

Economic Theory and the Interpretation of GATT/WTO

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Abstract

Over the past 50 years, a remarkable degree of trade liberalization has been achieved through GATT/WTO negotiations. In this paper, we describe work that provides a theoretical interpretation of this institution. We emphasize two key features of GATT/WTO: reciprocity and enforcement. We also identify important areas for future research. The work described here contributes to the fields of International Trade and Applied Game Theory.

1. Introduction

Over the post-war period, the General Agreement on Tariffs and Trade (GATT) has sponsored eight rounds of trade-policy negotiations. The most recent round of negotiations, which was completed in 1994, resulted in the creation of the World Trade Organization (WTO). The WTO includes the text of GATT, but it also goes further and embodies a set of agreements that build on and extend GATT principles to new areas. The central role played in the world economy by GATT/WTO is widely accepted. Indeed, through the eight rounds of GATT negotiations, the average ad valorem tariff on industrial goods has fallen from over 40% to below 4%. Over this period, GATT/WTO membership has also grown in number from 23 to now over 140 countries.

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Given the significant influence of GATT/WTO on the world economy, it is of special importance to assess the progress that economists have made in providing a theoretical interpretation of GATT/WTO. This is the focus of the present paper.¹ Our discussion proceeds in three broad steps. First, we consider the theory of trade agreements. We organize our discussion here around a simple but fundamental question: What is the problem that a trade agreement might solve? Second, we briefly describe the history and institutional design of GATT/WTO. Finally, we draw on the recent theoretical literature and interpret the design of GATT/WTO. Our discussion examines two key features of GATT/WTO: reciprocity and enforcement.

The work described here cuts across two fields of Economics. The first is International Trade. In this field, there is the famous result that unilateral free trade is optimal, whenever a government maximizes national income and presides over a small country. For an economist seeking a theoretical interpretation of GATT/WTO, this result is initially discouraging. Apparently, in some circumstances, governments have no reason to pursue reciprocal tariff liberalization through GATT/WTO negotiations, since each already has the unilateral incentive to eliminate its own tariff. But in fact this result has important constructive value. It suggests that a trade agreement might solve a problem that arises because the negotiating governments (i) have political motivations and do not maximize national income, or (ii) preside over large countries.

Of course, there is little doubt that real-world governments have political motivations. Actual governments are interested not just in the size of national income but also in its distribution. As a consequence, the optimal unilateral policy for a government with political motivations may not be free trade. A positive tariff, for example, may be the means through which such a government steers surplus toward its import-competing firms. But it is quite another matter to say that political considerations constitute a problem that two governments might solve with a trade agreement. As we explain, in the leading political-economy models of trade policy, if the negotiating governments preside over small countries, then the governments can do no better with a trade agreement than without one. In these models, at least, politics itself fails to explain the appeal of a trade agreement.

The other possibility is that governments preside over large countries. What does this mean? In a standard general-equilibrium model of trade in two goods, a country is said to be large if a change in its trade policy alters the terms on the world market at which its export good is traded for its import good. For example,

¹This paper draws heavily from our book (Bagwell and Staiger, 2002).

if the government of a large country were to depart from free trade and select a positive import tariff, then the import good would become more plentiful on the world market, and so the world price of this good would drop. The government has then engineered a terms-of-trade gain for its country: a unit of its export good can be exchanged on world markets for a greater volume of its import good. By the same logic, the trading partner then experiences a terms-of-trade loss. Since a government does not internalize the terms-of-trade externality that its import tariff imposes upon its trading partner, the optimal unilateral tariff for a national-income maximizing government of a large country is positive. If both governments behave this way and set positive import tariffs, a Prisoners' Dilemma situation is created. In the Nash equilibrium, tariffs are too high and trade volumes are too low; hence, a trade agreement that facilitates a reciprocal reduction in tariffs could be mutually beneficial.

Governments of large countries thus may gain from a trade agreement. This insight is hardly new. The terms-of-trade theory of trade agreements was identified by Mill (1844) and Torrens (1844), and Johnson (1953-54) provides a famous and elegant formalization. Nevertheless, many trade economists have objected to this theory as a foundation from which to interpret actual trade agreements. One objection is that this theory leaves out the important political constraints under which real-world governments labor. A second objection is simply that real-world governments just don't think this way. It is difficult, for example, to find any mention of the "terms of trade" in actual policy disputes. As we show, these objections are less worrisome than they might initially appear. The terms-of-trade theory is easily generalized to include political considerations, and it may be directly interpreted in the context of the market-access language that trade-policy negotiators use.

