

Reciprocity, non-discrimination and preferential agreements in the multilateral trading system

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Abstract

We present a framework for understanding and interpreting reciprocity and non-discrimination, the two principles that are the pillars of the multilateral trading system as embodied in GATT and its successor, the WTO. We show that the principle of reciprocity serves to neutralize the world-price effects of a country's trade policy decisions, and hence can deliver efficient trade-policy outcomes for its member governments provided that the externalities associated with trade intervention travel through world prices. We then establish that externalities indeed travel in this way if and only if tariffs also conform to the principle of non-discrimination (MFN). In this way, the principles of reciprocity and non-discrimination can work in concert to deliver efficient outcomes for the multilateral trading system. We also consider within our framework the implications of preferential agreements for the multilateral trading system. The introduction of free trade agreements complicates the way in which externalities are transmitted across countries, and in this environment the principle of reciprocity can no longer deliver efficient multilateral outcomes for its member governments. We do find, however, a limited place for customs unions in the multilateral trading system, provided that the member countries of the union have similar political preferences. As these conditions are quite stringent, we offer little support for the hypothesis that the principle of reciprocity can deliver an efficient multilateral trade agreement in the presence of preferential agreements. Instead, our results

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offer support for the view that preferential agreements pose a threat to the existing multilateral system. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

In the preamble to the agreement establishing the WTO, the member governments state their objectives and the general arrangements that are to contribute toward the achievement of these objectives. The governments' objectives are to raise standards of living, ensure full employment as well as real-income growth and expand production of and trade in goods and services, while at the same time maintaining sustainable development, protecting the environment and ensuring trade-growth for developing countries. The achievement of these objectives is contributed toward when governments enter into "reciprocal and mutually advantageous arrangements directed to the substantial reduction of tariffs and other barriers to trade and to the elimination of discriminatory treatment in international trade relations." On this basis, the member governments thus resolve to develop the WTO as an integrated multilateral trading system that encompasses GATT, the results of past trade liberalization efforts and all of the results of the Uruguay Round of Multilateral Trade Negotiations.

It is notable that the member governments do not set forth the goal of free trade; instead, they advocate the less ambitious goals of *reciprocity* (i.e., "reciprocal and mutually advantageous arrangements directed to the substantial reduction of tariffs and other barriers to trade") and *non-discrimination* (i.e., "the elimination of discriminatory treatment in international commerce"). While the principles of reciprocity and non-discrimination (MFN) are the pillars upon which the WTO is founded, it is also notable that the governments agree through GATT Article XXIV to grant an important exception to MFN. This article provides conditions under which countries may form *preferential agreements*, which can be established as free trade areas (in which member countries eliminate their internal barriers to trade) or customs unions (in which member countries also set common external tariffs).

These observations present four questions to economists studying trade agreements. First, and most fundamentally, what can governments hope to accomplish with trade agreements that they cannot achieve when they set their trade policies unilaterally? Second, given that free trade is not the stated objective of governments in the WTO, can they nevertheless expect an arrangement that advocates reciprocal movements in the direction of free trade to be mutually advantageous?

Third, are their mutual goals best advanced by an agreement that eliminates discriminatory treatment? And fourth, once the principle of non-discrimination is adopted, can exceptions to this principle be granted for the creation of preferential agreements without compromising the performance of the multilateral system?

Our purpose in this paper is to explore these four questions within a unified framework. We adopt the view that governments enter into trade agreements in order to achieve higher welfare than they would receive were policies set unilaterally. We do not assume, however, that government welfare is given by national income; instead, we allow that the government welfare function embodies both “economic” (i.e., national income) and “political” (i.e., distributional) considerations. Of course, a trade agreement can offer higher welfare for its participants only if an inefficiency arises when trade policies are set unilaterally. We thus begin by identifying the key inefficiency that accounts for the appeal of a trade agreement. This provides a foundation from which to next assess the WTO as an institution that is designed to facilitate the implementation of more efficient trade outcomes. In particular, we evaluate whether three of the WTO’s central features—reciprocity, non-discrimination (MFN) and the exception to MFN associated with the formation of preferential agreements—serve well as principles that guide participating governments to efficient outcomes.

We begin, then, with the first question identified above: Why do governments negotiate trade agreements? A popular view is that such agreements are attractive to governments as a means to achieve political objectives. While actual governments clearly have political motivations, it is important to emphasize that this by itself provides no reason for governments to seek trade agreements. The possibility of mutual gains from such agreements requires something more: the unilateral trade policy decisions of each government, when viewed together, must be inefficient in light of the governments’ own preferences. In the leading political-economy models of trade, the introduction of politics affects the preferences of governments—for example, politically motivated governments may not aspire to free trade—but does not generate an externality across governments. As such, politics can affect the trade-policy objectives that governments have, but it does not explain why governments need a trade agreement in order to achieve these objectives.

An alternative view is that governments enter into trade agreements in order to escape from a terms-of-trade driven Prisoners’ Dilemma. When a government imposes an import tariff, it lowers the world price and harms foreign exporters; as a consequence of this terms-of-trade externality, governments’ unilateral trade policies restrict trade more than is efficient. A trade agreement can then be appealing to governments as a means to “undo” the restrictions in trade associated with the terms-of-trade externality, so that more efficient trade volumes can be achieved. This view has a long history, dating back to Torrens (1844), Mill (1844), Scitovszky (1942) and Johnson (1953–54), who developed their arguments in the context of national-income maximizing governments that exploited their monopoly

power in international markets with “optimal tariffs”.¹ While the terms-of-trade view is logically unassailable, many economists are skeptical of its practical relevance: a common position is that this argument becomes secondary in explaining the appeal of trade agreements once more realistic government objectives that include political concerns are acknowledged.

To answer our first question, we therefore construct a model in which governments are motivated by both political and terms-of-trade considerations. We show that more general government objectives do not overturn the view that trade agreements provide governments with an escape from a terms-of-trade driven Prisoners’ Dilemma. Moreover, in the leading formulations of political economy, and indeed whenever government objectives can be represented as a function of national prices and the terms of trade, this is *all* that trade agreements do: political considerations play no role in explaining why governments seek trade agreements. While political considerations surely affect the trade objectives that governments seek to achieve, it is the terms-of-trade externality that creates an inefficiency when policies are set unilaterally and that therefore explains why governments need a trade agreement in order to accomplish their objectives.²

Having identified the inefficiency that trade agreements are designed to eliminate, we turn next to the second question raised above: Why would it be mutually advantageous to form an agreement that calls for reciprocal tariff liberalization? At a general level, the answer to this question follows naturally from the answer to the first question: terms-of-trade externalities lead governments to restrict trade more than is efficient, and so an efficiency-enhancing trade agreement naturally involves a reciprocal movement in the direction of free trade. We push this idea much further, however, and examine the actual representation of reciprocity found in the WTO. Our framework provides a logic to this representation provided that, among those tariff combinations that achieve efficiency, governments seek through the WTO to implement the tariffs that remain when terms-of-trade motivations are eliminated from each government’s unilateral trade policy choices. In particular, we establish that an efficient trade agreement can be implemented under reciprocity only if the agreement is characterized by such tariffs.

We consider next the third question raised above: Is there an efficiency rationale for the principle of non-discrimination (MFN)? We find that a multilateral system built on the principle of reciprocity can implement an efficient agreement only if it also embraces the principle of non-discrimination. Hence, our

¹ More recently, this view has been explored by Bagwell and Staiger (1990), Dixit (1987) and McMillan (1986, 1989).

² Political considerations might give rise to a separate motivation for reciprocal trade agreements if governments seek such agreements to gain commitment relative to their private sectors. This possibility is explored by Bagwell and Staiger (2000), Maggi and Rodriguez-Clare (1998) and Staiger (1995). It has not yet been demonstrated, however, that this hypothesis accounts for the principles of reciprocity and non-discrimination.

framework provides a formal rationale for the linkage between the principles of reciprocity and non-discrimination as pillars of an efficient multilateral trading system. In essence, reciprocity and non-discrimination serve as principles that work together to deliver an efficient trade-policy outcome by eliminating the restrictions in trade that are associated with terms-of-trade motivations.

Finally, we consider the possibility of preferential agreements and re-phrase our fourth question in the more specific form: Can a multilateral system that relies on the principle of reciprocity to determine external tariffs implement an efficient agreement in the presence of free trade agreements or customs unions? We find that the principle of reciprocity cannot serve to implement an efficient agreement when free trade areas are present. On the other hand, reciprocity may implement an efficient agreement in the presence of a customs union, but only if the union is comprised of similar countries (i.e., “natural integration partners”). These conditions are quite stringent, and so we offer only limited support for the hypothesis that the principle of reciprocity can deliver an efficient trade agreement in the presence of preferential trade agreements. Instead, our results offer support for the view that preferential agreements pose a threat to the existing multilateral system.

The intuition for our central conclusions derives from three basic insights. First, we establish that an efficient multilateral trade agreement can be implemented under the WTO’s principle of reciprocity provided that the externalities associated with trade intervention are transmitted only through world-price movements. Second, we show that externalities indeed are transmitted only through world-price movements when tariffs conform to MFN. Thus, the principles of reciprocity and MFN work hand-in-hand to facilitate the implementation of efficient trade arrangements. Finally, when tariffs are discriminatory, we find that externalities travel through both world and local prices (which together define the multilateral terms-of-trade in discriminatory environments). For a given aggregate volume of trade, an importing government that selects discriminatory tariffs prefers that a greater share of the import volume come from the foreign export partner on whom it places the highest tariff. Since foreign export volumes are in turn determined by foreign local prices, it follows that local prices transmit externalities as well when tariffs are discriminatory. Discriminatory tariffs, such as arise when countries form preferential agreements, thus tend to undermine reciprocity as a principle with which to implement efficient trade policies.³

We explore similar themes in a companion paper (Bagwell and Staiger, 1999a), using a theoretical framework that features a general-equilibrium model of trade and a general family of government welfare functions. In the present paper, we develop our ideas in a theoretical framework that is simple and concrete. We

³ The only form of tariff discrimination that can be excepted from this statement amounts to the case where previously independent countries join together in complete political and economic union to become a “single country” for the purposes of trade policy.

employ a partial-equilibrium model of trade, and we adopt a particular and commonly used representation of government welfare functions.⁴ This approach offers two main advantages. First, we are able to concretely identify the respective roles of political and terms-of-trade motivations in the determination of trade-policy choices. Second, we are also able to obtain closed-form solutions for trade-policy choices, and this reveals some more specific findings. For example, we show that governments will subsidize exports, if the parameters associated with political motivations are large in magnitude.⁵

The remainder of the paper proceeds as follows. We present in Section 2 a model of trade between two countries. Here we identify the inefficiency associated with unilateral tariff setting that a reciprocal trade agreement can correct. In Section 3, we define the principle of reciprocity and explore the sense in which this principle promotes efficient outcomes. Section 4 extends our analysis to a many-country framework. In Section 5, we make use of this extended framework and present our main results regarding the efficiency relationships between reciprocity, non-discrimination and preferential agreements. Section 6 concludes, and remaining proofs are collected in Appendix A.

2. Trade agreements in a two-country framework

In this section, we develop a simple two-country partial-equilibrium model. This model allows us to explore the notion of reciprocity without the need to consider the topic of non-discrimination. The latter issue is addressed in the many-country model of Sections 4 and 5.

2.1. Model

We consider a world economy in which two countries—home (no ^{*}) and foreign (^{*})—trade two goods x and y , with x (y) the natural import good of the home (foreign) country. In this subsection, we construct a simple model, characterize the market-clearing values for prices and quantities, and then express government objectives in terms of these values.

2.1.1. Basic assumptions

We assume that each of the two goods is demanded in each country according to a symmetric demand function, D . Letting p_x and p_y denote the local prices of good x and y in the domestic market, the domestic demand function for good $i = x, y$ is represented by the decreasing function $D(p_i)$. Foreign demand func-

⁴ An early exploration of both frameworks is contained in Bagwell and Staiger (1996).

⁵ As is usual, the partial-equilibrium analysis can be re-interpreted as a general-equilibrium model, if an additional numeraire good is included that consumers value in a quasi-linear fashion. In the text, we develop this general-equilibrium interpretation of our analysis in a sequence of footnotes.

tions are symmetrically represented in terms of the foreign local prices, p_x^* and p_y^* . Each good is also produced in each country, and we allow that countries have different skills in this regard so that a basis for trade exists. The respective supply functions derive from competitive markets, and the domestic supply functions are represented by the increasing functions, $Q_x(p_x)$ and $Q_y(p_y)$. Similarly, the foreign supply functions are increasing and given as $Q_x^*(p_x^*)$ and $Q_y^*(p_y^*)$. Consistent with the hypothesis that the domestic country is the natural importer of good x , we assume that $Q_x(p) = Q_y^*(p) < Q_y(p) = Q_x^*(p)$. Finally, the associated domestic and foreign profit functions are represented with the increasing functions, $\Pi_x(p_x)$, $\Pi_y(p_y)$, $\Pi_x^*(p_x^*)$ and $\Pi_y^*(p_y^*)$.

While these basic assumptions underlie the broad themes developed below, further insights can be gained when the functional forms are given additional structure. To this end, we assume that the demand and supply functions take simple linear forms: $D(p_i) = 1 - p_i$, $Q_x(p_x) = p_x/2$, $Q_y(p_y) = p_y$, $Q_x^*(p_x^*) = p_x^*$, and $Q_y^*(p_y^*) = p_y^*/2$. The profit functions are then given by $\Pi_x(p_x) = (p_x)^2/4$, $\Pi_y(p_y) = (p_y)^2/2$, $\Pi_x^*(p_x^*) = (p_x^*)^2/2$ and $\Pi_y^*(p_y^*) = (p_y^*)^2/4$.⁶

2.1.2. Price determination

To describe the determination of market prices, we first introduce some notation for tariffs. Let τ_x denote the (specific) import tariff applied by the domestic government to imports of good x , and let τ_y represent the (specific) export subsidy given by the domestic country to exports of good y . In similar fashion, we represent the foreign country's import tariff as τ_x^* and export subsidy as τ_y^* .

