenous constant. An individual from legislative district \( k \) derives income from his allocation of the numeraire factor plus his allocation of non-numeraire factor \( k \), so total factor income is \( \frac{1}{N}(yp_k K + y_0) \). Government revenue derived from tariffs is evenly rebated to individuals. Government revenue from tariffs for each individual is therefore \( \frac{1}{N} \sum_{j=1}^{K} \tau_j (Nc_j - y) \). So individuals maximize utility from consumption subject to the budget constraint

\[
\sum_{j=1}^{K} p_j c_j + c_0 = \frac{1}{N} \left[ (yp_k K + y_0) + \sum_{j=1}^{K} \tau_j (Nc_j - y) \right].
\]

Each individual’s demand for non-numeraire good \( j \) is given by \( c_j = \beta - p_j \), hence, given a tariff vector, \( \tau \), an individual from district \( k \) has indirect utility

\[
\nu^k(\tau) = \frac{2 \beta y}{N} - \sum_{j=1}^{K} \left[ \frac{\tau^2}{2} + \frac{\tau y}{N} \right] + \lambda, \tag{1}
\]
where \( \lambda \) is a constant.

Any trade policy vector that is legislated will be such that payoffs to that vector will lie on the Pareto-frontier. That is, legislated tariffs will maximize a weighted sum of the utilities of all districts. The reason is that if there is a tariff policy that would be accepted by the legislature such that payoffs do not lie on the Pareto frontier, then the proposing legislator could do better by choosing a payoff that does lie on the frontier, while holding everyone else’s payoff constant. Note that payoffs that lie on the Pareto frontier do not imply that there are no deadweight losses induced by the corresponding tariff vectors. The only tariff vector that does not involve deadweight losses is the free trade vector which weights everyone’s utility equally. Denote the set \( T \subset \mathbb{R}^K \) as the set of trade polices that correspond to payoffs on the Pareto frontier, that is

\[
T = \{ \tau \in \mathbb{R}^K : \tau = \arg \max \sum_{j=1}^{K} \phi_j v_j(\tau), \forall \phi_j \in [0, 1] \text{ s.t. } \sum_{j=1}^{K} \phi_j = 1 \}. 
\]

Lemma 1 proves that tariff vectors in the set \( T \) sum to zero. This will allow the application of an existing result by Bowen and Zahran (2009) in the characterization of a Markov perfect equilibrium.

**Lemma 1.** All tariff vectors in the set \( T \) satisfy

\[
\sum_{k=1}^{K} \tau_k = 0. \tag{2}
\]

**Proof.** Tariff vectors in \( T \) are given by

\[
\arg \max \sum_{j=1}^{K} \phi_j \left[ \frac{\tau_j y_K}{N} - \sum_{m=1}^{K} \left( \frac{\tau_m}{2} + \frac{\tau_m y}{N} \right) + \lambda \right].
\]

The first order condition for an arbitrary tariff, \( \tau_k \), satisfies

\[
\phi_k \left( \frac{yK}{N} \right) - \left( \tau_k + \frac{y}{N} \right) \sum_{j=1}^{K} \phi_j = 0.
\]

Since \( \sum_{j=1}^{K} \phi_j = 1 \), we can rearrange this expression to obtain the value of an arbitrary tariff on the Pareto frontier, \( \tau_k \), as

\[
4 \lambda = \frac{y y}{N^2} + K \left[ \frac{\bar{p}^* y}{N} + \frac{1}{2}(\beta - p^*)^2 \right].
\]
\[ \tau_k = \frac{y}{N}(\phi_k K - 1). \]  

(3)

Hence the sum of these tariffs is given by

\[ \sum_{k=1}^{K} \tau_k = \frac{y}{N} \sum_{k=1}^{K} (\phi_k K - 1). \]

Using again that \( \sum_{j=1}^{K} \phi_j = 1 \) we have the result. \( \blacksquare \)

Since these tariffs sum to a constant they can be conveniently represented in a \((K - 1)\)-dimensional simplex. In the case of 3 legislators the 2-dimensional simplex is as in Figure [1].

![Figure 1: Tariffs Corresponding to the Pareto Frontier](image)

The vertices represent a tariff vector where a single district maximizes his utility at the expense of all other districts, that is, \( \phi_k = 1 \) for some \( k \). Denote this vector as \( \tau^{xz} \). Let \( \tau^x \) be the tariff awarded to district \( k \). By equation (3), \( \tau^x = \frac{y}{N} [K - 1] \), and it is the maximum value any tariff on the Pareto frontier will take. Let \( \tau^z \), or the loser tariff, be the tariff awarded to all other goods \( j \neq k \). For these industries the Pareto weight is \( \phi_j = 0 \), hence by equation (3), \( \tau^z = -\frac{y}{N} \). This is the minimum value any tariff on the Pareto frontier will take. Since this tariff vector awards a high tariff to a single industry, I will denote it as the biased tariff vector.

The centroid of the simplex represents the free trade tariff vector with \( \phi_k = \frac{1}{K} \) for all \( k \). The free trade tariff vector is the utilitarian optimal, so the further trade policy is from the centroid, the higher are the deadweight losses.
3 Legislative Process

Tariff policy is determined by the legislative process in each period. Elections are held within each district to select a local representative. Local representatives form the legislature, and the legislature meets every period to determine tariff policy. Let $\mathbb{K}$ denote the set of legislators, one from each district. Since agents from district $k$ are identical the representative from district $k$ will have the same preferences as all other members of his district. Preferences for legislator $k$ over tariffs in each period are given by equation (1). When choosing tariff policy in period $t$ legislator $k$ therefore maximizes his expected discounted utility given by

$$
(1 - \delta)E \left[ \sum_{t=1}^{\infty} \delta^{t-1} v^k(\tau^t) \right].
$$

where $\tau^t = \{\tau^t_1, \ldots, \tau^t_K\} \in \mathbb{T}$ is the vector of trade tariffs for each of the non-numeraire sectors in period $t$.