This theoretical perspective offers a means by which to interpret the rules of GATT/WTO. For instance, it suggests that a government may hesitate to liberalize unilaterally, since it does not want to face the terms-of-trade loss that such behavior would imply. If the governments were to liberalize reciprocally, however, then the terms of trade could be preserved, and the impediment to liberalization thereby would be removed. An interpretation of reciprocity is thereby facilitated. Likewise, a government would hesitate to liberalize as part of a reciprocal negotiation, if it were concerned that its negotiating partner might later "cheat" and raise its tariff. We argue that the GATT/WTO enforcement provisions can be interpreted in this light.

The second field to which this paper contributes is Applied Game Theory.

Within this field, there is a rich theoretical literature that examines how players that interact repeatedly might construct self-enforcing agreements, so as to overcome a Prisoners' Dilemma problem and achieve a more efficient outcome. The theory of collusion among firms, for example, falls into this category. As there are no GATT/WTO police, agreements between governments achieved through GATT/WTO negotiations must be self-enforcing. Indeed, the rules of GATT/WTO may be interpreted as a codification of supergame strategies. This paper thus also may be of interest to Applied Game Theorists, since it describes the creation and interprets the design of a successful self-enforcing agreement.

The paper proceeds as follows. In Section 2, we discuss the theory of trade agreements. Next, in Section 3, we discuss the history and design of GATT/WTO. Section 4 contains our interpretation of GATT/WTO's reciprocity and enforcement features. Concluding thoughts are offered in Section 5.

2. The Theory of Trade Agreements

A theory of trade agreements must explain the purpose of a trade agreement. To this end, we first present a standard two-good general equilibrium model of trade between two countries. Next, we specify a general family of government preferences. Our representation follows the political-economy literature and allows that governments are concerned with the distributional consequences of their trade-policy decisions. With these ingredients, we then identify and discuss the problem that a trade agreement can solve.

The General Equilibrium Model We consider a standard general equilibrium model of trade. There are two countries, home and foreign, that trade two goods, where these goods are normal goods in consumption and produced in perfectly competitive markets under conditions of increasing opportunity costs.² With x (y) denoting the natural import good of the home (foreign) country, we define $p \equiv p_x/p_y$ ($p^* \equiv p_x^*/p_y^*$) as the local relative price facing home (foreign) producers and consumers. We denote the home (foreign) ad valorem import tariff as t (t^*), and we assume that this tariff is not prohibitive. Letting $\tau \equiv (1+t)$ and $\tau^* \equiv (1+t^*)$, we then have the following relationships among prices: $p = \tau p^w \equiv p(\tau, p^w)$ and $p^* = p^w/\tau^* \equiv p^*(\tau^*, p^w)$, where $p^w \equiv p_x^*/p_y$ is the "world" (i.e., untaxed) relative

²Throughout, we follow convention and distinguish domestic and foreign variables by placing an asterisk on the latter.

price.³ The foreign (domestic) terms of trade is given by p^w ($1/p^w$). We interpret $\tau > 1$ ($\tau < 1$) as an import tax (import subsidy) and similarly for τ^* .⁴

How are production and consumption determined? Within a given country, production is given by the point on the production possibilities frontier at which the marginal rate of transformation between x and y is equal to the local relative price. We may thus represent domestic and foreign production functions as $Q_i = Q_i(p)$ and $Q_i^* = Q_i^*(p^*)$ for $i = \{x, y\}$. Consumption is also influenced by the local relative price, since this price defines the trade-off faced by consumers and implies the level and distribution of factor income in the economy. In addition, consumption is dependent upon tariff revenue R (R^*), which is distributed lump-sum to domestic (foreign) consumers and measured in units of the local export good at local prices. Therefore, we may represent domestic and foreign consumption as $D_i = D_i(p, R)$ and $D_i^* = D_i^*(p^*, R^*)$ for $i = \{x, y\}$. Next, we observe that tariff revenue is implicitly defined by $R = [D_x(p, R) - Q_x(p)][p - p^w]$ or $R = R(p, p^w)$ for the domestic country and by $R^* = [D_y^*(p^*, R^*) - Q_y^*(p^*)][1/p^* - 1/p^w]$ or $R^* = R^*(p^*, p^w)$ for the foreign country. Under the assumption that goods are normal, each country's tariff revenue increases with its terms of trade. Having now expressed tariff revenue as a function of local and world prices, we may also express national consumption as a function of local and world prices: $C_i(p, p^w) \equiv D_i(p, R(p, p^w))$ and $C_i^*(p^*, p^w) \equiv D_i^*(p^*, R^*(p^*, p^w))$ for $i = \{x, y\}$.