Provided trade taxes do not prohibit all trade, local prices in each country must obey arbitrage and market-clearing conditions. These conditions are given respectively as follows:

$$p_i = p_i^* + \tau_i - \tau_i^*, \quad i = x, y$$

$$Q_i(p_i) + Q_i^*(p_i^*) = D(p_i) + D(p_i^*), \quad i = x, y.$$

These two sets of equations yield market-clearing domestic prices, $p_x(\tau_x - \tau_x^*)$ and $p_y(\tau_y^* - \tau_y)$, as well as the associated foreign prices, $p_x^*(\tau_x - \tau_x^*)$ and $p_y^*(\tau_y^* - \tau_y)$. The market-clearing local prices depend upon trade policy only

⁶ The domestic functions derive from production functions of the form $Q_x = (L_x)^{1/2}$ and $Q_y = (2L_y)^{1/2}$, where L_x (L_y) is the labor used in the production of good x (y), under the assumption that labor supply is infinitely elastic at a unitary wage. Similar remarks apply for the foreign functions. The partial-equilibrium model can be closed with the addition of a traded numeraire good z , where the utility of a representative agent is given by $U = C_z + (C_x - C_x^2/2) + (C_y - C_y^2/2)$ with C_z and C_i denoting consumption of the numeraire good z and good $i = x, y$. If z is sufficiently abundant in each country so that it is always consumed in positive amounts by each agent, the marginal utility of income will be fixed at one and partial-equilibrium analysis of the two non-numeraire sectors is appropriate. Trade in the numeraire good is then determined by the requirement of overall trade balance.

through the associated net tariffs, $\tau_x - \tau_x^*$ and $\tau_y^* - \tau_y$. Given that demand (supply) functions are downward (upward) sloping, it is direct to confirm that a higher net tariff raises (lowers) the local price in the importing (exporting) country.

Consider next the world (i.e., offshore) prices. Letting p_x^w and p_y^w denote the world price of goods x and y , respectively, we have the following definition: $p_i \equiv p_i^w + \tau_i$, $i = x, y$. Having already solved for the market-clearing local prices, we may thus represent the market-clearing world prices as $p_x^w(\tau_x, \tau_x^*)$ and $p_y^w(\tau_y, \tau_y^*)$. Using the monotonicity of the demand and supply functions, it is direct to confirm that the world price is decreasing in each argument: the world price falls when the import tariff is raised and when the export subsidy is increased.⁷ Finally, it is convenient to express market-clearing local prices as explicit functions of world prices: $\hat{p}_i(\tau_i, p_i^w(\tau_i, \tau_i^*)) = p_i^w(\tau_i, \tau_i^*) + \tau_i$ and $\hat{p}_i^*(\tau_i^*, p_i^w(\tau_i, \tau_i^*)) = p_i^w(\tau_i, \tau_i^*) + \tau_i^*$.

2.1.3. Trade volumes

We consider next the market-clearing import and export volumes. The domestic import volume for good x is denoted by $M(\hat{p}_x) \equiv D(\hat{p}_x) - Q_x(\hat{p}_x)$, and the domestic export volume of good y is given by $E(\hat{p}_y) \equiv Q_y(\hat{p}_y) - D(\hat{p}_y)$. Using the linear structure of the model, we may derive the conditions under which trade volumes are positive:

$$M(\hat{p}_x) > 0 \quad \text{iff} \quad \tau_x - \tau_x^* < 1/6; \quad E(\hat{p}_y) > 0 \quad \text{iff} \quad \tau_y^* - \tau_y < 1/6. \tag{1}$$

Thus, trade occurs so long as the net tariff is not too large. Foreign import and export volumes, $M^*(\hat{p}_y^*)$ and $E^*(\hat{p}_x^*)$, are defined symmetrically, with $M(\hat{p}_x) = E^*(\hat{p}_x^*)$ and $M^*(\hat{p}_y^*) = E(\hat{p}_y)$ then following directly from the market-clearing requirement.

2.1.4. Government objectives

We may now define government welfare functions. Governments are assumed to maximize a weighted sum of consumer surplus, producer surplus and tariff revenue. Following Baldwin (1987), we allow for political-economy influences with the assumption that governments may weigh producer surplus differently than consumer surplus and tariff revenue. This representation has been given micro-analytic foundations in the explicit lobbying model developed by Grossman and Helpman (1994).⁸

⁷ Formally, the world price function takes the form $p_x^w(\tau_x, \tau_x^*) = [4 - 4\tau_x^* - 3\tau_x]/7$ and $p_y^w(\tau_y, \tau_y^*) = [4 - 4\tau_y - 3\tau_y^*]/7$. The closed-form solutions for the market-clearing local prices now can be directly derived.

⁸ In Grossman and Helpman (1994), governments behave as if they place greater weight on the producer surplus of politically represented sectors provided that these sectors comprise a small fraction of the overall economy.

Let $\gamma_m \geq 1$ ($\gamma_e \geq 1$) denote the weight that the government attaches to the producer surplus earned by import-competing (exporting) firms. The welfare that the domestic government experiences on its import and export goods is then defined as follows:

$$W_x(\hat{p}_x, p_x^w) \equiv \int_{\hat{p}_x}^1 D(p_x) dp_x + \gamma_m \Pi_x(\hat{p}_x) + [\hat{p}_x - p_x^w] M(\hat{p}_x)$$

$$W_y(\hat{p}_y, p_y^w) \equiv \int_{\hat{p}_y}^1 D(p_y) dp_y + \gamma_e \Pi_y(\hat{p}_y) - [\hat{p}_y - p_y^w] E(\hat{p}_y).$$

The domestic-government welfare function is then the sum of the welfare achieved on the import good and the export good: $W(\hat{p}_x, \hat{p}_y, p_x^w, p_y^w) \equiv W_x(\hat{p}_x, p_x^w) + W_y(\hat{p}_y, p_y^w)$.⁹ The foreign-government import and export welfare functions take analogous forms:

$$W_y^*(\hat{p}_y^*, p_y^w) \equiv \int_{\hat{p}_y^*}^1 D(p_y^*) dp_y^* + \gamma_m \Pi_y^*(\hat{p}_y^*) + [\hat{p}_y^* - p_y^w] M^*(\hat{p}_y^*)$$

$$W_x^*(\hat{p}_x^*, p_x^w) \equiv \int_{\hat{p}_x^*}^1 D(p_x^*) dp_x^* + \gamma_e \Pi_x^*(\hat{p}_x^*) - [\hat{p}_x^* - p_x^w] E^*(\hat{p}_x^*)$$

so that $W^*(\hat{p}_x^*, \hat{p}_y^*, p_x^w, p_y^w) \equiv W_y^*(\hat{p}_y^*, p_y^w) + W_x^*(\hat{p}_x^*, p_x^w)$ defines the foreign welfare function.

2.2. Nash equilibria

In this subsection, we consider a static tariff game, in which the domestic government unilaterally selects its tariff policy, (τ_x, τ_y) , in order to maximize its welfare, W , at the same time that the foreign government unilaterally chooses its tariff policy, (τ_y^*, τ_x^*) , in order to maximize its welfare, W^* . Our purpose is to characterize the Nash tariff policies, paying particular attention to the relation between Nash policies and the political-economy parameters.

We begin with a general characterization of the best-response tariff policies. To this end, we define the parameters,

$$\lambda_x \equiv [\partial p_x^w / \partial \tau_x] / [d \hat{p}_x / d \tau_x] = [\partial p_y^w / \partial \tau_y^*] / [d \hat{p}_y^* / d \tau_y^*] \equiv \lambda_y^*$$

$$\lambda_y \equiv [\partial p_y^w / \partial \tau_y] / [d \hat{p}_y / d \tau_y] = [\partial p_x^w / \partial \tau_x^*] / [d \hat{p}_x^* / d \tau_x^*] \equiv \lambda_x^*,$$

and then maximize W with respect to (τ_x, τ_y) and W^* with respect to (τ_y^*, τ_x^*) .

⁹ In the general equilibrium interpretation of our model presented in footnote 6, the tariff-revenue term in the welfare functions corresponds to consumer surplus arising from the consumption of the numeraire good, z .

We find that the best-response tariffs for the domestic and foreign governments are defined implicitly by

$$\text{Home: } W_{\hat{p}_x} + \lambda_x W_{p_x^w} = 0 = W_{\hat{p}_y} + \lambda_y W_{p_y^w} \tag{2}$$

$$\text{Foreign: } W_{\hat{p}_y^*} + \lambda_y^* W_{p_y^{w*}} = 0 = W_{\hat{p}_x^*} + \lambda_x^* W_{p_x^{w*}}.$$

The best-response tariffs are thus determined by the combined impact that the implied local- and world-price movements have on welfare.

A general interpretation can be offered with reference to Fig. 1. Let $A \equiv (\tau_x, \tau_x^*)$ represent an initial tariff pair for good x . This pair is associated with a domestic iso-local-price line (i.e., an iso-net-tariff line), denoted as $\iota(A) \rightarrow \iota(A)$, and an iso-world-price line, given as $p_x^w(A) \rightarrow p_x^w(A)$. The iso-local-price line is linear with a slope of unity, since the net tariff is held constant when an increase in the import tariff is matched by an equal increase in the export subsidy; on the other hand, the iso-world-price line slopes downward, because the world price can be held constant only if an increase in the export subsidy is balanced against a decrease in the import tariff. For a fixed τ_x^* , when τ_x is increased to τ_x^l , a new point $C \equiv (\tau_x^l, \tau_x^*)$ is induced. This point lies on new iso-price lines, represented as $\iota(C) \rightarrow \iota(C)$ and $p_x^w(C) \rightarrow p_x^w(C)$, and the local (world) price is now higher (lower) than it was originally at A .

As Eq. (2) suggests, the overall movement from A to C can be disentangled into separate movements in the world and local prices, respectively. The move-

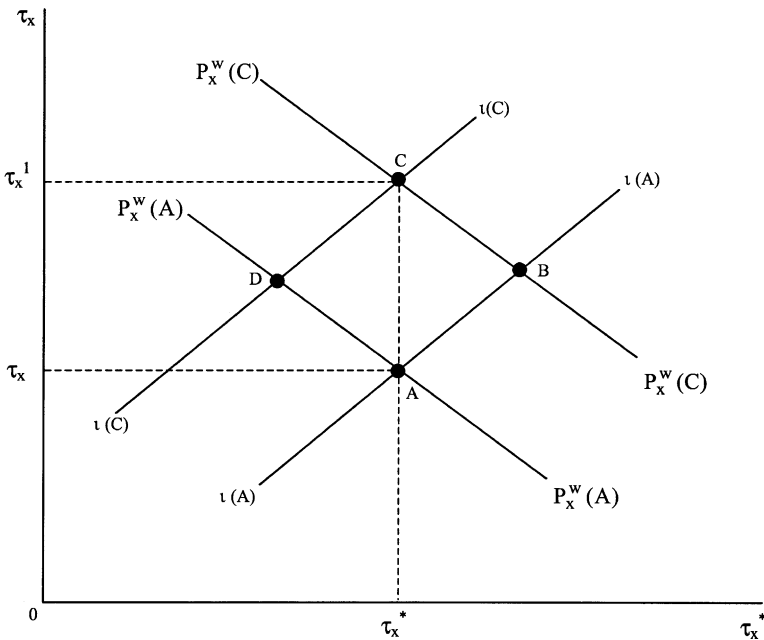


Fig. 1.

ment from A to B captures the induced reduction in the world price, holding fixed the local price, and the welfare implications of this change for the domestic government are associated in Eq. (2) with the term $W_{p_x^w}$. Similarly, the movement from B to C isolates the local price change, with the corresponding welfare change for the domestic government captured in Eq. (2) with the term $W_{\hat{p}_x}$. The world-price movement from A to B illustrates the cost-shifting inefficiency that arises when policies are set unilaterally. If the domestic government aspires to a local price corresponding to the iso-local-price line $\iota(C) \rightarrow \iota(C)$, then a unilateral increase in the domestic import tariff passes some of the costs of this outcome to the foreign government, whose exports are sold at a lower world price.

We now exploit the specific structure of the model and offer further interpretation of the best-response tariffs. Best-response tariffs are determined by two forces: the impact of tariffs on world prices (the terms of trade) and the impact of tariffs on local prices. It is through the *terms-of-trade effect* associated with world-price movements that a country can redistribute surplus from its trading partner to itself. As we demonstrate below, the local-price effect can be further disentangled into two component effects: a *political-economy effect* and an *efficiency effect*. The political-economy effect refers to the ability of trade policy to alter the local price and redistribute surplus between domestic producers and domestic consumers or tariff revenue, holding the volume of trade fixed. Trade policies also have an efficiency effect through their impact on local prices, as these local-price changes alter the volume of trade and thereby affect welfare. We establish below that the terms-of-trade effect leads governments to restrict trade more than if each were motivated only by local-price considerations.

To make these points, we note that the best-response condition (Eq. (2)) for the home government may be re-written as:

$$\{Q_x(\hat{p}_x)[\gamma_m - 1] + \tau_x[\partial M/\partial \hat{p}_x]\} + [3M(\hat{p}_x)/4] = 0 \tag{3a}$$

$$\{Q_y(\hat{p}_y)[\gamma_e - 1] - \tau_y[\partial E/\partial \hat{p}_y]\} + [-4E(\hat{p}_y)/3] = 0, \tag{3b}$$

where we use the fact that $\lambda_x = -3/4$ and $\lambda_y = -4/3$. The home import and export policies are optimal under Eqs. (3a) and (3b), respectively. Similar conditions apply for the foreign government.

The terms in curly brackets on the LHS of Eq. (3a) correspond to $W_{\hat{p}_x}$ in Eq. (2) and represent the local-price effect of a small increase in the domestic import tariff, τ_x . The first term, $Q_x(\hat{p}_x)[\gamma_m - 1]$, measures the net effect on consumer surplus and import-competing producer surplus when the fixed $Q_x(\hat{p}_x)$ units of domestically produced and consumed x are exchanged domestically at a higher price.¹⁰ This political-economy effect is positive when the implied redistribution is

¹⁰ The given $M(\hat{p}_x)$ units of imports also trade at a higher local price; however, the associated gain to total revenue is exactly offset by the corresponding loss to consumer surplus.

desirable (i.e., when $\gamma_m > 1$). The second term, $\tau_x[\partial M/\partial \hat{p}_x]$, is negative and captures the efficiency effect. It gives the efficiency cost to the domestic country when its import tariff is raised slightly, thereby inducing import volume (and tariff revenue) to fall. Finally, the last term on the LHS of Eq. (3a), given by $(3/4)M(\hat{p}_x)$, is positive and corresponds to $\lambda_x W_{p_x}$ in Eq. (2). It represents the increase in tariff revenue collected on the $M(\hat{p}_x)$ units of imported x attributable to the reduction in the world price that follows a slight increase in the import tariff; this is the terms-of-trade effect, and it reflects a redistribution of surplus from foreign exporters to the domestic country, the effect of which is to lower the cost to the domestic government of providing additional protection to its import-competing producers. Condition (3b) admits a similar interpretation, except that the terms-of-trade effect associated with a small increase in the export subsidy now redistributes surplus from the home to the foreign country, the effect of which is to raise the cost to the domestic government of providing additional help to its export interests.