At the beginning of each period a legislator, $x^t \in \mathbb{K}$, is randomly recognized to make a tariff vector proposal for that period. Legislators are recognized with equal probability in each period. The recognized legislator, $x^t$, makes a tariff proposal, $q^t \in \mathbb{T}$, which is voted on by all legislators, each legislator having a single vote. A simple majority of votes is required for a proposal to be implemented, hence the proposer requires $\frac{K}{2}$ legislators (including the proposer) to be in agreement. If the proposal fails to achieve $\frac{K}{2}$ legislators’ vote, the status quo tariff policy, $\tau^{t-1}$, prevails.

4 Markov Perfect Equilibrium

I seek a Markov perfect equilibrium (MPE) of this game. An MPE is a subgame perfect equilibrium in Markov strategies. Markov strategies condition only on the portion of history that is relevant to current period payoffs. I focus on Markov strategies because legislatures are typically large and characterized by periodic turnover. Coordinating strategies on complicated histories becomes difficult, and somewhat implausible. To take into account any lack of institutional memory I assume that

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5The implicit tie-breaking rule is that ties go in favor of the proposer. This is for simplicity and does not affect results qualitatively.
legislators condition strategies on the simplest history possible, which is the payoff-relevant history. The payoff relevant variables in this model are the status quo tariff policy, \( \tau_t^{-1} \), and the identity of the proposing legislator, \( x^t \). I summarize these payoff relevant variables as the state variable \( \omega^t = (\tau_t^{-1}, x^t) \in \mathcal{T} \times \mathcal{K} \).

Each legislator’s strategy is a pair \( (\alpha_k, \sigma_k) \) such that \( \alpha_k \) is legislator \( k \)'s acceptance strategy and \( \sigma_k \) is legislator \( k \)'s proposal strategy, so a strategy profile is given by \( (\alpha, \sigma) \). A proposal strategy for legislator \( k \), \( \sigma_k(\omega^t) \), is a tariff proposal for each sector, \( q^t \). Given a proposal, \( q^t \), an acceptance strategy for legislator \( k \) is a binary function \( \alpha_k(\omega^t; q^t) \) such that

\[
\alpha_k(\omega^t; q^t) = \begin{cases} 
1 & \text{if legislator } k \text{ accepts proposal } q^t, \\
0 & \text{if legislator } k \text{ rejects proposal } q^t.
\end{cases}
\]

I seek a notion of symmetry for the legislators’ strategies reflecting the fact that any legislator \( k \) will be expected to behave in the same manner as legislator \( j \) if he was in legislator \( j \)'s position. More concretely, define the one-to-one operator, \( \Phi : \mathcal{K} \to \mathcal{K} \) that represents any permutation of the identity of the legislators. Given a proposed vector of tariffs, \( q^t = (q^t_1, \ldots, q^t_K) \), and permutation \( \Phi(\cdot) \), I denote the resulting permuted vector of proposed tariffs as \( q^t_\Phi = (q^t_{\Phi(1)}, \ldots, q^t_{\Phi(K)}) \). A permutation of the state variable \( \omega^t = (\tau_t^{-1}, x^t) \) is therefore denoted \( \omega^t_\Phi = (\tau_t^{-1}_\Phi, \Phi(x^t)) \), and a symmetric strategy profile is given by the following definition.

**Definition 1.** A strategy profile \( (\alpha, \sigma) \) is symmetric if for any permutation of the identities of legislators, \( \Phi : \mathcal{K} \to \mathcal{K} \),

\[
\alpha_k(\omega^t; q^t) = \alpha_{\Phi(k)}(\omega^t_{\Phi}; q^t_{\Phi}), \quad \text{and} \\
\sigma_j(\omega^t) = \sigma_{\Phi(j)}(\omega^t_{\Phi}).
\]

The dynamic payoff for any legislator \( k \), given a strategy profile, \( (\alpha, \sigma) \), and a state \( \omega^t \) is,

\[
V_k(\alpha, \sigma; \omega^t) = (1 - \delta)v^k(\tau^t) + \delta E_{t+1}[V_k(\alpha, \sigma; \omega^{t+1})].
\]

Where \( \tau^t = \sigma_{x^t}(\omega^t) \) if the proposal receives the required majority of votes, otherwise the policy reverts to the status quo, and \( \tau^t = \tau^t_{t-1} \). A Markov perfect equilibrium
strategy profile must maximize this dynamic payoff for all legislators, for all possible states and must be a best response to any history contingent strategy played by any other legislator. I focus on symmetric strategies, hence I define a symmetric Markov perfect equilibrium formally as follows.

**Definition 2.** A symmetric Markov Perfect Equilibrium (MPE) is a symmetric strategy profile, \((\alpha^*(\omega^t; q^t), \sigma^*(\omega^t))\), such that for all \(\omega^t \in \mathbb{T} \times \mathbb{K}\), for all \((\alpha_k(h^t; q^t), \sigma_k(h^t))\), for all \((h^t, q^t)\), and for all \(k\),

\[
V_k(\alpha^*, \sigma^*; \omega^t) \geq V_k(\alpha_k(h^t; q^t), \alpha^*_{-k}, \sigma^*; \omega^t)
\]

and

\[
V_k(\alpha^*, \sigma^*; \omega^t) \geq V_k(\alpha^*, \sigma_k(h^t), \sigma^*_{-k}; \omega^t),
\]

where \(h^t\) represents any history of the state \(\omega^t\).

The first proposition of the paper states that a symmetric Markov perfect equilibrium exists in which low applied MFN tariffs is a possible outcome. The **low applied MFN tariff vector** is defined as a tariff vector on the Pareto frontier that gives equal Pareto weights to a coalition of legislators consisting of all legislators except one.

**Definition 3.** The low applied MFN tariff vector, \(\tau^{cz}\), satisfies for a coalition of \(K - 1\) legislators, \(\phi_c = \frac{1}{K-1}\), and for some other legislator, \(z\), \(\phi_z = 0\).

Lemma 2 characterizes the low applied MFN tariff vector.

**Lemma 2.** Under the low applied MFN tariff vector, coalition members receive tariff, \(\tau^c = \frac{y}{N(K-1)}\), for their industry and the remaining legislator’s industry receives tariff \(\tau^z = -\frac{y}{N}\).