We consider next the determination of imports and exports. For the home country, imports of x and exports of y are respectively defined by $M_x(p, p^w) \equiv C_x(p, p^w) - Q_x(p)$ and $E_y(p, p^w) \equiv Q_y(p) - C_y(p, p^w)$. Likewise, for the foreign country, we represent imports of y and exports of x as $M_y^*(p^*, p^w)$ and $E_x^*(p^*, p^w)$, respectively. For any prices, home and foreign budget constraints imply that

$$p^w M_x(p, p^w) = E_y(p, p^w), \text{ and} \quad (2.1)$$

$$M_y^*(p^*, p^w) = p^w E_x^*(p^*, p^w). \quad (2.2)$$

Making explicit the dependence of the local price upon the tariff and the world price, we may now determine the equilibrium world price, $\tilde{p}^w(\tau, \tau^*)$, by the requirement of market-clearing for good y :

³Henceforth, p denotes the function $p(\tau, p^w)$, and p^* indicates the function $p^*(\tau^*, p^w)$.

⁴In this two-sector general equilibrium setting, the Lerner symmetry theorem ensures that trade taxes and subsidies can be equivalently depicted as applying to exports or imports.

$$E_y(p(\tau, \tilde{p}^w), \tilde{p}^w) = M_y^*(p^*(\tau^*, \tilde{p}^w), \tilde{p}^w). \quad (2.3)$$

Market clearing for good x is then implied by (2.1), (2.2) and (2.3).

We place some modest structure on the equilibrium prices. Specifically, we assume that the Metzler and Lerner paradoxes are ruled out, so that $dp/d\tau > 0 > dp^*/d\tau^*$ and $\partial\tilde{p}^w/\partial\tau < 0 < \partial\tilde{p}^w/\partial\tau^*$. The latter inequalities ensure that each country is “large,” since a country can improve its terms of trade by increasing its tariff.

In summary, equilibrium values are implied by a given pair of tariffs in the following manner. First, given the tariffs, the equilibrium world price is determined by (2.3). Second, the equilibrium world price and the given tariffs determine the local prices. Third, the world and local prices imply values for the production, consumption, import, export and tariff revenue levels.

Government Preferences In representing government preferences, the traditional approach is to impose the assumption that governments maximize national income. By contrast, the political-economy approach emphasizes that governments are motivated by distributional concerns. Here, we follow Bagwell and Staiger (1999, 2002) and adopt a general representation for government preferences that (i) allows for both the terms-of-trade externality and political motivations, and (ii) facilitates the identification of the respective roles played by the terms-of-trade externality and political motivations in explaining the purpose of a trade agreement.

Formally, we represent the objectives of the home and foreign governments with the general functions $W(p, \tilde{p}^w)$ and $W^*(p^*, \tilde{p}^w)$, respectively. In expressing the welfare functions in this way, we break with the usual game-theoretic custom, under which payoffs (welfare values) are expressed directly in terms of actions (tariffs). Instead, we find it convenient to represent welfare in terms of the prices that the tariffs induce. As will become clear, this representation enables us to disentangle the separate roles played by the terms-of-trade externality and political motivations.

Allowing for a wide range of political motivations, we place no restrictions on government preferences over local prices. In fact, we impose only one assumption on the welfare functions (aside from standard assumptions to ensure that second-order conditions are globally met in each of the optimization problems considered below). We assume that, holding its local price fixed, each government achieves higher welfare when its terms of trade improve:

$$W_{\tilde{p}^w} < 0 \text{ and } W_{\tilde{p}^w}^* > 0. \quad (2.4)$$

This assumption can be understood using Figure 1. Point $A \equiv (\tau, \tau^*)$ represents an initial tariff pair. This pair is associated with a domestic iso-local-price locus, $p(A) \rightarrow p(A)$, and an iso-world-price locus, $\tilde{p}^w(A) \rightarrow \tilde{p}^w(A)$.⁵ Point $C \equiv (\tau^1, \tau^*)$ denotes the tariff pair that obtains following an increase in the home tariff. This pair is associated with a second set of prices, corresponding to the domestic iso-local-price locus, $p(C) \rightarrow p(C)$, and the iso-world-price locus, $\tilde{p}^w(C) \rightarrow \tilde{p}^w(C)$. The world price is lower at C than at A , reflecting an improved terms-of-trade for the domestic country. A reduction in the world price that maintains the domestic local price is thus achieved with the movement from A to B . This movement corresponds to a higher (lower) domestic (foreign) import tariff. The meaning of condition (2.4) is thus simply that the domestic government values the international income transfer that is implied by the movement from A to B .