We next solve Eqs. (3a) and (3b) to obtain the home government’s import-tariff and export-subsidy best-response (i.e., reaction) functions, respectively denoted as $\tau_x^R(\tau_x^*)$ and $\tau_y^R(\tau_y^*)$.¹¹ We find that the second-order conditions are satisfied if the political-economy weights are not too large, and so we assume that $\gamma_m \in [1,3]$ and $\gamma_e \in [1,3]$. As Fig. 2 illustrates, we find as well that the reaction curves are upward sloping.¹² The foreign-government import-tariff and export-subsidy reaction functions, $\tau_y^{*R}(\tau_y)$ and $\tau_x^{*R}(\tau_x)$, can be derived analogously.

For each good, we next determine the import tariffs and export subsidies at which the reaction curves intersect. Given the symmetry across countries and products, such a Nash equilibrium will be described by a Nash import tariff, $\tau_m^N \equiv \tau_x^N = \tau_y^{*N}$ and a Nash export subsidy, $\tau_e^N \equiv \tau_y^N = \tau_x^{*N}$. Solving, we find that the import-tariff and export-subsidy reaction curves agree if and only if

$$\begin{aligned} \tau_m^N &= \frac{104\gamma_m + 51\gamma_e - 24\gamma_m\gamma_e - 113}{6[101 - 8\gamma_m - 9\gamma_e]}; \\ \tau_e^N &= \frac{123\gamma_e + 56\gamma_m - 24\gamma_m\gamma_e - 179}{6[101 - 8\gamma_m - 9\gamma_e]}. \end{aligned} \tag{4}$$

Applying the conditions for prohibitive trade taxes recorded in Eq. (1) above, a

¹¹ Formally, the reaction functions take the following forms: $\tau_x^R(\tau_x^*) = \{[8\gamma_m - 5] + 2\tau_x^*[13 - 4\gamma_m]\} / \{4[17 - 2\gamma_m]\}$ and $\tau_y^R(\tau_y^*) = \{4[3\gamma_e - 4] + 3\tau_y^*[11 - 3\gamma_e]\} / \{3[25 - 3\gamma_e]\}$.

¹² Intuitively, when the foreign export subsidy increases, the domestic country experiences a rise in imports (i.e., $M(\hat{p}_x)$ increases) and a fall in domestic production (i.e., $Q_x(\hat{p}_x)$ decreases). The former (latter) change magnifies (weakens) the terms-of-trade (political-economy) gain that is associated with a higher import tariff. Our finding that the best-response functions are increasing indicates that the magnification of the terms-of-trade effect dominates the weakening of the political-economy effect.

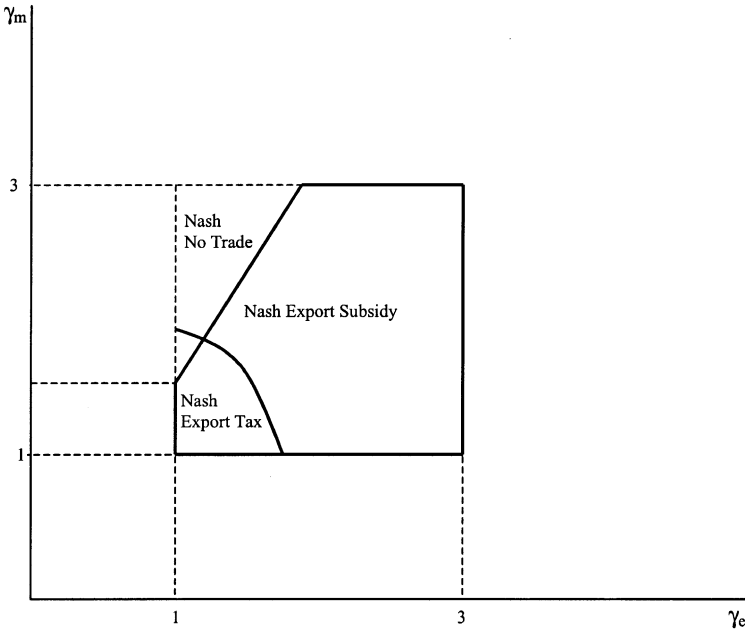


Fig. 3.

The situation is more ambiguous with respect to the Nash export subsidy. We find that

$$\tau_e^N > 0 \text{ iff } \gamma_m > [1253 - 861\gamma_e] / [56(7 - 3\gamma_e)]. \tag{7}$$

To interpret this condition, consider the case in which the political-economy effect is absent. In this case, the condition in Eq. (7) is violated, and the standard prescription of an export tax emerges: a slight export tariff offers a first-order benefit that is associated with the terms-of-trade effect, while the efficiency cost of reduced trade volume is second order for a small export tariff. When political-economy effects are included, however, the attractiveness of an export tariff is reduced, since an additional political-economy cost is experienced, as surplus is redistributed from domestic exporters to domestic consumers and tariff revenue. When political-economy influences are sufficiently pronounced, a slight export tariff is no longer desirable. In fact, the Nash equilibrium then entails an export subsidy.¹³

These conclusions are illustrated in Fig. 3. The upward-sloping line represents Eq. (5) and gives parameter combinations above which the Nash equilibrium net

¹³ Grossman and Helpman (1995) also note that an export subsidy is possible in a Nash equilibrium when the export sector has significant political power.

tariff exceeds the critical value of $1/6$; for this range of parameters, a Nash equilibrium with positive trade volume does not exist. The export-subsidy inequality given in Eq. (7) is represented by the downward-sloping line. The Nash export subsidy is positive if the political-economy weights, γ_m and γ_e , are sufficiently large. The Nash import tariff is positive throughout the parameter space.

Finally, we return to Fig. 2 and explore the possibility of autarky Nash equilibria. The dotted line is a “no-trade” line, along which the net tariff achieves the critical value of $1/6$. It is now easy to argue that all tariff/subsidy combinations to the northwest of the point AB represent autarky equilibria. To see this, suppose that the trade-policy choices in good x place the countries in this region, and consider the options available to the domestic government. Holding fixed the foreign-country export policy, if the domestic government is to deviate and induce a positive volume of trade, then it must cut its import tariff substantially and create a net tariff that lies below the no-trade line. But such an outcome is worse for the domestic government than is point A , which itself gives the autarky outcome.¹⁴ Thus, the domestic government cannot benefit by deviating, and the autarky trade policy is an equilibrium policy.

We summarize our specific findings with the following proposition:

Proposition 1. *In the static tariff game:*

- (i) *There exists a unique Nash equilibrium with positive trade volume.*
- (ii) *In the Nash equilibrium with positive trade volume, the Nash import tariff is positive, but the Nash export subsidy is positive if and only if the political-economy parameters are sufficiently large in magnitude.*
- (iii) *There also exist a continuum of autarky Nash equilibria.*

2.3. Trade agreements

In this subsection, we characterize the trade agreement that is efficient from the governments’ perspective, and we show that the Nash equilibrium is inefficient. We then define *politically optimal tariffs* as the tariffs that would be chosen by governments were they not motivated by their ability to affect the terms of trade. We find that a trade agreement that implements such tariffs is efficient. Finally, we exploit the specific structure of our model in order to gain more insight into the role of political-economy parameters in the determination of the various tariff policies.

¹⁴ It can be shown that welfare for a government declines along its reaction curve as the policy of its trading partner becomes more restrictive.

An efficient trade agreement calls for trade policies that maximize joint welfare, $W + W^*$. A first observation is that joint welfare is a function only of the net tariff levels. To see this, notice from the definitions of W and W^* that their sum is independent of world prices (since market clearing requires that $M(\hat{p}_x) = E^*(\hat{p}_x^*)$ and $E(\hat{p}_y) = M^*(\hat{p}_y^*)$). Intuitively, a change in world prices holding fixed local prices simply redistributes income across countries, and in our partial-equilibrium setting such a redistribution does not affect joint welfare, since the marginal utility of income for each country is fixed at unity. It follows that only local prices matter for efficiency. But, as we have seen, local prices depend only upon the net trade impediments in each sector, and so joint welfare is entirely determined by net tariffs.

Given the symmetry between sectors x and y , the efficient net tariff for market x will be the same as that for market y . Consequently, we may define $\iota \equiv \tau_x - \tau_x^* \equiv \tau_y^* - \tau_y$ and characterize the efficient level of the net trade impediment, ι . Letting $J(\iota) \equiv W + W^*$ denote joint welfare, and noting that the second-order condition, $J''(\iota) < 0$, holds generally under our parameter restrictions, the first-order condition that $J'(\iota) = 0$ defines the efficient trade agreement, ι^E . This first-order condition for efficiency can be written as

$$W_{\hat{p}_x} + W_{\hat{p}_x^*} / \lambda_x^* = 0. \quad (8)$$

Any set of tariff choices that imply net trade impediments which satisfy Eq. (8) will be efficient, with the difference across such sets reflecting the different international distributions of income implied by the different associated world prices. Condition (8) may be contrasted with those that describe the Nash equilibrium policies in Eq. (2). Observe in particular that terms-of-trade effects are relevant for governments when setting their Nash policies, but terms-of-trade effects are not relevant for governments when setting efficient trade policies. This discrepancy indicates that Nash tariffs are not efficient.

We consider next politically optimal tariffs. These are the tariffs that governments would choose were they not motivated by the terms-of-trade consequences of their choices. Formally, politically optimal tariffs are defined as tariffs that satisfy

$$W_{\hat{p}_x} = 0 = W_{\hat{p}_y}; \quad W_{\hat{p}_y^*} = 0 = W_{\hat{p}_x^*}. \quad (9)$$

It is immediate from a comparison of Eqs. (2), (8) and (9) that politically optimal tariffs are efficient and that these efficient tariffs will be attained if the terms-of-trade motivations from each government's Nash trade policy choices are eliminated.

A general perspective on these observations is possible with reference to Fig. 1. If the domestic government seeks to achieve a local price that corresponds to the iso-local-price line $\iota(C) \rightarrow \iota(C)$, then the attainment of this price involves no world-price externality when the domestic government's higher import tariff is

balanced against a lower foreign export subsidy, so that the world price is not altered. This corresponds to the movement from *A* to *D*. When the domestic government is not motivated by the terms-of-trade implications of its tariff policy, it prefers choosing a higher tariff and inducing point *C* instead of selecting a lower tariff and inducing point *A* if and only if it also prefers point *D* to point *A*. If both governments choose tariffs in this fashion, then a resulting consistent set of tariffs is politically optimal. In this case, the tariffs that governments select are not influenced by cost-shifting motivations, and so politically optimal tariffs are efficient.¹⁵

On the other hand, when the domestic government chooses its import tariff mindful of the terms-of-trade externality associated with movements in the world price (i.e., the movement from *D* to *C* in Fig. 1), then it recognizes that some of the costs of achieving the higher domestic local price are shifted to the foreign government through the resulting reduction in the world price. As a consequence, the domestic government can be expected to choose higher import tariffs (i.e., restrict trade more) than is jointly efficient. This explains why Nash trade policies are always inefficient, with trade volumes that are too low. The broad conclusion that thus emerges is that an inefficiency arises when governments set trade policies unilaterally if and only if they are motivated by terms-of-trade considerations.

To confirm and extend these observations, we now exploit the specific structure of our model. We begin with politically optimal trade policies. Imposing symmetry and solving Eq. (9) for an import tariff and export subsidy, τ_m^{PO} and τ_e^{PO} , that generate the local prices for each good that each government would prefer once terms-of-trade motivations have been eliminated, we find that

$$\tau_m^{PO} = \frac{4(\gamma_m - 1)(3 - \gamma_e)}{59 - 8\gamma_m - 9\gamma_e} \geq 0; \quad \tau_e^{PO} = \frac{4(\gamma_e - 1)(4 - \gamma_m)}{59 - 8\gamma_m - 9\gamma_e} \geq 0.$$

Observe that the politically optimal trade policy calls for reciprocal free trade when political-economy influences are absent (politically optimal tariffs are those each country would choose unilaterally if it were “small,” and absent political-economy motives small countries would unilaterally adopt free trade). Otherwise, the politically optimal trade policy involves an import tariff and an export subsidy.¹⁶

¹⁵ While a willingness to move from point *A* to point *D* in Fig. 1 induces no externality through the terms of trade, it will involve a change in the foreign local price; however, if the foreign government also selects tariffs that are politically optimal, then a small change in the foreign local price will not alter the foreign welfare in a first-order sense.

¹⁶ The politically optimal tariffs derived above correspond to the tariffs that governments would choose unilaterally in the small-country setting of Grossman and Helpman (1994), under the further assumption that $\gamma_m = \gamma_e \equiv (1 + a)/a$, with the parameter “*a*” denoting the weight placed on aggregate welfare in the government’s objective function defined in Eq. (5) of the Grossman and Helpman (1994) paper (see also footnote 8 above). These tariffs would also be consistent with the outcome of negotiations between large countries in Grossman and Helpman (1995).

We consider next the net tariffs. The efficient net tariff solves Eq. (8), and it is given by $\iota^E = 4[2\gamma_m - 3\gamma_e + 1]/[59 - 8\gamma_m - 9\gamma_e]$. Next, using Eq. (4), the Nash net tariff, $\iota^N \equiv \tau_m^N - \tau_e^N$, can be written as $\iota^N = [8\gamma_m - 12\gamma_e + 11]/[101 - 8\gamma_m - 9\gamma_e]$. As expected, when political-economy effects are absent, the efficient net tariff corresponds to free trade and the Nash net tariff is positive. We may define the politically optimal net tariff as $\iota^{PO} \equiv \tau_m^{PO} - \tau_e^{PO}$. The politically optimal net tariff is indeed efficient, as it follows easily that $\iota^{PO} = \iota^E$. Finally, using Eq. (5) it can be shown that $\iota^N - \iota^E > 0$.¹⁷ Thus, whether or not political-economy effects are present, the Nash equilibrium is inefficient, and the inefficiency always takes the form of a trade volume that is too low.

The central findings of this subsection are summarized as follows:

Proposition 2. *In the static tariff game:*

- (i) *The politically optimal import tariff and export subsidy are non-negative.*
- (ii) *The politically optimal trade policy is efficient.*
- (iii) *The Nash trade policy is not efficient, as the net Nash tariff is too high and the Nash trading volume is too low.*

3. Reciprocity

At this point, we have constructed a framework that reveals several specific insights regarding trade policy and that also delivers an answer to our first question. In particular, we find that governments can mutually gain from a trade agreement if and only if their unilateral trade policies are motivated by their ability to affect the terms of trade. We now turn to our second question and explore the sense in which a trade agreement that is founded on the principle of reciprocity can guide governments from their inefficient unilateral policies to the efficiency frontier.