**Proof.** From equation 3, substituting \(\phi_c = \frac{1}{K-1}\) gives \(\tau^c = \frac{y}{N(K-1)}\), and substituting \(\phi_z = 0\) gives \(\tau^z = -\frac{y}{N}\). ■

In the case of three legislators, the three possible low applied MFN tariff vectors are illustrated in Figure 2.

We focus on the low applied tariff vector, \(\tau^{cz}\), because it allows us to use an existing result on dynamic legislative compromise established by Bowen and Zahran (2009). That paper showed how compromise may be achieved in a setting where
Figure 2: The Low Applied Tariff Class

legislators are bargaining over distributive policy which lies in the $K - 1$ dimensional simplex. Compromise in that paper is defined as when $K - 1$ legislators distribute benefits equally and it is the first to show how compromise may be achieved in a dynamic legislative game with an endogenous status quo. Trade policy, and in particular, free trade, is by nature a compromise among industries. The result in Bowen and Zahran (2009) is therefore a natural place to start as we seek to understand how free trade (or something close to it) may arise out of a dynamic legislative bargaining game. Note that free trade would correspond to an equal division of benefits in that paper, but Bowen and Zahran (2009) show that this is not a possible outcome using the equilibrium strategies. Proposition 1 is essentially the application of this result.

**Proposition 1.** There exists a non-degenerate interval $[\delta, \bar{\delta}]$, such that for all $\delta \in [\delta, \bar{\delta}]$ a symmetric MPE exists in which low applied tariffs may be legislated each period.

In the next section I characterize the Markov perfect equilibrium of this game in which low applied tariffs is a possible outcome applying the strategies of Bowen and Zahran (2009).

4.1 Equilibrium Characterization

Define the partition of tariff vectors $\mathbb{T}_\theta \subset \mathbb{T}$ to be such that a number, $\theta$, of industries receive a tariff that is equal to the loser tariff. That is

$$\mathbb{T}_\theta \equiv \{ \tau \in \mathbb{T} : |\{ k \in \mathbb{K} : \tau^k = \tau^* \}| = \theta \}$$
The set $\mathbb{T}_{K-1}$ therefore represents all permutations of the biased tariff policy. Denote the entire set of low level tariff vectors as $\mathbb{T}_1 \subset \mathbb{T}_1$.

Let the stage game payoff from the biased policies be given as $v^x(\tau^{xz})$ for the district receiving $\tau^x$, and $v^z(\tau^{xz})$ for the losers. These represent the highest and lowest payoffs that will be legislated. For simplicity, I normalize $v^z(\tau^{xz}) = 0$, which implies $v^x(\tau^{xz}) = (\frac{xK}{N})^2$.

The payoffs to the low applied vector, $\tau^{cz}$, are given as $v^c(\tau^{cz})$ for coalition members and $v^z(\tau^{cz})$ for the loser. These are

\[
\begin{align*}
  v^c(\tau^{cz}) &= \frac{y^2K^3}{2N^2(K-1)}, \text{ and} \\
  v^z(\tau^{cz}) &= \frac{y^2K^2(K-2)}{2N^2(K-1)}.
\end{align*}
\]

The equilibrium in Bowen and Zahran (2009) is such that, if initial trade policies are close to free trade, the sustained outcome is the low applied tariff outcome, whereas for all other initial tariffs, the outcome will be biased policies. The set of initial tariff policies that lead to low applied tariffs, $\Gamma$, is indicated by the shaded region in figure 3. I am interested in the properties of this region as I allow for administered protection, but first I fully describe the equilibrium strategies and payoffs.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{Figure3.png}
\caption{Initial Tariffs that Lead to Low Applied MFN Tariffs}
\end{figure}
4.2 Equilibrium Strategies

The equilibrium acceptance strategy for any legislator $k$ is $\alpha_k^*$ such that he accepts proposals that give a dynamic payoff that is at least as great as the payoff to the status quo. That is, given proposal $q^t$,

\[
\alpha_k^*(\omega^t; q^t) = \begin{cases} 
1 & \text{if } (1 - \delta)v^k(q^t) + \delta E_{p^{t+1}}[V_k(\alpha^*, \sigma^*; q^t, p^{t+1})] \geq (1 - \delta)v^k(\tau^{t-1}) + \delta E_{p^{t+1}}[V_k(\alpha^*, \sigma^*; \tau^{t-1}, p^{t+1})] \\
0 & \text{otherwise.} \end{cases}
\]

A proposal strategy, $\sigma_k^*(\omega^t)$, depends on the status quo allocation and the proposing legislator. Under the equilibrium proposal strategies, if $K_2$ or more legislators have a status quo tariff equal to the loser tariff, $\tau_z$, the proposer exploits the opportunity to legislate high tariffs for their industry, and offers a biased tariff proposal. If less than $K_2$ legislators have a status quo tariff equal to the loser tariff, the proposer will choose between offering the low tariff proposal or extracting as much protection for their industry as possible by using a cherry-picking strategy. Once a low level of tariffs has been implemented, these tariffs are sustained.

More specifically, suppose first that there are $K_2$ or more legislators whose industry faces the loser tariff, $\tau_z$. That is, $\tau^{t-1} \in T_{\theta \geq \frac{K}{2}}$. Each legislator with a loser tariff is willing to accept a proposal that gives them a loser tariff, since they can’t do better under the status quo. This allows the proposer to legislate tariffs biased towards his industry. So the equilibrium proposal is the biased policy, $\sigma^*(\omega^t) = \tau^{xz}$, such that

\[
\begin{align*}
\sigma_{x^t}^* &= \tau^x \\
\sigma_k^* &= \tau^z \text{ for } k \neq x^t.
\end{align*}
\]

Notice that the proposal $\tau^{xz} \in T_{K-1}$ is also an element of the set $T_{\theta \geq \frac{K}{2}}$ so all subsequent equilibrium strategies will call for the proposal $\tau^{xz}$ to be implemented. This means that once a biased policy is legislated all subsequent policies that are legislated will be biased.