To begin, it is useful to remark that the principle of reciprocity has two meanings. At a general level, the principle refers to the “balance of concessions”

¹⁷ Formally, we find that $\iota^N - \iota^E = 49[5 - 8\gamma_m + 9\gamma_e]/\{[101 - 8\gamma_m - 9\gamma_e][59 - 8\gamma_m - 9\gamma_e]\} > 0$, where the inequality follows from Eq. (5). It is interesting to note that $d(\iota^N - \iota^E)/d\gamma_m < 0 < d(\iota^N - \iota^E)/d\gamma_e$. Hence, while trade liberalization under an efficient trade agreement simply eliminates the terms-of-trade driven restrictions that arise in the absence of such an agreement, the magnitude of this liberalization is smaller (greater) as the political weight placed by governments on import interests (export interests) is larger. This reflects the fact that a larger political weight on import interests (export interests) results in a lower (higher) trade volume in the Nash equilibrium, and thus a diminished (expanded) role for terms-of-trade considerations in the Nash trade-policy choices.

that governments seek when they enter into trade negotiations. As Dam (1970, p. 59) explains, the language of GATT Article XXVIII bis, under which the rounds of GATT (and now WTO) tariff negotiations occur, makes it clear that participation in these negotiations is to be voluntary, and that negotiations are to be carried out “on a reciprocal and mutually advantageous basis.” Dam continues:

This permissive approach to the content of tariff agreements is often referred to under the heading of reciprocity. From the formal legal principle that a country need make concessions only when other contracting parties offer reciprocal concessions considered to be ‘mutually advantageous’ has been derived the informal principle that exchanges of concessions must entail reciprocity. (Dam, 1970, p. 59)

As is evident from Dam’s discussion, there is nothing in GATT which *requires* that the outcome of negotiations produce a balance of concessions. Indeed, the notion of a balance of concessions is nowhere defined in the WTO. This general principle of reciprocity describes instead the broad manner in which governments seem to approach trade negotiations.

On the other hand, under GATT Article XXVIII, governments are provided with the right to *renegotiate* tariff commitments made initially under GATT Article XXVIII bis, and it is when governments fail to come to agreement under these renegotiations that GATT Article XXVIII *imposes* the requirement of reciprocity on the resulting tariff changes. In particular, if a country withdraws a tariff concession to which it had committed in a previous round of tariff negotiations, its trading partners are then authorized to withdraw “substantially equivalent concessions.” We develop more fully and analyze these two notions of reciprocity below.

3.1. *General meaning*

We start with the general notion of reciprocity. As mentioned, in trade-policy negotiations, it is often the case that each government views a reduction in its own tariff as a “concession” that is offered only if its trading partner reciprocates with a concession of its own. The general meaning of reciprocity then refers to the balance of concessions that governments seek in their trade-policy negotiations. The manner in which governments approach trade agreements suggests a mercantilist perspective. Our first task is to establish that this seeming mercantilist orientation in fact can be explained within our framework.

To make this point, we must formalize what is meant by a balance of concessions. We will say that a proposed set of reciprocal tariff reductions constitutes a *balance of concessions* provided that, when valued at existing world prices, the proposed set of tariff reductions together bring about equal increases in

the volume of each country’s imports and exports.¹⁸ Within the context of our model, we find that a proposed set of tariffs $\{\tau_x^1, \tau_y^1, \tau_x^{*1}, \tau_y^{*1}\}$ achieves a balance of concessions relative to an existing set of tariffs $\{\tau_x^0, \tau_y^0, \tau_x^{*0}, \tau_y^{*0}\}$ provided that¹⁹

$$\begin{aligned} & \left[p_x^w(\tau_x^0, \tau_x^{*0}) - p_x^w(\tau_x^1, \tau_x^{*1}) \right] M(\iota_x^1) \\ & = \left[p_y^w(\tau_y^0, \tau_y^{*0}) - p_y^w(\tau_y^1, \tau_y^{*1}) \right] M^*(\iota_y^1), \end{aligned}$$

where we now simplify our notation and express import volumes directly as functions of net tariffs. By inspection of the welfare functions, it can be seen that this condition is satisfied by any set of tariff reductions that (i) leaves world prices unchanged, or (ii) alters world prices in a way that keeps each government’s welfare unaffected by the world price changes. Hence, in seeking a balance of concessions, governments seek reciprocal tariff reductions from their trading partners that will neutralize the world-price effects of their own liberalization.

With a balance of concessions now defined, we examine the liberalization paths that governments might follow in moving from the Nash equilibrium to an efficient trade agreement. Given the symmetry of the model, it is natural to consider the class of *symmetric* liberalization paths along which $\tau_x = \tau_y^* \equiv \tau_m$ and $\tau_y = \tau_x^* \equiv \tau_e$. It is now evident that *any* liberalization path within this class delivers the balance of concessions demanded under reciprocity. To see this, note that import volume may be written as $M(\iota) \equiv (1 - 6\iota)/7 \equiv M^*(\iota)$, where $\iota \equiv \tau_m - \tau_e$, while world prices satisfy $p_x^w(\tau_m, \tau_e) \equiv p_y^w(\tau_m, \tau_e)$. Thus, as liberalization occurs from the Nash equilibrium and the net tariff ι is reduced, import and export volumes increase in equal amounts and the world prices adjust (if at all) in equal amounts as well.

The liberalization process can be further understood with reference to Fig. 4. There, we depict Nash trade policies (τ_m^N, τ_e^N) by the point labeled *N* and politically optimal trade policies $(\tau_m^{PO}, \tau_e^{PO})$ by the point labeled *PO* under the

¹⁸ See Dam (1970, pp. 58–61) for a discussion and interpretation of the notion of reciprocity that appears in GATT negotiation rounds and that is broadly consistent with our approach. Bhagwati (1991) offers a similar interpretation and refers to “first-difference reciprocity.”

¹⁹ Referring to the general-equilibrium interpretation of our model described in footnote 6, we define reciprocity as the condition:

$$\begin{aligned} & p_x^w(\tau_x^0, \tau_x^{*0}) \left[M(\tau_x^1) - M(\tau_x^0) \right] + M_z(\tau_x^1, \tau_y^1) - M_z(\tau_x^0, \tau_y^0) \\ & = p_y^w(\tau_y^0, \tau_y^{*0}) \left[M^*(\tau_y^1) - M^*(\tau_y^0) \right], \end{aligned}$$

where M_z denotes domestic-country imports of the numeraire good z . We utilize the requirement of balanced trade at the existing set of world prices to eliminate all existing trade volumes (i.e., the trade volumes at the existing set of tariffs) from this condition, while the requirement of balanced trade at the set of world prices under the proposed tariffs is used to eliminate trade in the numeraire good under the proposed tariffs from this condition. With this, the reciprocity condition takes the form given in the text.

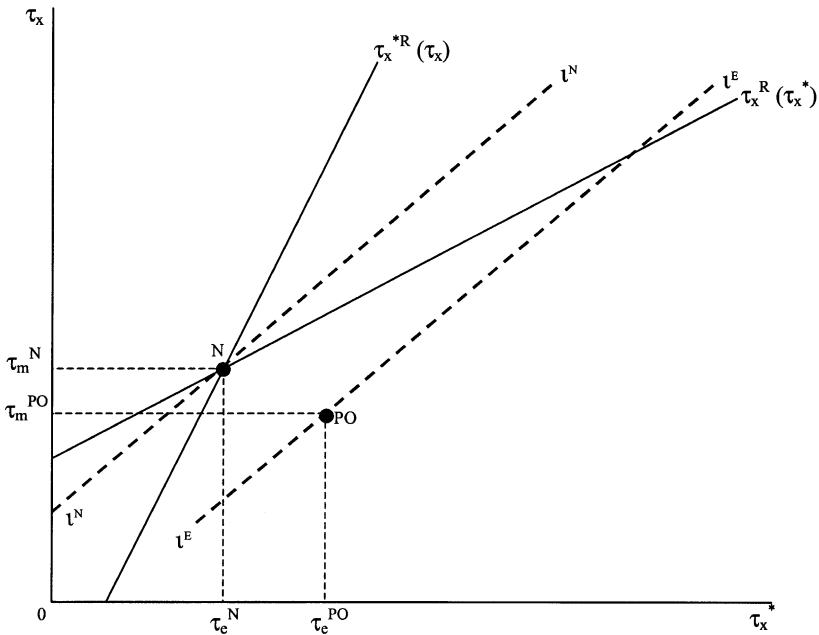


Fig. 4.

assumption that export interests are sufficiently powerful to secure an export subsidy in the Nash equilibrium.²⁰ Fig. 4 also depicts iso-efficiency loci through both the Nash and politically optimal points. Each iso-efficiency locus gives combinations of τ_m and τ_e that hold ι —and thus joint welfare $J(\iota \equiv \tau_m - \tau_e)$ —constant. We label the iso-efficiency line through PO (N) by $\iota^E \rightarrow \iota^E$ ($\iota^N \rightarrow \iota^N$).

Starting from the Nash equilibrium, an efficient symmetric trade agreement will call for the symmetric liberalization of net trade impediments (a reduction in ι) in order to move the world from point N in Fig. 4 to a point (any point) on the iso-efficiency line $\iota^E \rightarrow \iota^E$.²¹ It is direct from the definition of ι^E and the concavity of $J(\iota)$ that joint welfare (and the welfare of each government) increases monotonically from the Nash equilibrium as ι falls to ι^E . This liberalization process achieves Pareto improvements by “undoing” the effects of the terms-of-trade motivations that caused the initial discrepancy between the Nash and efficient policies.

²⁰ It can be shown that the Nash import tariff (export subsidy) is greater (less) than the politically optimal import tariff (export subsidy). This relationship is illustrated in Fig. 4.

²¹ Symmetry across countries, products and trade policies ensures that movements along the iso-efficiency line, which by definition hold fixed the local prices in each country, will alter world prices in such a way as to leave each government’s overall welfare unchanged.

Our model thus rationalizes the seeming mercantilist approach with which governments approach trade negotiations. In particular, each government enters into negotiations: (1) seeking a foreign concession, because a reduced foreign tariff helps its export interests in a manner that is less costly than would be a unilateral increase in the export subsidy, which would result in a terms-of-trade loss; (2) viewing its own import liberalization as a concession, because a reduction in the import tariff entails a terms-of-trade loss; and (3) expecting to gain from a concession at home that is balanced against a concession abroad, because the balance of concessions so achieved serves to neutralize the terms-of-trade decline that would have made unilateral liberalization undesirable.²²

We have thus argued that the general practice of reciprocity can be understood in terms of the desire of governments, whatever their political preferences, to escape from a terms-of-trade driven Prisoners' Dilemma.²³ But, if this is the case, then why do not governments more often explicitly mention the terms of trade when explaining the appeal of a trade agreement? Instead, policy makers usually link the benefits of a trade agreement to the improved market access that their respective exporters will enjoy. The distinction, however, is largely semantic. The domestic government potentially benefits from a trade agreement when the foreign government reduces its tariff. In turn, this benefit may be understood with reference to the terms of trade (as in the model presented above) or with reference to enhanced market access that domestic exporters would then enjoy (as in the policy speeches commonly heard).²⁴

3.2. *GATT Article XXVIII*

We consider next the specific representation of reciprocity that is found within the WTO. As discussed above, while reciprocity may be a desired outcome of

²² Krugman (1991, p. 25) refers to the manner in which governments approach trade agreements as "enlightened mercantilism," since governments appear to believe that: "(1) Exports are good; (2) Imports are bad; (3) Other things equal, an equal increase in imports and exports is good." As the discussion here confirms, these three objectives are directly consistent with rational government behavior, once the terms-of-trade externality is identified as the problem that a trade agreement is designed to solve.

²³ Of course, there are other bargaining rules which can be specified that could also assist governments in achieving an efficient trade agreement. At a theoretical level, though, the principle of reciprocity is especially appealing, since it neutralizes the world price and thereby directly arrests the source of the inefficiency. And in any event, the efficiency properties of the principle of reciprocity are of particular interest, since reciprocity is a central principle of the trade agreement (GATT and now the WTO) that we study and since it is commonly argued that this principle reflects a misguided mercantilist perspective.

²⁴ This formal analogy between market-access and terms-of-trade objectives is developed in Bagwell and Staiger (in press).

negotiators, the WTO does not require reciprocity in negotiating rounds (GATT Article XXVIII bis; Dam, 1970, pp. 58–59; Jackson, 1989, p. 123). However, once negotiations are concluded and tariff bindings are set, the WTO does limit countries to abide by reciprocity in the event that a country withdraws or modifies a previously negotiated concession (tariff binding), which it is essentially free to do at any time (GATT Article XXVIII; Dam, 1970, pp. 79–99; Jackson, 1989, p. 119). Hence, rather than a requirement that the outcomes of negotiations conform to reciprocity, the WTO imposes reciprocity in a more indirect way: Whatever the outcome of negotiations, any country is permitted to raise its tariffs in the future and thereby reduce import volumes, in the knowledge that its trading partners will be entitled to respond by withdrawing substantially equivalent concessions of their own.²⁵ An important issue is whether the WTO’s embodiment of reciprocity restricts the kinds of trade agreements that can be implemented.

To explore this issue, we must formalize what is meant by substantially equivalent concessions. As with the notion of balanced concessions, the WTO does not provide a precise definition of substantially equivalent concessions for the purpose of withdrawal, but we will say that, if a country proposes to increase a previously negotiated tariff, a proposed set of tariff increases by its trading partner will constitute a withdrawal of *substantially equivalent concessions* provided that, when evaluated at the original world prices, the proposed tariff increases together bring about equal reductions in the volume of each country’s imports and exports.²⁶ Given a previously negotiated set of tariffs $\{\tau_x^1, \tau_y^1, \tau_x^{*1}, \tau_y^{*1}\}$, a proposed set of renegotiated tariffs $\{\tau_x^2, \tau_y^2, \tau_x^{*2}, \tau_y^{*2}\}$ will represent an initial tariff withdrawal by one country and a withdrawal of substantially equivalent concessions by its trading partner provided that

$$\begin{aligned} & \left[p_x^w(\tau_x^1, \tau_x^{*1}) - p_x^w(\tau_x^2, \tau_x^{*2}) \right] M(\iota_x^2) \\ & = \left[p_y^w(\tau_y^1, \tau_y^{*1}) - p_y^w(\tau_y^2, \tau_y^{*2}) \right] M^*(\iota_y^2). \end{aligned}$$

Once again, inspection of the welfare functions reveals that this condition is satisfied by any set of tariff increases that (i) leaves world prices unchanged, or (ii) alters world prices in a way that keeps each government’s welfare unaffected by the world price changes. Thus, reciprocity ensures that any renegotiation will be

²⁵ GATT Article XXVIII renegotiations require that the negotiating parties “endeavor to maintain a general level of reciprocal and mutually advantageous concessions not less favorable to trade than that provided for in this Agreement.” (GATT Article XXVIII:2) However, GATT Article XXVIII renegotiations need not result in agreement, in which case “... the applicant is free to carry out the proposed changes. Both negotiating and consulted contracting partners are correspondingly free to withdraw ‘substantially equivalent concessions.’” (Dam, 1970, p.86).

²⁶ Dam (1970, pp. 87–91) provides an interpretation of GATT’s definition of substantially equivalent concessions that is broadly consistent with our approach.

over the set of outcomes which are feasible under the world prices that were established in the original negotiations.

Effectively, then, the representation of reciprocity in the WTO implies that, when governments negotiate tariff bindings, they are really negotiating a set of world prices upon which, in the event of future tariff increases by any one country, reciprocal tariff increases by its trading partners will be gauged.²⁷ To capture this process, we consider a three-stage negotiation game (for each good). In the initial negotiation stage (corresponding to GATT Article XXVIII bis), governments agree to bind their tariffs at specified levels. The second stage is a renegotiation stage (corresponding to GATT Article XXVIII), where any renegotiation satisfies the restriction of reciprocity as outlined above, and thus results in mutual changes in tariffs that preserve the world price from the first stage.²⁸ Finally, we introduce a third stage that arises if governments fail to agree on a renegotiated set of tariffs. In this case, we specify that the tariffs that are implemented are those that achieve the greatest trade volume consistent with the restriction of reciprocity and the requirement that no country is asked to import a volume greater than is implied by its government's proposal in the renegotiation stage. This specification is motivated by the basic idea that concession withdrawals are always feasible (corresponding to GATT Article XXVIII) and so no country can be forced to import a volume greater than it desires (holding fixed the world price).

A formal statement of the three-stage game requires some definitions. For any good $i = x, y$, given a world price \bar{p}_i^w that is determined in the first stage of the negotiations, we will say that a renegotiated tariff pair (τ_i, τ_i^*) satisfies the *restriction of reciprocity* if the pair preserves the original world price: $p_i^w(\tau_i, \tau_i^*) = \bar{p}_i^w$. If in the renegotiation stage the domestic government proposes a domestic tariff $\hat{\tau}_i$ and the foreign government proposes a foreign tariff $\hat{\tau}_i^*$, then under the restriction of reciprocity the tariff proposed by one government will “imply” a world-price-preserving tariff for its trading partner. We thus define the domestic government's implied foreign tariff, $\tau_i^* = \tau_i^*(\hat{\tau}_i, \bar{p}_i^w)$, and likewise the foreign government's implied domestic tariff, $\tau_i = \tau_i(\hat{\tau}_i^*, \bar{p}_i^w)$, by the requirements that $(\hat{\tau}_i, \tau_i^*(\hat{\tau}_i, \bar{p}_i^w))$ and $(\tau_i(\hat{\tau}_i^*, \bar{p}_i^w), \hat{\tau}_i^*)$ satisfy the restriction of reciprocity. We may then say that the proposed tariffs, $\hat{\tau}_i$ and $\hat{\tau}_i^*$, *agree* if they imply the same tariff pair along the iso-world-price locus: $(\hat{\tau}_i, \tau_i^*(\hat{\tau}_i, \bar{p}_i^w)) = (\tau_i(\hat{\tau}_i^*, \bar{p}_i^w), \hat{\tau}_i^*)$. When the proposed tariffs do not agree, the pair (τ_i, τ_i^*) that is implemented in the final stage satisfies the *restriction of proposed trade volume*

²⁷ In terms of market access, what governments are really negotiating is the balance of their market access commitments (which determines the world prices), but not necessarily the level of these commitments (see also footnote 24).

²⁸ Hence, we restrict attention to tariff renegotiations that satisfy the restriction of reciprocity by keeping each world price fixed. In light of our discussion of the particular world price changes that reciprocity would allow, this restriction involves no formal loss of generality.

limits if the trade volume under (τ_i, τ_i^*) is no greater than the trade volume implied by the proposal of each government. This final restriction formalizes the idea that no government can be forced to trade a volume greater than implied by its own proposal in the renegotiation stage. Fig. 5 illustrates for good x a domestic government proposal that implies less trade volume than the foreign government’s proposal (and hence the domestic government’s proposal would be implemented).

We now formally define the *Bilateral Negotiation Game* that is applied to each good:

- Stage 1 Governments bargain over trade policies and a world price is determined.
- Stage 2 The domestic government proposes a domestic tariff at the same time that the foreign government proposes a foreign tariff. If the proposals agree, then they are implemented as the outcome of the negotiation.
- Stage 3 If the proposals do not agree, then the tariffs that are implemented are those which achieve the greatest trade volume while satisfying the restrictions of reciprocity and proposed trade volume limits.

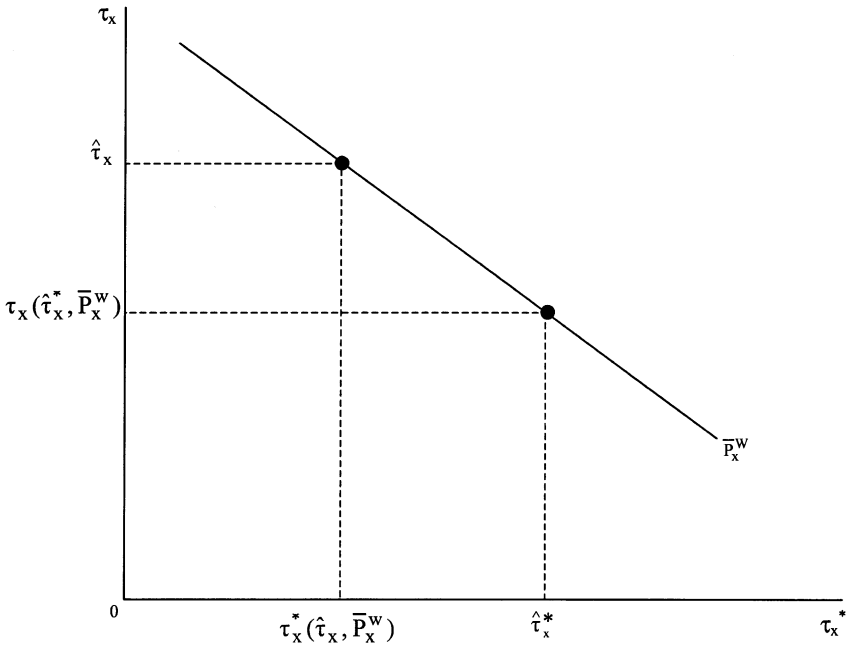


Fig. 5.

This game allows each government to “renegotiate” to a new trade-policy pair, provided that the pair generates the same world price that arose in the first stage. As our interest lies in the set of trade-policy outcomes that *can* be achieved under the representation of reciprocity given in stages 2 and 3, we do not offer a formal description of the stage 1 bargaining process.²⁹

In light of the symmetry of the model, we again consider the class of *symmetric* tariffs ($\tau_x = \tau_y^* \equiv \tau_m$ and $\tau_y = \tau_x^* \equiv \tau_e$) and the corresponding symmetric world price ($p_x^w = p_y^w \equiv p^w$). We will say that a tariff pair $\{\bar{\tau}_m, \bar{\tau}_e\}$ can be *implemented under reciprocity* if there exists a world price \bar{p}^w such that the outcome of stages 2 and 3 of the Bilateral Negotiation Game is uniquely $\{\bar{\tau}_m, \bar{\tau}_e\}$ when governments make dominant proposals.

We first state a property of any tariff pair that can be implemented under reciprocity:

Proposition 3. *A tariff pair can be implemented under reciprocity if and only if it satisfies either $\{W_{\hat{p}_x} = 0, W_{\hat{p}_y}^* = 0, W_{\hat{p}_x}^* \geq 0, W_{\hat{p}_y} \geq 0\}$ or $\{W_{\hat{p}_y} = 0, W_{\hat{p}_x}^* = 0, W_{\hat{p}_x}^* \leq 0, W_{\hat{p}_y} \leq 0\}$.*

Proposition 3 says that a tariff pair can be implemented under reciprocity if and only if, when faced with the fixed world prices implied by that tariff pair, at least one government is content with the volume of trade and no government wants reduced trade volume.

The argument is as follows. Given any world price determined in stage 1, the restriction of proposed trade volume limits ensures that, if the tariff proposals of stage 2 do not agree, then the tariff pair implied by the most restrictive proposal will be implemented in stage 3. This means that it is a dominant strategy for each government to propose a tariff that implies its preferred trade volume at the given world price, and hence the stage 2 proposals will satisfy $\{W_{\hat{p}_i} = 0, W_{\hat{p}_i}^* = 0\}$ for $i = x, y$.³⁰ For any good, at the tariffs that are ultimately implemented, it follows that either the importing government achieves its preferred trade volume while the exporting government weakly seeks greater volume or the exporting government achieves its preferred trade volume while the importing government weakly seeks

²⁹ We think of Stage 1 of the Bilateral Negotiation Game as representing a round of tariff negotiations under GATT Article XXVIII bis, and Stage 2 as the ensuing GATT Article XXVIII renegotiation. Note that nothing “happens” between stages 1 and 2 (i.e., no “shock,” no new information), and that this is consistent with the fact that no justification need be given for renegotiation under GATT Article XXVIII.

³⁰ To see that these proposals are dominant, consider the domestic government. If it makes such a proposal, then either (i). the foreign government’s proposal will be no more trade restrictive, in which case the domestic government achieves its preferred point on the given iso-world-price locus, or (ii). the foreign proposal is more restrictive, in which case the domestic proposal is not pivotal, and it could be made pivotal only if it were made even more restrictive, which would imply an even worse outcome for the domestic government.

greater trade volume. Imposing symmetry, we capture these two possibilities in Proposition 3.

We now consider whether efficient trade agreements can be implemented under reciprocity, and if so, the form that these agreements take. We find the following:

Proposition 4. *An efficient trade agreement can be implemented under reciprocity if and only if it is characterized by tariffs which are set at their politically optimal levels.*

Hence, our framework can provide a logic to the representation of reciprocity found in the WTO, but only if governments seek through the WTO to implement the tariffs that remain when the terms-of-trade motivations from each government’s Nash trade policies are eliminated: No other efficient set of tariffs can be implemented under reciprocity.³¹

The formal argument is direct. An efficient agreement is on the locus defined by Eq. (8) as $W_{\hat{p}_x} + W_{\hat{p}_x^*} / \lambda_x^* = 0$, with the symmetric condition holding for good y . Under Proposition 3, though, a tariff pair can be implemented under reciprocity if and only if it satisfies either $\{W_{\hat{p}_x} = 0, W_{\hat{p}_y^*} = 0, W_{\hat{p}_x^*} \geq 0, W_{\hat{p}_y} \geq 0\}$ or $\{W_{\hat{p}_y} = 0, W_{\hat{p}_x^*} = 0, W_{\hat{p}_y^*} \leq 0, W_{\hat{p}_x} \leq 0\}$. It thus follows that an efficient trade agreement can be implemented under reciprocity if and only if it satisfies $W_{\hat{p}_x} = 0 = W_{\hat{p}_x^*}$ and $W_{\hat{p}_y} = 0 = W_{\hat{p}_y^*}$. But this is by Eq. (9) the definition of politically optimal tariffs.

The basic intuition is illustrated in Fig. 6. This figure depicts the iso-efficiency line through the Nash point (labeled $\iota^N \rightarrow \iota^N$), the iso-efficiency line through the politically optimal point (i.e., the efficiency locus, labeled $\iota^E \rightarrow \iota^E$), and iso-welfare contours for the importing and exporting government. At a political optimum (labeled PO in the figure), these iso-welfare contours are tangent to each other and to a world price line (labeled p_{PO}^w) and the corresponding tariffs can be implemented under reciprocity. At a point on the efficiency locus such as that labeled $H(L)$, the iso-welfare contours are again tangent to each other but now the iso-world-price line through this point is steeper (flatter) than their common tangency. The tariffs associated with point $H(L)$ are not politically optimal, and they cannot be implemented under reciprocity as the importing (exporting) govern-

³¹ Terms-of-trade motivations lead all governments to protect against imports too readily and to promote exports too timidly relative to the efficient levels of intervention given their preferences. Hence, Proposition 4 implies that import tariffs will be reduced in an efficient trade agreement that is implemented under reciprocity, but that export subsidies should be *encouraged*. This suggests that the WTO’s attempt to restrict export subsidies may be misplaced, since such attempts work against the basic task of expanding trade volumes from inefficiently low levels. In fact, the treatment of subsidies in GATT and now the WTO has long been a source of controversy and confusion. GATT originally contained no rules on the use of export subsidies, and then later introduced and repeatedly tightened its rules on allowable export subsidies and on subsidies more broadly (Jackson, 1989, pp. 249–273). For an analysis of the treatment of export subsidies in international trade agreements, see Bagwell and Staiger (1997a).

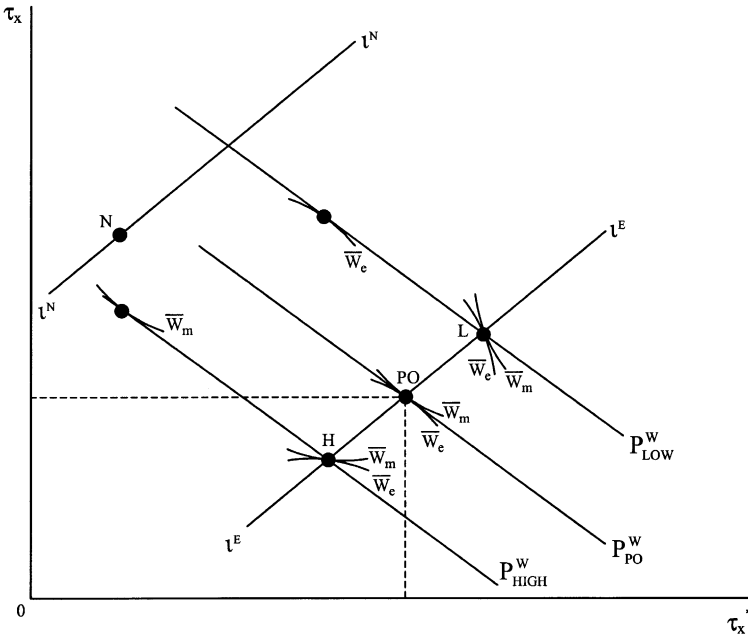


Fig. 6.

ment will desire less liberalization than is required to reach the efficiency locus along this world price line.³²

We have now provided an answer to our second question, finding that the principle of reciprocity serves to “undo” the terms-of-trade driven restrictions in trade volume that occur when governments pursue unilateral trade policies. In this way, reciprocity acts as a principle that guides member governments to a more efficient outcome. We turn next to our third and fourth questions and consider the principle of non-discrimination and preferential agreements.