Now consider that $\tau^{t-1} \in T_1$. In this case one legislator has tariff $\tau^z$ and the remaining $K-1$ legislators maximize their joint payoff, so have tariff $\tau^c$. The equi-
librium strategy for this set of status quo allocations is the low tariff proposal,
\( \sigma^*(\omega^t) = \tau^{cz} \), such that if the proposer’s status tariff is not \( \tau^z \), then the legislator
that had \( \tau^z \) is given \( \tau^z \) again and all other legislators receive \( \tau^c \). That is

\[
\sigma_k^* = \begin{cases} 
\tau^z & \text{if } \tau^{t-1}_k = \tau^z, \\
\tau^c & \text{otherwise.}
\end{cases}
\]

If the proposer’s status quo tariff is \( \tau^z \), then the proposer takes a legislator at random
to give \( \tau^z \) and splits the surplus evenly among himself and the remaining legislators.
That is

\[
\sigma_x^* = \tau^c,
\]

and for \( k \neq x^t \),

\[
\sigma_k^* = \begin{cases} 
\tau^z & \text{with probability } \frac{1}{K-1}, \\
\tau^c & \text{with probability } \frac{K-2}{K-1}.
\end{cases}
\]

Notice again that once a proposal in the low tariff class, \( \bar{T}_1 \), has been implemented
the equilibrium strategies dictate that all subsequent proposals lie in this set. So
once low tariffs are legislated, all subsequent tariff proposals are low tariff proposals.

I must also consider status quo tariffs that are not an element of (or do not
lead directly to) the biased polices class or the low tariffs class, i.e. interior tariffs.
Suppose the status quo tariff vector is such that \( \tau^{t-1} \in T_{\theta<\frac{K}{2}} \setminus \bar{T}_1 \). In this case, there
are fewer than \( \frac{K}{2} \) legislators that have a status quo tariff, \( \tau^z \), so the proposer does
not have an immediate opportunity to achieve the maximum payoff. The proposer
is faced with the choice of buying-off a minimum winning coalition, or offering a
low-tariff proposal. Clearly for the proposer to want to propose the low tariffs the
correct incentives must be in place. The set \( \Gamma_{x^t} \) is the set of interior tariffs such
that, in equilibrium, the proposer has an incentive to propose the low tariffs rather
than buy-off a minimum winning coalition. So if \( \tau^{t-1} \in \Gamma_{x^t} \) then the proposer gives
the legislator with the largest tariff (other than the proposer) \( \tau^z \) and each of the \( K-1 \)
remaining legislators \( \tau^c \). So the equilibrium calls for the low tariff strategy,
\( \sigma^*(\omega^t) = \tau^{cz} \), such that

\[^6\text{The only exception here is if } \tau^{t-1} \in T_{\theta=\frac{K}{2}+1} \text{ and } \tau^{t-1}_x \neq \tau^z. \text{ Here the proposer would be able}
\text{to extract the entire surplus, and implement a biased policy.}\]
\[ \sigma_k^* = \begin{cases} 
\tau^z & \text{if } \tau_{k}^{t-1} = \max\{\tau_j^{t-1} | j \in K \setminus \{x^t\}\}, \\
\tau^c & \text{otherwise.} 
\end{cases} \]

This proposal is an element of the low tariff class, so once implemented the equilibrium remains in the low tariff class.

Suppose there is an interior tariff that does not fall within \( \Gamma_{x^t} \), so \( \tau_{t-1} \in \mathbb{T}_{\theta < \frac{K}{2}} \setminus (\mathbb{T}_1 \cup \Gamma_{x^t}) \). The proposer then has an incentive to cherry-pick legislators to form a minimum winning coalition. He will do so by offering a tariff vector that gives \( \frac{K}{2} \) legislators the loser tariff, and offers \( \frac{K}{2} - 1 \) coalition members a tariff vector that makes them at least indifferent to the status quo. Let \( C_{x^t} \) be the set of legislators that are a part of the proposing legislator’s coalition. Define the single period payoff that makes coalition member \( k \) indifferent as \( c_k(\omega^t) \), and define the vector \( \tilde{\tau}(\omega^t) \) such that \( v^k(\tilde{\tau}(\omega^t)) \equiv \max\{c_k(\omega^t), 0\} \) for all \( k \in C_{x^t} \). Then the proposing legislator will offer the cherry picking proposal \( \sigma^*(\omega^t) = \tilde{\tau}(\omega^t) \) such that

\[
\tilde{\tau}_k(\omega^t) = \begin{cases} 
\frac{K}{2}(-\tau^z) - \sum_{k \in C_{x^t}} \tilde{\tau}_k(\omega^t) & \text{if } k = x^t \\
\tilde{\tau}_k(\omega^t) & \text{if } k \in C_{x^t}, \\
\tau^z & \text{otherwise.} 
\end{cases}
\]

These cherry-picking strategies are transitory, and lead to the biased class.

The equilibrium proposal strategies can be summarized as

\[
\sigma_k^*(\omega^t) = \begin{cases} 
\tau^zz & \text{if } \tau_{t-1} \in \mathbb{T}_{\theta \geq \frac{K}{2}}, \\
\tilde{\tau} & \text{if } \tau_{t-1} \in \mathbb{T}_{\theta < \frac{K}{2}} \setminus (\mathbb{T}_1 \cup \Gamma_k), \\
\tau^{c_0} & \text{if } \tau_{t-1} \in \mathbb{T}_1 \cup \Gamma_k. 
\end{cases}
\]

Starting from some vector where strictly less than \( \frac{K}{2} \) legislators have the loser tariff, the equilibrium may head either towards the low tariff class, \( \mathbb{T}_1 \), where the surplus is evenly split among \( K - 1 \) legislators, or the biased class, \( \mathbb{T}_{K-1} \), where the proposer benefits from a high level of protection on his industry, and all other industries are subsidized. Where the equilibrium heads depends on whether the initial tariff vector falls in the set \( \Gamma_k \).
4.3 Low Tariffs as an Equilibrium Outcome

Bowen and Zahran (2009) prove that the above strategies constitute a symmetric MPE of a game where legislators bargain over the share of a fixed surplus. Since the Pareto-efficient tariffs lie in a simplex the strategies are analogous, hence the proof of equilibrium is identical. I will focus here on incentive constraints that determine the region of initial tariff vectors that lead to the low tariff class. The region consists of a lower and an upper bound on initial tariffs of coalition members.