4. Trade agreements in a many-country framework

We now extend the two-country model of the previous section to a many-country setting. We continue to assume that there is a single home country (no ^{*}), but

³² While we do not specify the bargaining environment in the first stage of the Bilateral Negotiation Game, it is immediate that any first-stage bargaining structure that yields an efficient outcome to the Bilateral Negotiation Game must implement politically optimal tariffs. For instance, it can be shown that if the Generalized Nash Bargaining solution is applied to the first stage of the Bilateral Negotiation Game, politically optimal tariffs will be the unique outcome provided that international lump-sum transfers are feasible with instruments that are not subject to the negotiation rules of the WTO.

we now allow the home country to import good x from three separate foreign sources. The set of foreign countries is denoted by $N^* \in \{1, 2, 3\}$. For simplicity, we focus on trade among the four countries in good x alone.³³

4.1. Model

In this subsection, we present our basic assumptions, determine the market-clearing prices and trade volumes, and define the government welfare functions.

4.1.1. Basic assumptions

The good x is produced and demanded in each of the four countries, but the demand and supply functions are such that the domestic country is a natural importer of good x while the three foreign countries are natural exporters of this good. Letting p denote the local price of x in the domestic market, the domestic demand and supply functions are respectively represented with the functions $D(p)$ and $Q(p)$. We assume that the three foreign countries are symmetric. Denoting the local price of good x in foreign country j as p^{*j} , the corresponding demand and supply in foreign country j are given as $D^*(p^{*j})$ and $Q^*(p^{*j})$. We represent the domestic import volume as $M(p) \equiv D(p) - Q(p)$, while the export volume of foreign country j is denoted as $E^*(p^{*j}) \equiv Q^*(p^{*j}) - D^*(p^{*j})$. Finally, the respective profit functions are given as $\Pi(p)$ and $\Pi^*(p^{*j})$.

While we describe our main findings in general terms, it is sometimes convenient to refer to a concrete version of the model. To this end, we assume that $D(p) = 1 - p$, $Q(p) = p/2$, $D^*(p^{*j}) = (1 - p^{*j})/3$ and $Q^*(p^{*j}) = p^{*j}/3$, from which it follows that $M(p) = 1 - 3p/2$, $E^*(p^{*j}) = [2p^{*j} - 1]/3$, $\Pi(p) = (p)^2/4$ and $\Pi^*(p^{*j}) = (p^{*j})^2/6$.

4.1.2. Price determination

Let τ^j denote the specific import tariff on home imports of x from foreign country j , and let τ^{*j} similarly denote the specific export subsidy on exports of x from foreign country j . Provided that trade taxes do not prohibit trade, the local prices must obey the following arbitrage and market-clearing conditions:

$$p = p^{*j} + \tau^j - \tau^{*j} \quad \text{and} \quad M(p) = \sum_{j \in N^*} E^*(p^{*j}).$$

The market-clearing prices again depend upon the net tariffs. Letting $\iota^j \equiv \tau^j - \tau^{*j}$ denote the net tariff between the domestic country and foreign country j , we may thus represent the market-clearing local prices as $p(\iota^1, \iota^2, \iota^3)$ and $p^{*j}(\iota^1, \iota^2, \iota^3)$. The domestic market-clearing local price, $p(\iota^1, \iota^2, \iota^3)$, is increasing in each argument, while the foreign market-clearing local price, $p^{*j}(\iota^1, \iota^2, \iota^3)$, is decreasing in ι^j and increasing in its other arguments.

³³ While trade between each of the foreign countries could be induced by discriminatory home tariffs, we abstract from this possibility.

Turning now to the world price, we begin with the observation that each bilateral trading relationship is associated with its own “world” price. Letting p^{wj} denote the world (untaxed) price of x between the home country and foreign country j , we have that the world price satisfies $p = p^{wj} + \tau^j$ and $p^{*j} = p^{wj} + \tau^{*j}$. Using the solutions for the market-clearing local prices, we may express the world price as $p^{wj}(\tau^j, \iota^1, \iota^2, \iota^3)$.³⁴ This function is decreasing in its first argument and increasing in all of its other arguments. Market-clearing local prices also may be expressed as functions of world prices: $\hat{p}(\tau^j, p^{wj}(\tau^j, \iota^1, \iota^2, \iota^3)) = p^{wj}(\tau^j, \iota^1, \iota^2, \iota^3) + \tau^j$ and $\hat{p}^{*j}(\tau^{*j}, p^{wj}(\tau^j, \iota^1, \iota^2, \iota^3)) = p^{wj}(\tau^j, \iota^1, \iota^2, \iota^3) + \tau^{*j}$. Finally, we observe that bilateral trades link world prices according to

$$p^{wj} + \tau^j = p^{wk} + \tau^k \tag{10}$$

for $j, k \in N^*$. Hence, if domestic tariffs conform to MFN, then $\tau^1 = \tau^2 = \tau^3 \equiv \tau$ and therefore a single world price obtains with $p^{w1} = p^{w2} = p^{w3} \equiv p^w$.

4.1.3. Trade volumes

With the market-clearing local and world prices now determined, it is possible to provide the condition under which the market-clearing trade volumes are positive. Exploiting the specific structure of the model, it can be shown that trade policies are non-prohibitive provided that

$$\iota^j < (4/7) \left[1/8 + \sum_{i \in N^*} \iota^i / 3 \right], \text{ for } j \in N^* .$$

Thus, trade volumes are positive provided that the net tariffs are not too high.

4.1.4. Government objectives

As in the previous section, governments are assumed to maximize a weighted sum of consumer surplus, producer surplus and tariff revenue. Since each foreign country trades only with the home country, the objectives of each foreign country can be written as a function of its local price and the world price between it and the home country. Specifically, the welfare function for the government of foreign country j is

$$\begin{aligned} W^{*j}(\hat{p}^{*j}, p^{wj}) \\ \equiv \int_{\hat{p}^{*j}}^1 D(p^{*j}) dp^{*j} + \gamma_c^j \Pi^*(\hat{p}^{*j}) - [\hat{p}^{*j} - p^{wj}] E^*(\hat{p}^{*j}). \end{aligned}$$

Notice that the political-economy weight placed upon the export sector may differ across the foreign governments.

While the foreign-government welfare functions are similar to those derived in the previous section, the home government now faces three trading partners

³⁴ Explicit solutions for the various prices can be found in Appendix A.

against which it can discriminate, and so its welfare function is more complicated. The home-government welfare function is defined as

$$W(\hat{p}, \hat{p}^{*1}, \hat{p}^{*2}, \hat{p}^{*3}, p^{w1}, p^{w2}, p^{w3}) \equiv \int_{\hat{p}}^1 D(p) dp + \gamma_m \Pi(\hat{p}) + \sum_{j \in N^*} [\hat{p} - p^{wj}] E^*(\hat{p}^{*j}).$$

Observe that the home-government welfare function depends upon the home local price, the world prices and the foreign local prices.

The welfare functions reveal an interesting pattern of externalities. As before, externalities pass between countries through the corresponding world prices. Now, however, there is an additional externality channel through which a foreign tariff can affect home welfare. For any fixed volume of imports (i.e., for any fixed home price), the home government prefers that more of the given import volume is allocated to the foreign country against which it has the highest tariff. Thus, foreign local prices, which determine foreign export flows, exert a separate externality on home welfare, even when the local home and world prices are fixed. Notice that this local price externality is removed when the home government adopts non-discriminatory tariffs, in which case home tariff revenue can be expressed simply as a function of the home local price and the single world price (i.e., as $[\hat{p} - p^w]M(\hat{p})$).

The home welfare function also can be written as a function of the home local price and a composite variable, $\hat{T} = \hat{T}(\hat{p}^{*1}, \hat{p}^{*2}, \hat{p}^{*3}, p^{w1}, p^{w2}, p^{w3})$ that represents the home country's multilateral terms of trade. To this end, we define bilateral trade shares by

$$s^{*j}(\hat{p}^{*1}, \hat{p}^{*2}, \hat{p}^{*3}) \equiv \frac{E^*(\hat{p}^{*j})}{\sum_{i \in N^*} E^*(\hat{p}^{*i})},$$

and we then define \hat{T} as a weighted average of the world prices that the home country faces:

$$\hat{T} \equiv \sum_{i \in N^*} s^{*i}(\hat{p}^{*1}, \hat{p}^{*2}, \hat{p}^{*3}) \cdot p^{wi}.$$

It is now direct to verify that home welfare may be re-written as

$$W(\hat{p}, \hat{T}) \equiv \int_{\hat{p}}^1 D(p) dp + \gamma_m \Pi(\hat{p}) + [\hat{p} - \hat{T}]M(\hat{p}).$$

Thus, externalities associated with foreign tariffs travel through the foreign local and world prices to the home multilateral terms of trade, \hat{T} , and from there to home welfare. Note that $\hat{T} = p^w$ under MFN tariffs for the home country, confirming that the world price is then the only channel through which externalities flow to the home country.

4.2. Nash equilibria

As in the previous section, we start by considering the static tariff game, in which the domestic government selects a tariff policy, (τ^1, τ^2, τ^3) , in order to maximize its welfare, W , at the same time that each foreign government j chooses its tariff policy, τ^{*j} , to maximize its welfare, W^{*j} . Having offered a thorough interpretation of the Nash equilibrium in the previous section, we simply present here the general best-response conditions that Nash trade policies must satisfy. We also focus only on interior Nash equilibria in which trade takes place.

Maximizing W with respect to τ^j and W^{*j} with respect to τ^{*j} for each j defines implicitly the domestic- and foreign-government best-response tariffs:

$$\text{Home: } W_{\hat{p}} + \tilde{\lambda}^j W_{\hat{\tau}} = 0, \quad \text{for } j \in N^* \tag{11a}$$

$$\text{Foreign: } W_{\hat{p}^{*j}} + \tilde{\lambda}^{*j} W_{p^{*j}} = 0, \quad \text{for } j \in N^*, \tag{11b}$$

where $\tilde{\lambda}^j \equiv [d\hat{T}/d\tau^j]/[d\hat{p}/d\tau^j]$ and $\tilde{\lambda}^{*j} \equiv [\delta p^{wj}/\delta\tau^{*j}]/[d\hat{p}^{*j}/d\tau^{*j}]$. Note that it is only the home government’s concern over the world-price effects of its intervention that leads it to discriminate against its foreign trading partners: any local price achieved under discriminatory tariffs could also be achieved under an MFN tariff that allows the same multilateral import volume. In particular, since $d\hat{p}/d\tau^j$ is constant and identical across j in our linear model, it follows that the home government’s best-response tariffs are set so as to equate their marginal effects on the home-country’s terms of trade ($d\hat{T}/d\tau^i = d\hat{T}/d\tau^k$ for $i, k \in N^*$), thereby achieving maximal terms-of-trade improvement for any local price through tariff intervention. From the implicit equations given in Eqs. (11a) and (11b), it is straightforward to solve for the six Nash tariffs that arise when each government selects a best-response tariff.

4.3. Trade agreements

We next characterize the tariff combinations that maximize joint welfare. A general perspective can be offered with reference to the tariff that the home country places on imports from foreign country j . The efficiency condition that this tariff must satisfy is given by

$$W_{\hat{p}} \frac{d\hat{p}}{d\tau^j} + W_{\hat{\tau}} \frac{d\hat{T}}{d\tau^j} + \sum_{i=1}^3 \left\{ W_{\hat{p}^{*i}} \frac{d\hat{p}^{*i}}{d\tau^j} + W_{p^{wi}} \frac{\delta p^{wi}}{\delta\tau^j} \right\} = 0.$$

To interpret this condition further, we recall that the home tariff affects the multilateral terms of trade through its effect on world prices and local foreign prices:

$$\frac{d\hat{T}}{d\tau^j} = \sum_{i=1}^3 \left\{ \frac{\partial \hat{T}}{\partial \hat{p}^{*i}} \frac{d\hat{p}^{*i}}{d\tau^j} + \frac{\partial \hat{T}}{\partial p^{wi}} \frac{\delta p^{wi}}{\delta\tau^j} \right\}.$$

Using $W_{\hat{p}} = -M(\hat{p})$, $\partial \hat{T} / \partial p^{wi} = E^*(\hat{p}^{*i}) / M(\hat{p})$ and $W_{p^{wi}} = E^*(\hat{p}^{*i})$, it is now direct to see that the efficiency condition can be written as

$$W_{\hat{p}} \frac{d\hat{p}}{d\tau^j} + W_{\hat{T}} \sum_{i=1}^3 \frac{\partial \hat{T}}{\partial \hat{p}^{*i}} \frac{d\hat{p}^{*i}}{d\tau^j} + \sum_{i=1}^3 W_{p^{*i}} \frac{d\hat{p}^{*i}}{d\tau^j} = 0. \tag{12}$$

Notice that the world-price movements are again eliminated from the efficiency condition. Comparing efficiency condition (12) with the best-response conditions (11a) and (11b), we see that Nash tariffs are once more inefficient, since the selection of these tariffs is motivated by the consequent movements in the world prices.

The novel feature of the multi-country model concerns the connection between the local foreign price and the home-country multilateral terms of trade. This local-price externality corresponds to the second term in Eq. (12). If home tariffs are discriminatory, so that the multilateral terms of trade depends upon local foreign and world prices, then this local-price externality is non-zero. Let us again define politically optimal tariffs as the tariffs that would be attained if the terms-of-trade motivations from each government’s Nash trade policy choices were eliminated. In the present model, these tariffs are implicitly defined by

$$W_{\hat{p}} = 0 = W_{\hat{p}^{*j}}, \quad \text{for } j \in N^*. \tag{13}$$

Returning now to the efficiency condition (12) above and using Eq. (13), we see that politically optimal tariffs are inefficient when the home tariffs are discriminatory. Intuitively, even if the foreign governments are not motivated by the world-price consequences of their trade-policy choices, the local prices that their tariffs imply determine foreign export volumes and thereby impose an externality upon the home government if its tariffs are discriminatory.