The lower bound on initial tariffs for coalition members is derived from the incentive of the proposer to propose low tariffs rather than choose a cherry-picking strategy that will lead to biased policies. I can define the recursive dynamic payoffs when proposals are in the low tariff class as

\[ V^c(\tau_{cz}) \]

for the proposer and coalition members and

\[ V^z(\tau_{cz}) \]

for the loser. With probability \( \frac{K-1}{K} \) each legislator receives the same payoff as it did in the previous period, and with probability \( \frac{1}{K} \) the current loser becomes the proposer, and a new loser is randomly selected. These dynamic payoffs are given by

\[ V^c(\tau_{cz}) = (1 - \delta) v^c(\tau_{cz}) + \delta \frac{K-1}{K} \left[ (K-1)V^c(\tau_{cz}) + \frac{1}{K-1} V^z(\tau_{cz}) + \frac{K-2}{K-1} V^c(\tau_{cz}) \right] , \]  

and

\[ V^z(\tau_{cz}) = (1 - \delta) v^z(\tau_{cz}) + \delta \frac{1}{K} \left[ V^c(\tau_{cz}) + (K-1)V^z(\tau_{cz}) \right] . \]

Solving for \( V^z(\tau_{cz}) \) and \( V^c(\tau_{cz}) \) gives

\[ V^c(\tau_{cz}) = \frac{(K-1)[K(1-\delta)+\delta]}{K[(K-1)(1-\delta)+\delta]} v^c(\tau_{cz}) + \frac{\delta}{K[(K-1)(1-\delta)+\delta]} v^z(\tau_{cz}) \]  

(5)

and

\[ V^z(\tau_{cz}) = \frac{\delta(K-1)}{K[(K-1)(1-\delta)+\delta]} v^c(\tau_{cz}) + \frac{K(K+1)(1-\delta)+\delta}{K[(K-1)(1-\delta)+\delta]} v^z(\tau_{cz}) . \]  

(6)

I need to compare these payoffs to cherry-picking proposal payoffs. Define the payoffs to the cherry-picking proposals, \( \bar{\tau} \), as

\[ V^x(\bar{\tau}(\omega^t)) \]

for the proposer, and

\[ V^k(\bar{\tau}(\omega^t)) \]

for coalition member, \( k \). The cherry-picking proposal, \( \bar{\tau} \), involves giving at least \( \frac{K}{2} \) legislators the minimum tariff, hence is in the set \( \mathcal{T}_{\theta \geq \frac{K}{2}} \), so the period \( t+1 \) proposal will lie in the biased class. Define the recursive payoffs when proposals are in the biased class as

\[ V^x(\tau_{xz}) \]

for the proposer and

\[ V^z(\tau_{xz}) \]

for the losers. With probability \( \frac{1}{K} \) each legislator is the proposer in the next period, hence any legislator’s continua-
tion value is $V^x(\tau_{xz})$ with probability $\frac{1}{K}$ and $V^z(\tau_{xz})$ with probability $\frac{K-1}{K}$. Denote this continuation value as $V(\tau_{xz}) = \frac{1}{K}[V^x(\tau_{xz}) + (K-1)V^z(\tau_{xz})]$. So payoffs to the cherry-picking proposals are

\begin{align*}
V^x(\bar{\tau}(\omega^t)) &= (1-\delta)v^x(\bar{\tau}(\omega^t)) + V(\tau_{xz}), \quad \text{and} \\
V^k(\bar{\tau}(\omega^t)) &= (1-\delta)v^k(\bar{\tau}(\omega^t)) + V(\tau_{xz}).
\end{align*}

And payoffs in the biased class are

\begin{align*}
V^x(\tau_{xz}) &= (1-\delta)v^x(\tau_{xz}) + V(\tau_{xz}), \quad \text{and} \\
V^z(\tau_{xz}) &= (1-\delta)v^z(\tau_{xz}) + V(\tau_{xz}).
\end{align*}

Solving gives

\begin{align*}
V^x(\tau_{xz}) &= \frac{K(1-\delta)+\delta}{K}v^x(\tau_{xz}) + \frac{\delta(K-1)}{K}v^z(\tau_{xz}) \\
V^z(\tau_{xz}) &= \frac{\delta}{K}v^x(\tau_{xz}) + \frac{(K-\delta)}{K}v^z(\tau_{xz}).
\end{align*}

Starting from an allocation that is interior, that is if $\tau^{t-1} \in \bar{T}_{<\frac{K}{2}}$, for a proposer to have an incentive to propose low tariffs it must be the case that $V^c(\tau_{xz}) \geq V^x(\bar{\tau}(\omega^t))$. Rearranging gives an upper bound on the single period payoff for the cherry-picking proposal which is

\begin{equation}
\frac{\delta}{V^x(\tau_{xz})} \leq \frac{v^x(\bar{\tau}(\omega^t))}{1-\delta}.
\end{equation}

The cherry-picking proposal, $\bar{\tau}(\omega^t)$, is a function of the status quo tariff, $\tau^{t-1}$, so the cherry-picking payoff, $v^x(\bar{\tau}(\omega^t))$, is implicitly a function of the status quo tariff vector of coalition members. The next few lemmas show that inequality (13) implies a lower bound on the status quo tariff of a coalition member.

**Lemma 3.** The proposer’s single period cherry-picking payoff, $v^x(\bar{\tau}(\omega^t))$, is a decreasing function of a coalition member’s cherry-picking tariff, $\bar{\tau}_k$.

The proof is in the Appendix.
Lemma 4. The coalition member’s cherry-picking tariff, $\tilde{\tau}_k$, is an increasing function of a coalition member’s status quo tariff, $\tau_{k}^{t-1}$.

The proof is in the Appendix.

Lemma 5. The proposer’s cherry-picking payoff, $v^x(\tilde{\tau}(\omega^t))$, is a decreasing function of a coalition member’s status quo tariff, $\tau_{k}^{t-1}$.

Proof. By the chain rule, I have

$$\frac{\partial v^x(\tilde{\tau}(\omega^t))}{\partial \tau_{k}^{t-1}} = \frac{\partial v^x(\tilde{\tau}(\omega^t))}{\partial \tilde{\tau}_k} \cdot \frac{\partial \tilde{\tau}_k}{\partial \tau_{k}^{t-1}}.$$ 

By lemmas 3 and 4 this product is negative.

For the three-legislator case, considering that legislator 1 is the proposer, then either legislators 2 or 3 will be in the coalition. The restriction that $V^c(\tau^{cz}) \geq V^x(\tilde{\tau}(\omega^t))$ reduces to the lower bounds on legislator 2 and 3’s status quo tariffs illustrated in Figure 4. The darker shaded region gives the intersection of these two, and is the set of allocations from which $\Gamma_1$ is derived.

Figure 4 defines the region $\Gamma$ illustrated in figure 5 for legislator 1. The region is defined by incentive constraints. It identifies those initial payoffs, such that, in equilibrium, a proposing legislator does not have an opportunity to extract a high level of protection for his legislative district, hence it is in his best interest to make a “good faith” proposal for free trade. Once this proposal is implemented it becomes politically impossible to legislate biased policies. In the next sections I examine the impact of tariff bindings and administered protection on this set of allocations.
5 Tariff Bindings

With tariff bindings there is a ceiling on tariffs that can be implemented. This exogenously lowers the maximum tariff that can be a part of any equilibrium. The maximum tariff, $\tau^x$, is no longer chosen optimally, and is now set below the optimal level. To determine the effect of tariff bindings it suffices to examine the impact of changes in $\tau^x$ on the boundaries of the intersections of $\Gamma_j$. Note that the intersection is bounded only by the lower bound on the acceptor’s status quo allocation. First, Lemma 6 says how the expected payoff in the biased tariff class, $V(\tau^{xz})$, behaves as $\tau^x$ changes.

**Lemma 6.** The expected payoff in the biased outcome, $V(\tau^{xz})$, is a decreasing function of the maximum tariff, $\tau^x$.

**Proof.** Combining equations 11 and 12 I can derive $V(\tau^{xz}) = \delta \frac{v^x(\tau^{xz})}{K} + \frac{\delta(K-1)}{K} v^z(\tau^{xz})$. Differentiating $V(\tau^{xz})$ with respect to $\tau^x$ I have $\frac{dV(\tau^{xz})}{d\tau^x} = -\delta \tau^x$. This is clearly negative since $\tau^x > 0$.

The intuition for lemma 6 is simple. The expected payoff in the biased outcome is a weighted sum of the high payoff when the legislator is the proposer, and the low payoff when the legislator is not a proposer. Clearly with tariff bindings, the negative externalities imposed on non-proposing legislators by a high tariff is reduced. Since legislators are more likely to be non-proposers, in the biased outcome, they benefit more from the reduced externality, than they lose when they are the proposer.

**Lemma 7.** The coalition member’s cherry-picking tariff, $\tilde{\tau}_k$, is an increasing function of the maximum tariff, $\tau^x$.

**Proof.** The cherry-picking tariff is defined by equating a coalition member’s status quo payoff to the coalition member’s payoff under the cherry-picking proposal. Hence I can define the function $H(\tau^x, \tilde{\tau}_k) = V^k(\tau^{t-1}) - V^k(\tilde{\tau}(\omega^t)) = 0$, and by the implicit function theorem I know

$$\frac{d\tilde{\tau}_k}{d\tau^x} = -\frac{\partial H}{\partial \tau^x} / \frac{\partial H}{\partial \tilde{\tau}_k}.$$ 

This simplifies to

$$\frac{d\tilde{\tau}_k}{d\tau^x} = \frac{\Delta \delta N \tau^x}{K[2g(2-\delta) - (1-\delta)(K-2)N(\tau^x + \tilde{\tau}_k)]}.$$
The denominator is positive because a coalition member’s cherry-picking tariff, $\tau^k$, will not exceed $\frac{y}{N}$, hence the result is proved.

The intuition for this result is also quite straightforward. The coalition member’s dynamic cherry-picking payoff is a sum of the current period cherry-picking payoff and the expected payoff to the biased proposal, $V(\tau^{xz})$. Since $V(\tau^{xz})$ is decreasing in the maximum tariff (lemma 6), an increase in the maximum tariff will increase the $V^k(\tau^{t-1})$ that is required to equate $V^k(\tau^{t-1})$ and $V^k(\tilde{\tau}(\omega^t))$. Since $V^k(\tilde{\tau}(\omega^t))$ is increasing in the coalition member’s tariff, $\tilde{\tau}^k$, (for the range of tariffs considered), this results in an increase in the $\tilde{\tau}^k$ required to make the coalition member indifferent between the status quo and the cherry-picking proposal.

Proposition 2 tells us what happens to the region of initial payoffs that allows for the low levels of protection as $\tau^x$ decreases.

**Proposition 2.** If tariffs are bound the set of tariffs leading to the low-tariff outcome is reduced.

**Proof.** The lower bound on the acceptor’s status quo tariff is derived from the condition $V^c(\tau^{cz}) \geq V^x(\tilde{\tau}(\omega^t))$. Denote the lower bound as $(\tau_k^{t-1})^*$ so this is defined by,

$$V^c(\tau^{cz}) = V^x(\tilde{\tau}(\omega^t))$$.

By the implicit function theorem, I can define the function $M((\tau_k^{t-1})^*, \tau^x) = V_x - V^c(\tau^{cz})$, and I know that

$$\frac{d(\tau_k^{t-1})^*}{d\tau^x} = -\frac{\partial M}{\partial \tau^x} / \frac{\partial M}{\partial (\tau_k^{t-1})^*}$$.

The function $M((\tau_k^{t-1})^*, \tau^x)$ can be rewritten as $M((\tau_k^{t-1})^*, \tau^x) = (1-\delta)v^x(\tilde{\tau}(\omega^t)) + V(\tau^{xz}) - V^c(\tau^{cz})$, so

$$\frac{\partial M}{\partial \tau^x} = (1-\delta)\frac{\partial v^x(\tilde{\tau})}{\partial \tau_k} + \frac{\partial V(\tau^{xz})}{\partial \tau^x}$$.

From lemma 3 I know that $\frac{\partial v^x(\tilde{\tau})}{\partial \tau_k}$ is negative, from lemma 7 $\frac{\partial \tau_k}{\partial \tau^x}$ is positive and from lemma 6 $\frac{\partial V(\tau^{xz})}{\partial \tau^x}$ is negative. Hence $\frac{\partial M}{\partial \tau^x}$ is negative. Now

$$\frac{\partial M}{\partial (\tau_k^{t-1})^*} = (1-\delta)\frac{\partial v^x(\tau^{cz})}{\partial (\tau_k^{t-1})^*}$$.