On the other hand, if home tariffs satisfy MFN, then the multilateral terms of trade is simply the (common) world price, and the local-price-externality term in Eq. (12) is zero. It follows that a multilateral trade agreement is efficient if the terms-of-trade motivations are eliminated from each government’s Nash tariff selection *and* all tariffs conform to MFN. In other words, politically optimal tariffs that also satisfy MFN are efficient, but politically optimal tariffs that are discriminatory are inefficient.³⁵ The central idea is that, under MFN, externalities are channeled only through the world price, and so efficiency is achieved if terms-of-trade motivations are eliminated from each government’s Nash trade policy choices.

³⁵ The requirement of political optimality as given in Eq. (13) represents four restrictions placed on a total of six tariffs. Thus, there will be many politically optimal tariff combinations. When tariffs are required to satisfy MFN, then there are only four tariffs in total, and so among the set of politically optimal tariffs there is a unique combination of tariffs that are also MFN.

5. Reciprocity, non-discrimination and preferential agreements

Having characterized the Nash, efficient and politically optimal trade policies in our many-country framework, we now use this framework in order to evaluate the principles of reciprocity and non-discrimination in a multilateral trade agreement. We also assess the implications of preferential agreements for a multilateral trading system built upon these principles. We begin by exploring the link between reciprocity and non-discrimination.

5.1. Reciprocity and non-discrimination

We are again interested in characterizing the conditions under which an efficient multilateral trade agreement can be implemented under reciprocity. We thus now extend to the multi-country setting the definition of substantially equivalent concessions. We will say that, if a country proposes to increase a previously negotiated tariff, a proposed set of tariff increases by its trading partner(s) will constitute a withdrawal of *substantially equivalent concessions* provided that, when valued at existing world prices, the proposed tariff increases together bring about equal reductions in the volume of each country's imports and exports. Given a previously negotiated set of tariffs, $(\{\bar{\tau}^j\}, \{\bar{\tau}^{*j}\}) \equiv (\bar{\tau}^1, \bar{\tau}^2, \bar{\tau}^3, \bar{\tau}^{*1}, \bar{\tau}^{*2}, \bar{\tau}^{*3})$, a proposed set of renegotiated tariffs, $(\{\tilde{\tau}^j\}, \{\tilde{\tau}^{*j}\}) \equiv (\tilde{\tau}^1, \tilde{\tau}^2, \tilde{\tau}^3, \tilde{\tau}^{*1}, \tilde{\tau}^{*2}, \tilde{\tau}^{*3})$, will represent an initial tariff withdrawal by one country and a withdrawal of substantially equivalent concessions by its trading partner(s) provided that

$$\left[p^{wj}(\tilde{\tau}^j, \tilde{\tau}^1, \tilde{\tau}^2, \tilde{\tau}^3) - p^{wj}(\bar{\tau}^j, \bar{\tau}^1, \bar{\tau}^2, \bar{\tau}^3) \right] E^* \left(\hat{p}^{*j}(\bar{\tau}^1, \bar{\tau}^2, \bar{\tau}^3) \right) = 0,$$

for $j \in N^*$.

This condition is satisfied by any set of tariff increases that leaves world prices unchanged.³⁶ Therefore, as in the two-country setting of the previous section, reciprocity ensures that any renegotiation will be over the set of outcomes which are feasible under the world prices that were established in the original negotiations.

We therefore extend the Bilateral Negotiation Game of the previous section to our multi-country model. As before, we posit a three-stage negotiation process that begins with an initial stage in which tariffs are bound at specified levels,

³⁶ This condition can be derived with the same steps described in footnote 19, where the numeraire good z again ensures that trade is balanced. The presence of a single non-numeraire good in our multi-country model accounts for the slightly stronger condition defining the withdrawal of substantially equivalent concessions as compared to the condition derived above for the two-country model. In either case, renegotiation takes place over the same set of outcomes: those that are feasible under the world prices that were established in the original negotiations.

determining a set of bilateral world prices. In the second stage, governments make renegotiation proposals, where under the restriction of reciprocity the bilateral world prices must be preserved. If governments fail to reach an agreement in this renegotiation stage, a third stage is entered in which tariffs are implemented that achieve the greatest multilateral trade volume consistent with the constraints that the tariffs satisfy the restriction of reciprocity and require no government to trade a bilateral volume in excess of that implied by its proposal in the renegotiation stage.

We now develop a formal representation of the trade negotiation process. Letting $\{\bar{p}^{wj}\}$ denote the set of bilateral world prices determined in the first stage, we say that a renegotiated set of tariffs $(\{\tau^j\}, \{\tau^{*j}\})$ satisfies the *restriction of reciprocity* if the tariff set preserves the bilateral world prices: $p^{wj}(\{\tau^j\}, \{\tau^{*j}\}) = \bar{p}^{wj}$ for each $j \in N^*$. We now consider the foreign tariffs and bilateral trade volumes that are “implied” by the domestic government’s proposal in the renegotiation stage, where the domestic proposal is a set $\{\hat{\tau}^j\}$ of domestic tariffs that satisfy Eq. (10) given $\{\bar{p}^{wj}\}$. In contrast to the two-country model, the proposed tariff set when combined with the fixed set of bilateral world prices $\{\bar{p}^{wj}\}$ does not uniquely imply foreign tariffs, as there will be many sets of foreign tariffs $\{\tau^{*j}\}$ that can generate the required domestic import volume. We therefore assume that the domestic government also proposes the shares $\{s^{*j}\}$ of its total import volume that are to come from each foreign trading partner. These shares are nonnegative and sum to one. When the domestic government proposes $\{\hat{\tau}^j\}$ and $\{\hat{s}^{*j}\}$, the implied foreign tariffs, $\tau^{*j} = \hat{\tau}^{*j}(\{\hat{\tau}^j\}, \{\hat{s}^{*j}\}, \{\bar{p}^{wj}\})$, are defined by the requirements that the tariffs $(\{\hat{\tau}^j\}, \{\hat{\tau}^{*j}\})$ satisfy the restriction of reciprocity and generate the proposed set of trade volume shares:

$$E^*(p^{*j}(\tau^{*j}(\cdot), \bar{p}^{wj})) = \hat{s}^{*j} \sum_{i \in N^*} E^*(p^{*i}(\tau^{*i}(\cdot), \bar{p}^{wi}))$$

for $j \in N^*$,

where $\tau^{*j}(\cdot)$ denotes the value $\tau^{*j}(\{\hat{\tau}^j\}, \{\hat{s}^{*j}\}, \{\bar{p}^{wj}\})$.

We consider next the foreign trade volumes and domestic import tariffs that are implied by the proposals of the foreign governments in the renegotiation stage. We assume that, in this stage, each foreign government j proposes its tariff, $\hat{\tau}^{*j}$. Given the bilateral world price \bar{p}^{wj} , this proposal directly implies an export volume for foreign country j , which is given as $E^*(p^{*j}(\hat{\tau}^{*j}, \bar{p}^{wj}))$. In addition, the three foreign tariff proposals together imply a set of domestic tariffs, when the bilateral world prices are fixed. Thus, if in the renegotiation stage, each foreign government j proposes tariff $\hat{\tau}^{*j}$, then the set $\{\hat{\tau}^{*j}\}$ defines an implied set of domestic tariffs, with member $\tau^j = \tau^j(\{\hat{\tau}^{*j}\}, \{\bar{p}^{wj}\})$, by the requirement that the tariffs $(\{\tau^j\}, \{\hat{\tau}^{*j}\})$ satisfy the restriction of reciprocity.

We are now prepared to state two final definitions. First, the proposals $(\{\hat{\tau}^j\}, \{\hat{s}^{*j}\})$ and $\{\hat{\tau}^{*j}\}$ agree if $(\{\hat{\tau}^j\}, \{\hat{\tau}^{*j}(\cdot)\}) = (\{\tau^j(\cdot)\}, \{\hat{\tau}^{*j}\})$, where $\tau^{*j}(\cdot)$ denotes

the implied value $\tau^{*j}(\{\hat{\tau}^j\}, \{\hat{s}^{*j}\}, \{\bar{p}^{wj}\})$ and where $\tau^j(\cdot)$ denotes the implied value $\tau^j(\{\hat{\tau}^{*j}\}, \{\bar{p}^{wj}\})$. Second, if the proposals do not agree, the tariff set $(\{\tau^j\}, \{\tau^{*j}\})$ that is implemented in the final stage is said to satisfy the *restriction of proposed trade volume limits* if under $(\{\tau^j\}, \{\hat{\tau}^{*j}\})$ no country is engaged in a bilateral trade volume greater than the volume implied by its proposal.

We now define the *Multilateral Negotiation Game* as follows:

- Stage 1 Governments bargain over tariffs and a set of bilateral world prices, $\{\bar{p}^{wj}\}$, is determined.
- Stage 2 The domestic government proposes a set of domestic tariffs, $\{\hat{\tau}^j\}$, and trade-volume shares, $\{\hat{s}^{*j}\}$, at the same time that each foreign government j proposes a foreign tariff, $\hat{\tau}^{*j}$. If the proposals agree, then the tariffs are implemented as the outcome of the negotiation.
- Stage 3 If the proposals do not agree, then the tariffs that are implemented are those which achieve the greatest multilateral trade volume while satisfying the restrictions of reciprocity and proposed trade volume limits.

As before, we concentrate on stages 2 and 3, in order to determine the tariffs that can be implemented when reciprocity is represented in this way.

We say that a tariff set $(\{\tau^j\}, \{\tau^{*j}\})$ can be *implemented under reciprocity* if there exists a set of bilateral world prices $\{\bar{p}^{wj}\}$ such that the outcome of stages 2 and 3 of the Multilateral Negotiation Game is uniquely $(\{\tau^j\}, \{\tau^{*j}\})$, when foreign governments choose dominant proposals and the proposal of the domestic government is a best response to the foreign proposals.³⁷ We can now state our next proposition, which is proved in Appendix A:

Proposition 5. *An efficient multilateral trade agreement can be implemented under reciprocity if and only if it is characterized by tariffs which conform to the principle of MFN and are set at their politically optimal levels.*

The broader idea embedded in Proposition 5 is that the principle of reciprocity serves well as a means to promote efficient agreements when externalities travel only through the world price. When governments abide by the principle of MFN, externalities indeed do travel in only this fashion, and so reciprocity and non-discrimination work in concert as principles that guide governments to efficient trade

³⁷ In the multicountry model, we no longer require that the domestic-government proposal is dominant. Intuitively, the domestic government will wish to choose its share proposal so as to trade as much as possible with the partners with whom it has the most favorable terms of trade. The optimal domestic share proposals are thus sensitive to the anticipated foreign proposals, as the latter bound the import volumes that the respective foreign partners will accept.

agreements. In response to our third question, this explains why the principle of non-discrimination can advance the mutual goals of member governments that participate in a multilateral trading agreement that also endorses the principle of reciprocity. We now develop an analysis of preferential agreements in order to address our final question.

5.2. Preferential agreements

We consider two forms of preferential agreements. We will say that the home country forms a *free trade area* with foreign country i if $\tau^i = \tau^{*i} = 0$ and $\tau^j > 0$ for some $j \neq i$. The feature of a *customs union* that distinguishes it from a free trade area is that, in addition to eliminating internal barriers, the members of a customs union adopt a common external tariff policy as well. Hence, the tariff decisions of customs union members are centralized, and so the objectives of the tariff authorities in the customs union must be defined. If the home country forms a customs union with foreign country i , we define the objectives of the customs union as the sum of the objectives of its members: $U^{*i} \equiv W + W^{*i}$.

Consider first the introduction of free trade agreements. In particular, suppose that the home government establishes a free trade agreement with foreign country i . We may now express an immediate implication of Proposition 5:

Proposition 6. *An efficient multilateral trade agreement can not be implemented under reciprocity in the presence of a free trade agreement.*

Proposition 6 indicates that free trade agreements are fundamentally at odds with a multilateral system that is built on the pillars of reciprocity and non-discrimination: the legitimacy of the principle of reciprocity at the multilateral level is undermined if exceptions from the principle of MFN are granted for the formation of free trade agreements. Intuitively, the politically optimal tariffs are efficient when externalities travel only through world prices, but externalities travel through local prices as well when tariffs are discriminatory (as when some countries form a free trade agreement). The efficiency properties of politically optimal MFN external tariffs are thus lost when a free trade agreement is in place.

We next consider the formation of a customs union between the home country and foreign country i . We can not immediately conclude from Proposition 5 that the presence of a customs union is incompatible with the pursuit of an efficient multilateral trade agreement through the principle of reciprocity. This is because the situation in which a customs union exists represents a different modeling environment than considered above, as the number of policy-setting countries has been reduced from four to three. Nevertheless, Proposition 5 is instructive. Suppose that two countries that form a customs union are symmetric and that they eliminate the internal tariff for trade within the union. Then, in a sense, the union

is analogous to a single country in the analysis above, suggesting that the principle of reciprocity can deliver an efficient agreement in the presence of a customs union if and only if all external tariffs satisfy MFN and are politically optimal.

To explore this idea, we require a notion of symmetry. Observe that if the home country and foreign country i remove internal tariffs (i.e., if $\tau^i = \tau^{*i} = 0$), then there must be a common price within the union (i.e., $\hat{p} = \hat{p}^{*i}$). Not surprisingly, a common local price within the union is inefficient unless the home import-competing and foreign-country- i exporting firms have political weights that are in some sense symmetric. In Appendix A, we exploit the specific structure of our model and demonstrate that the common local price that results from a removal of internal barriers is *internally inefficient* unless the weights satisfy the following relationship: $3\gamma_e^i - 2\gamma_m = 1$. When this relationship holds, we say that the domestic country is a *natural integration partner* with foreign country i , as the removal of internal trade barriers is then internally efficient.

We can now state:

Proposition 7. *An efficient multilateral trade agreement can be implemented under reciprocity in the presence of a customs union if and only if the members of the customs union are natural integration partners and the external tariffs of the customs union and the tariffs of all other countries conform to the principle of MFN and are politically optimal.*

The proof of this proposition is found in Appendix A. Proposition 7 establishes that preferential agreements can be part of an efficient multilateral system that is based on reciprocity, but both the form of the preferential agreement and the circumstances under which it is appropriate are quite special. Thus, with respect to our fourth question, our framework offers only limited support for the view that preferential agreements are compatible with the efficient functioning of a multilateral system founded on reciprocity.