From lemma 5 I know that $\frac{\partial v^x(\tau^{cz})}{\partial (\tau_k^{t-1})^*}$ is negative, hence $\frac{\partial M}{\partial (\tau_k^{t-1})^*}$ is also negative. Hence the lower bound on the coalition member’s status quo tariff increases with $\tau^x$, the maximum tariff. I therefore have the result.
Proposition 2 is illustrated below. Essentially, the region of initial payoffs that allows the low tariff outcome, shrinks with tariff bindings. The intuition as follows: With tariff bindings, the expected payoff to the biased outcome is increased because of the reduced externality to non-proposing legislators. Hence the incentive to implement biased policies is increased. This results in the reduction of the area that guarantees low levels of tariffs to be implemented.

![Figure 5: Effect of Tariff Bindings](image)

6 Administered Protection

Under administered protection, all industries are allowed some minimum level of protection. This exogenously raises the minimum tariff that can be a part of any equilibrium. The minimum tariff, \( \tau^z \), is no longer chosen optimally, and is now set above the optimal level. To determine the effect of administered protection it suffices to examine the impact of increases in \( \tau^z \) on the boundaries of the intersection of \( \Gamma_j \).

Proposition 3 tells us what happens to the region of initial payoffs that guarantees for the low levels of protection as \( \tau^z \) increases, and lemmas 8-10 provide useful results to prove proposition 3.

Lemma 8. The expected payoff in the low tariff class, \( V(\tau^{xz}) \), is an increasing function of the minimum tariff, \( \tau^z \).

Proof. Differentiating \( V(\tau^{xz}) \) with respect to \( \tau^z \) I have \( \frac{dV(\tau^{xz})}{d\tau^z} = -\delta \tau^z (K - 1) \). This is positive since \( \tau^z \) is negative. ■

Lemma 9. The proposer’s payoff to the cherry-picking proposal, \( v^x(\tilde{\tau}) \), is a decreasing function of the minimum tariff, \( \tau^z \).
Proof. The minimum tariff enters directly in the cherry picking proposal, so the total derivative with respect to the minimum tariff is,

\[
\frac{dv^x(\tilde{\tau})}{d\tau^z} = \frac{\partial v^x(\tilde{\tau})}{\partial \tau^k} \frac{\partial \tau^k}{\partial \tau^z} + \frac{\partial v^x(\tilde{\tau})}{\partial \tau^z}.
\]

This is equivalent to

\[
\frac{dv^x(\tilde{\tau})}{d\tau^z} = N^2 \delta (K-1) (K-2) \tau^z (\tilde{\tau}^k + \tau^z) + 2y[N(K(K-2\delta)+2\delta)\tau^z+yK^2(1-\delta)+\delta y]\\NK[2y(2-\delta)-(1-\delta)(K-2)]N(\tau^z+\tau^k)]
\]

The numerator and denominator of the expression are both positive, so the entire expression is negated by the sign. ■

Lemma 10. The payoff to a coalition member in the low tariff class, \(V_c(\tau^{cz})\), is a decreasing function of the minimum tariff, \(\tau^z\).

Proof. The payoff in the low tariff class is given by equation 5. Differentiating this with respect to \(\tau^z\) gives.

\[
\frac{dV^x(\tau^{xz})}{d\tau^z} = -\frac{y(K-1)(1-\delta)}{N[(K-1)(1-\delta)+\delta y]} - \tau^z.
\]

This value is negative. ■

Proposition 3. If a small amount of administered protection is allowed the set of initial tariffs that lead to a low tariff outcome expands.

Proof. From before I have the function \(M((\tau_t^{-1})^*, \tau^z) = V_x - V^c_c(\tau^{cz})\), that defines the boundary tariff, and I know that

\[
\frac{d(\tau_t^{-1})^*}{d\tau^z} = -\frac{\partial M}{\partial \tau^z} / \frac{\partial M}{\partial (\tau_t^{-1})^*}.
\]

The partial derivative of \(M\) with respect to the minimum tariff is

\[
\frac{\partial M}{\partial \tau^z} = (1-\delta)\frac{dv^x(\tilde{\tau})}{d\tau^z} + \frac{dV^x(\tau^{xz})}{d\tau^z} - \frac{dV^c(\tau^{cz})}{d\tau^z}.
\]

From from lemma 8 \(\frac{dV^x(\tau^{xz})}{d\tau^z}\) is negative, from lemma 9 I know that \(\frac{dv^x(\tilde{\tau})}{d\tau^z}\) is negative, and from lemma 10 \(\frac{dV^c(\tau^{cz})}{d\tau^z}\) is negative. Hence the sign on \(\frac{\partial M}{\partial \tau^z}\) depends on the magnitudes of the these values, and is ultimately negative. I already know \(\frac{\partial M}{\partial (\tau_t^{-1})^*}\) is negative, so I have that the lower bound on the coalition member’s status quo tariff is decreasing in the minimum tariff. ■

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The intuition is as follows. In order to achieve a biased outcome, legislators will cherry-pick minimum winning coalitions and freeze out the remaining legislators by reducing tariffs on their industries. Placing a floor on tariffs raises the cost of freezing out legislators, hence decreases the incentive to go to the biased outcome. This results in the expansion of the area that guarantees low levels of tariffs to be implemented as illustrated in Figure 6.

Figure 6: Effect of Administered Protection

7 Conclusion

One of the main objectives of the WTO is to facilitate the reduction of trade barriers. In the WTO’s words it is “an organization for liberalizing trade”7. However, each country sets its own trade policy through some domestic process, usually, through some legislative process, so in this paper I first examine the outcome of tariffs determined by a legislative process and then look at the impact of two of the central components of WTO agreements: tariff bindings and administered protection, on tariffs that are enacted legislatively.