We summarize the results of this section with a final proposition:

Proposition 8. *An efficient multilateral trade agreement can be implemented under reciprocity in the presence of a preferential agreement if and only if the multilateral agreement is characterized as follows:*

- (i) *Each country that is not a member of a preferential agreement must abide by the principle of non-discrimination (MFN) and set its tariffs at a level which is politically optimal; and*
- (ii) *Each country that is a member of a preferential agreement must belong to a customs union between natural integration partners that sets its external tariffs in accordance with the principle of non-discrimination (MFN) and at a level which is politically optimal for the customs union.*

6. Conclusion

We began this paper with four questions. First, what can governments hope to accomplish with trade agreements? Second, given that free trade is not their stated objective, can governments nevertheless expect an arrangement that advocates reciprocal movements in the direction of free trade to be mutually advantageous? Third, are their mutual goals best advanced by an agreement that eliminates discriminatory treatment? And fourth, once the principle of non-discrimination is adopted, can exceptions to this principle be granted for the creation of preferential agreements without compromising the performance of the multilateral system?

Allowing that governments may have both political and economic motivations, we argue that the appeal of a trade agreement rests on the elimination of the inefficiency associated with the terms-of-trade externality that arises when governments set their policies unilaterally. This externality induces governments to restrict trade more than is efficient, given their preferences. Arguing from this perspective, we find that the representation of reciprocity as found in the WTO can enable governments to expand trade and achieve an efficient outcome. This is true, however, only if governments seek through the WTO to implement the tariffs that are desired when the terms-of-trade motivations from each government's Nash trade policy choices are eliminated. In particular, we find that an efficient trade agreement can be implemented under reciprocity only if the agreement is characterized by such tariffs. We also identify a link between the principles of reciprocity and non-discrimination (MFN) in an efficient multilateral trading system: A multilateral system built on the principle of reciprocity can implement an efficient agreement only if it also embraces the principle of non-discrimination.

With regard to preferential trading arrangements, an important departure of our focus from other work on the relationship between regionalism and the world trading system is that we do not analyze whether regionalism serves as a means to enable the WTO to bring the world closer to free trade. Instead, our analysis takes a positive approach to the issue of regionalism within the WTO, and we analyze whether the WTO serves the interests of its member governments when it allows under GATT Article XXIV exceptions to the principle of MFN for the purpose of creating preferential agreements. Our analysis suggests that the circumstances under which a preferential agreement can arise as part of an efficient agreement are limited. A preferential agreement can be part of an efficient multilateral system that is based on reciprocity, but both the form and the circumstances under which such an agreement is appropriate are quite special. The efficiency properties of a multilateral system based on reciprocity can be preserved when a preferential agreement is allowed only if the member countries are "natural integration partners" that seek to integrate fully by forming a customs union.

Fundamentally, our theory rests upon the hypotheses that governments care about the terms of trade and that they are able to influence the terms of trade with their trade policy choices. The former hypothesis demands that the terms-of-trade

effects of trade policy choices influence the national cost of intervention in quantitatively important ways. In this regard, empirical studies by Goldberg (1995) and Berry et al. (1999) offer strong support. These studies estimate the impacts of voluntary export restraints (VERs) imposed by the U.S. on Japanese automobiles in the 1980s. Both studies indicate that the terms-of-trade implications of the U.S. decision to restrict automobile imports from Japan with VERs (rather than with tariffs) increased by a substantial amount the cost to the U.S. of achieving the reduced import volumes. For example, comparing the actual VER policy with a hypothetical equivalent-tariff policy—the difference reflecting the distinct world (untaxed) prices associated with each form of intervention—Berry et al. (1999) calculate that the equivalent-tariff policy would have yielded revenue sufficient to turn what was a losing trade policy from the perspective of U.S. national income into a policy that would have generated a net gain to U.S. national income of US\$12.5 billion. It is precisely this role of world prices to affect the international incidence of the cost of intervention that is the starting point of our theory.³⁸

It is also important to mention that additional empirical evidence exists in support of the latter hypothesis.³⁹ Ultimately, an importing country has power over the terms of trade if foreign exporters incur some of the incidence of an import tariff (i.e., the full tariff is not passed through to domestic consumers). In this regard, we note that a large empirical literature exists that documents imperfect pass-through in the face of exchange rate shocks. It is thus natural to suppose that

³⁸ Our theory allows that a government might choose to offer protection even when the policy generates losses from a purely national income perspective, as the U.S. VERs against Japan evidently did, but it might be tempting to conclude that the “give-away” implicit in the U.S. choice to proceed with VERs rather than an equivalent-tariff policy suggests in fact that the U.S. did not care about terms-of-trade effects in this case. It must be remembered, however, that VERs represent a cooperative, negotiated approach to restricting trade, and that the U.S. “give-away” associated with its VERs was in fact in return for something from Japan: An understanding that Japan would not retaliate with trade restrictions of its own against U.S. imports. Therefore, the relevant policy alternative for the U.S. was not a set of unilateral tariff increases, which would surely have triggered a retaliatory “trade war” with Japan, but rather tariff changes that are consistent with the rules of GATT. In fact, one way to interpret the use of VERs is that, by giving away the tariff revenue and thereby ensuring that the importing government does not enjoy any terms-of-trade benefits as a by-product of its demand for reduced import volumes, these policy tools become an imperfect way of preventing cost-shifting motives from driving trade policy choices, and in this way substitute for the cooperative outcomes that GATT would have achieved had import tariffs been renegotiated under GATT Article XXVIII (or temporarily raised under GATT Article XIX).

³⁹ Support also can be found in the theoretical analysis of Gros (1987), who finds that even ostensibly small countries have some power over the terms of trade, if the industry is monopolistically competitive. We also note that our theory does not require that all countries have power to affect the world prices. Rather, our theory predicts that truly “small” countries would be extended MFN treatment in the WTO but would not be required to offer reciprocal liberalization of their own, as their unilateral trade policy decisions are not influenced by inefficient cost-shifting motives (see Bagwell and Staiger, 1996). This is, to some extent, what is accomplished in the WTO through the “principle supplier rule” (see, for example, Dam, 1970, p. 61).

imperfect pass-through would also arise when the cost increase takes the form a tariff increase, and indeed Feenstra (1995) offers some empirical support for this supposition.

Finally, we call attention to two caveats that are associated with our analysis. First, we have examined reciprocity and non-discrimination as principles that guide governments from inefficient unilateral outcomes to the efficiency frontier. We have not considered here the possibility that factors may arise that prevent governments from reaching this frontier. A case of particular interest is where *enforcement issues* at the multilateral level (see, e.g., Dam, 1970) preclude governments from eliminating fully the terms-of-trade motivations from their trade policy choices under MFN. In such circumstances, the granting of exceptions to MFN for those country pairs that have additional enforcement ability to move further toward the efficiency frontier could enhance the overall efficiency of the multilateral agreement. As we shown in other work (Bagwell and Staiger, 1999b), however, the enforcement implications of regional agreements for multilateral cooperation are complex, and there is as yet no basis from which to presume that such agreements necessarily enhance the overall efficiency of the multilateral agreement.⁴⁰

Second, the government objective function that we have adopted throughout our analysis, while representative of the leading formulations of political-economy of trade policy, nevertheless may be too narrowly defined to capture many of the reasons that governments pursue preferential agreements in practice. In fact, regional integration initiatives are likely to reflect broader non-economic objectives such as military security or political stability that are not reflected in a country's national prices or terms of trade. Under this interpretation, the WTO's willingness to allow GATT Article XXIV exceptions may be rationalized in terms of broader non-economic objectives that can be served by deeper integration among a subset of WTO members. Future work might explore the consequences of such government preferences for the role of preferential agreements in the multilateral trading system.

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⁴⁰ Other papers that consider the implications of allowing regional agreements for the ability to enforce multilateral cooperation include Bagwell and Staiger (1997b,c), Bond and Syropoulos (1996a,b) and Bond et al. (1996). A broad perspective of the role of enforcement in multilateral trading arrangements is developed by Maggi (1999).

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Appendix A

We prove here Propositions 5 and 7. To begin, we report various calculations for the many-country model:

$$\begin{aligned}
 p(\iota^1, \iota^2, \iota^3) &= (4/7) \left[1 + \sum_{i=1}^3 \iota^i / 3 \right] \\
 p^{*j}(\iota^1, \iota^2, \iota^3) &= (4/7) \left[1 + \sum_{i=1}^3 \iota^i / 3 \right] - \iota^j, \quad \text{for } j \in N^* \\
 p^{wj}(\tau^j, \iota^1, \iota^2, \iota^3) &= (4/7) \left[1 + \sum_{i=1}^3 \iota^i / 3 \right] - \tau^j, \quad \text{for } j \in N^* \\
 W(\hat{p}, \hat{T}) &= 1/2 - (4 - \gamma_m)(\hat{p})^2/4 - (1 - 3\hat{p}/2)\hat{T} \\
 W^{*j}(\hat{p}^{*j}, p^{wj}) &= 1/6 - (3 - \gamma_e^j)(\hat{p}^{*j})^2/6 + (2\hat{p}^{*j} - 1)p^{wj}/3, \\
 &\text{for } j \in N^* \\
 V(\iota^1, \iota^2, \iota^3) &= 1 - (4 - \gamma_m)(\hat{p})^2/4 - \sum_{i=1}^3 (3 - \gamma_e^i)(\hat{p}^{*i})^2/6,
 \end{aligned}$$

where $V \equiv W + \sum_{i=1}^3 W^{*i}$. Choosing $(\iota^1, \iota^2, \iota^3)$ to maximize V , we find that the efficiency locus is characterized as

$$(2/3)(4 - \gamma_m)\hat{p} = (3 - \gamma_e^1)(\hat{p}^{*1}) = (3 - \gamma_e^2)(\hat{p}^{*2}) = (3 - \gamma_e^3)(\hat{p}^{*3}). \tag{A1}$$

Next, we find that the politically optimal tariffs are defined implicitly by

$$W_{\hat{p}} = (3/4) [2\hat{T} - (2/3)(4 - \gamma_m)\hat{p}] = 0. \tag{A2}$$

$$W_{\hat{p}^{*j}} = (1/3) [2p^{wj} - (3 - \gamma_e^j)\hat{p}^{*j}] = 0, \quad \text{for } j \in N^*. \tag{A3}$$

Proof of Proposition 5. To begin, we record a lemma, which is the many-country analog of Proposition 3.

Lemma A1. *A set of tariffs $\{\bar{\tau}^1, \bar{\tau}^2, \bar{\tau}^3, \bar{\tau}^{*1}, \bar{\tau}^{*2}, \bar{\tau}^{*3}\}$ can be implemented under reciprocity if and only if it satisfies either $\{W_{\hat{p}} = 0; W_{\hat{p}^{*j}} \geq 0 \text{ for each } j\}$ or $\{W_{\hat{p}} \leq 0; W_{\hat{p}^{*j}} = 0 \text{ for each } j\}$.*

Using this lemma, it follows immediately that the politically optimal MFN tariffs can be implemented under reciprocity. Furthermore, a comparison of Eqs. (A2) and (A3) with Eq. (A1) reveals that the politically optimal MFN tariffs are efficient. It thus remains to show that no other efficient trade agreement can be implemented under reciprocity. The following are the three cases to consider.

(i) An agreement that calls for tariffs that are politically optimal but do not conform with MFN. In this case, $\hat{T} \neq p^{wj}$ for $j = 1, 2, 3$ and a comparison of Eqs. (A2) and (A3) with Eq. (A1) implies that politically optimal tariffs can not be efficient.

(ii) An agreement that calls for tariffs that conform to MFN but are not politically optimal. Then, Lemma A1 implies that either $\{2p^w = (2/3)(4 - \gamma_m)\hat{p}; 2p^w \geq (3 - \gamma_e^j)\hat{p}^{*j}$ for each $j\}$, or $\{2p^w \leq (2/3)(4 - \gamma_m)\hat{p}; 2p^w = (3 - \gamma_e^j)\hat{p}^{*j}$ for each $j\}$. If tariffs are not politically optimal, then by Eqs. (A2) and (A3) at least one inequality for some j is strict in each case, which by Eq. (A1) implies that the agreement cannot be efficient.

(iii) An agreement that calls for tariffs that do not conform to MFN and that are not politically optimal. Lemma A1 implies that either $\{2\hat{T} = (2/3)(4 - \gamma_m)\hat{p}; 2p^{wj} \geq (3 - \gamma_e^j)\hat{p}^{*j}$ for each $j\}$, or $\{2\hat{T} \leq (2/3)(4 - \gamma_m)\hat{p}; 2p^{wj} = (3 - \gamma_e^j)\hat{p}^{*j}$ for each $j\}$. Let k solve $\min_i \{p^{wi}\}$, and observe that k is uniquely defined under discriminatory tariffs. Then, either $(2/3)(4 - \gamma_m)\hat{p} = 2\hat{T} > 2p^{wk} \geq (3 - \gamma_e^k)\hat{p}^{*k}$ or $(2/3)(4 - \gamma_m)\hat{p} \geq 2\hat{T} > 2p^{wk} = (3 - \gamma_e^k)\hat{p}^{*k}$. Using Eq. (A1), we conclude that the agreement can not be efficient. □

Proof of Proposition 7. To begin, we calculate the customs-union objective function: $U^{*i} \equiv W + W^{*i} = 2/3 - (4 - \gamma_m)(\hat{p})^2/4 - (3 - \gamma_e^i)(\hat{p}^{*i})^2/6 - (1 - 3\hat{p}/2)\hat{T} + (2\hat{p}^{*i} - 1)p^{wi}/3$.

Suppose first that the home country and foreign country i are natural integration partners (i.e., $3\gamma_e^i - 2\gamma_m = 1$). This condition is equivalent to $(2/3)(4 - \gamma_m) = (3 - \gamma_e^i)$, and so it follows from Eq. (A1) that the removal of internal trade barriers (which implies $\hat{p} = \hat{p}^{*i}$) is internally efficient. Suppose further that all external tariffs conform to MFN and are set at their politically optimal levels. External tariffs then satisfy:

$$U_{\hat{p}}^{*i} = (3/4)[2p^w - (2/3)(4 - \gamma_m)\hat{p}] = 0$$

$$U_{\hat{p}^{*j}} = (1/3)[2p^w - (3 - \gamma_e^j)\hat{p}^{*j}] = 0, \quad j \neq i.$$

Referring to Proposition 5, we see that politically optimal MFN external tariffs can be implemented under reciprocity; in addition, we see from Eq. (A1) that, in the presence of a customs union between natural integration partners, politically optimal MFN external tariffs are efficient.

If the customs union members are not natural integration partners, then the elimination of internal trade barriers will be internally inefficient, and so the

efficiency locus can not be reached. Finally, if the external tariffs are not set at their politically optimal levels in accordance with MFN, then the efficiency locus can not be reached under reciprocity by the proof of Proposition 5 (points (i), (ii) and (iii) as applied to external tariffs). □

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