To examine the impact of these policies I develop a dynamic model of trade policy determination through a legislative process and ask, first, under what circumstances will the legislative process result in low applied MFN tariffs. What I find is that tariff determination is path dependent. If initial conditions are such that tariffs are uniformly low, a low applied tariff outcome will result. However if initial tariffs are biased, the outcome may be a cycle of biased tariffs. This intuition is reflected in the history of the United States legislature. One of the first acts of the newly

7http://www.wto.org/english/thewto_e/whatis_e/tif_e/fact1_e.htm
established Congress was to legislate protective tariffs, because, as Taussig (1910) put it, “...several of the States, especially Massachusetts and Pennsylvania, had imposed protective duties before 1789; and they were desirous of maintaining the aid then given to some of their industries.” This cycle of protectionism remained in the US until Congress enacted the Reciprocal Trade Act in 1934 to give the President authority to cut tariffs. But not all countries have given their executive such power, hence tariffs are still determined by the legislature, albeit constrained by international agreements.

To look at the effect of tariff bindings and administered protection on the legislative outcome, I consider how a ceiling on legislated tariffs affects the set of initial conditions that lead to a low protection outcome. The, somewhat surprising, answer is that tariff bindings shrink the set of initial conditions that leads to the low protection outcome, whereas administered protection expands the set of initial tariffs that leads to the low protection outcome. So, loosely speaking, I see tariff bindings leading to a lower likelihood of a low applied MFN tariff outcome, while administered protection leads to a higher likelihood of a low applied MFN tariff outcome.

Both these results contradict the traditional wisdom. Tariff bindings are a central element of the GATT put in place in 1947, while administered protection is generally regarded as opposing the goals of the WTO. This paper suggests that in some instances less restrictive tariff bindings may give countries the necessary “policy space” to allow the domestic process to arrive at low applied tariffs, whereas administered protection makes it more costly to implement biased policies.
8 Appendix

8.1 Proof of Lemma 3

Proof. The cherry-picking proposal is such that it gives coalition members the same dynamic payoff as the status quo tariff vector, \( \tau^{t-1} \). For simplicity, assume that the status quo tariff vector gave the same tariff to all members of the coalition, hence the cherry-picking tariff will also give the same tariff to all coalition members, \( \tilde{\tau}_k \). The proposer’s cherry-picking payoff is given by

\[
v^\tau(\tilde{\tau}(\omega')) = \tilde{\tau}_{xt_1} \left[ \frac{y}{N}(K - 1) - \frac{\tau^{t-1}_x}{2} \right] - \left( \frac{K}{2} - 1 \right) \tilde{\tau}_k \left[ \frac{\tilde{\tau}_k}{2} + \frac{\tau^{t-1}_x}{2} + \frac{y}{N} \right] + \lambda
\]

where the proposer’s tariff is \( \tilde{\tau}_{xt_1} = \frac{K}{2}(-\tau^{t-1}) - (\frac{K}{2} - 1) \tilde{\tau}_k \). Differentiating with respect to the coalition member’s cherry-picking tariff, \( \tilde{\tau}_k \), I have

\[
\frac{\partial v^\tau(\tilde{\tau}(\omega'))}{\partial \tilde{\tau}_k} = -(K-2)K[2y + N(\tau^+ + \tilde{\tau}_k)].
\]

This is negative since a coalition member’s cherry-picking tariff is at least as great as the loser tariff.

\[\blacksquare\]

8.2 Proof of Lemma 4

Proof. Denote the payoff to each member of the coalition under status quo tariff \( \tau^{t-1} \) as \( V^k(\tau^{t-1}) \). This is given by

\[
V^k(\tau^{t-1}) = (1 - \delta)v^k(\tau^{t-1}) + \frac{\delta}{K} [V^x(\tilde{\tau}(\omega'))] + (K-1)V^k.
\]

(14)

Since \( \tilde{\tau}(\omega') \) is obtained from equality of \( V^k(\tau^{t-1}) \) and \( V^k(\tilde{\tau}(\omega')) \), this simplifies to

\[
V^k(\tau^{t-1}) = \frac{(1-\delta)K}{K-\delta(K-1)} v^k(\tau^{t-1}) + \frac{\delta}{K-\delta(K-1)} V^x(\tilde{\tau}(\omega')).
\]

(15)

Now \( \tilde{\tau}(\omega') \) is defined implicitly by \( V^k(\tau^{t-1}) = V^k(\tilde{\tau}(\omega')) \). Define the function \( H(\tau^{t-1}_k, \tilde{\tau}_k) = V^k(\tau^{t-1}) - V^k(\tilde{\tau}(\omega')) \). Then by the implicit function theorem

\[
\frac{d\tilde{\tau}_k}{d\tau^{t-1}_k} = -\frac{\partial H}{\partial \tau^{t-1}_k} / \frac{\partial H}{\partial \tilde{\tau}_k}.
\]

This simplifies to

\[
\frac{d\tilde{\tau}_k}{d\tau^{t-1}_k} = \frac{2(K+2)y - (K-2)N\tau^{t-1}_k}{K[2y(2-\delta) - (1-\delta)(K-2)N(\tau^+ + \tilde{\tau}_k)]}.
\]

The numerator is positive because a coalition member will not have a status quo tariff larger than \( \frac{y}{N} \). This would imply that he was receiving a large share of the surplus in the previous period.

\[\footnote{Here \( v^k(\tau^{t-1}) = \tau^{t-1}_k \frac{y}{N} - (\frac{K}{2} - 1) \tau^{t-1}_x \left[ \frac{\tau^{t-1}_x}{2} + \frac{y}{N} \right] - \sum_{j\neq k} \tau^{t-1}_j \left[ \frac{\tau^{t-1}_j}{2} + \frac{y}{N} \right] + \lambda.}

\[\footnote{Where \( v^k(\tilde{\tau}(\omega')) = \tilde{\tau}_k \frac{y}{N} - \tilde{\tau}_{xt} \left[ \frac{\tilde{\tau}_{xt}}{2} + \frac{y}{N} \right] - (\frac{K}{2} - 1) \tilde{\tau}_k \left[ \frac{\tilde{\tau}_k}{2} + \frac{y}{N} \right] - K_2 \tau^+ \left[ \frac{\tau^+}{2} + \frac{y}{N} \right] + \lambda.}\]

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hence would not be the cheapest coalition member. The denominator is positive also for the same reason.

References