In both the traditional and the leading political-economy approaches to trade policy, governments maximize a welfare function of this form. Important formalizations of the traditional approach are offered by Dixit (1987), Johnson (1953-54), Kennan and Reizman (1988) and Mayer (1981). These models proceed under the assumption that the national welfare of a country improves when it experiences a terms-of-trade improvement. Within the political-economy literature, several specific models are entertained. As Mayer (1984) shows, if the government arises from a representative democracy, then the government sets its trade policy to promote the interests of the median voter, whose utility can be represented as a function of this form. Other major approaches to the political economy of trade policy are explored by Olson (1965), Caves (1976), Brock and Magee (1978), Feenstra and Bhagwati (1982), Findlay and Wellisz (1982) and Hillman (1982). As Baldwin (1987) observes, all of these approaches can also be represented in this form. Finally, the framework presented here also includes the lobbying models of Grossman and Helpman (1994, 1995).

Unilateral Trade Policies In order to determine the problem that a trade agreement might solve, we must first characterize the unilateral trade policies that would arise in the absence of a trade agreement. We therefore derive the home and foreign tariff reaction functions. To this end, we suppose that each

⁵Given our assumption that the Metzler and Lerner Paradoxes are ruled out, the iso-world-price locus takes a positive slope while the iso-local-price locus takes a negative slope.

government sets its tariff policy to maximize its welfare, taking as given the tariff choices of its trading partner. These optimization problems determine the reaction functions, which are defined implicitly by

$$W_p[dp/d\tau] + W_{\tilde{p}^w}[\partial\tilde{p}^w/\partial\tau] = 0 \quad (2.5)$$

$$W_{p^*}[dp^*/d\tau^*] + W_{\tilde{p}^w}^*[\partial\tilde{p}^w/\partial\tau^*] = 0. \quad (2.6)$$

Let $\lambda \equiv [\partial\tilde{p}^w/\partial\tau]/[dp/d\tau] < 0$ and $\lambda^* \equiv [\partial\tilde{p}^w/\partial\tau^*]/[dp^*/d\tau^*] < 0$. We may rewrite (2.5) and (2.6) as

$$W_p + \lambda W_{\tilde{p}^w} = 0, \quad (2.7)$$

$$W_{p^*} + \lambda^* W_{\tilde{p}^w}^* = 0. \quad (2.8)$$

As these expressions make clear, the best-response tariff of each government reflects the combined effect on welfare of the induced local and world price movements.

Figure 1 offers further insight. Beginning at the initial tariff pair $A \equiv (\tau, \tau^*)$, suppose that the domestic government unilaterally increases its tariff and thus induces the new pair $C \equiv (\tau^1, \tau^*)$. As (2.7) suggests, we can disentangle the overall movement from A to C into separate movements in the local and world prices. The movement from A to B isolates the change in the world price, and the corresponding welfare effect for the domestic government is captured in (2.7) with the term $\lambda W_{\tilde{p}^w}$. This term is strictly positive by (2.4). The movement from B to C isolates the induced increase in the local price, holding fixed the world price, and the associated change in the domestic government's welfare is represented in (2.7) with the term W_p .

The welfare implications of the local-price movement from B to C are domestic in nature: they reflect the balance for the domestic government between the costs of the associated economic distortions and the benefits of any induced political support. By contrast, the welfare implications of the world-price movement from A to B are international in kind: they reflect the benefits to the domestic government of shifting the costs of its policy onto the foreign government. The cost shifting occurs, since this movement corresponds to an improvement (deterioration) in the domestic (foreign) country's terms of trade. Due to this terms-of-trade externality, if the domestic government seeks to implement a local price corresponding to the iso-local-price locus $p(C) \rightarrow p(C)$, then a unilateral

increase in the domestic import tariff serves to shift a portion of the costs of this outcome onto the foreign government.

In a Nash equilibrium, both governments are on their reaction curves. A Nash equilibrium tariff pair, (τ^N, τ^{*N}) , thus satisfies (2.7) and (2.8). We assume that this equilibrium represents the trade-policy decisions that governments would make if there were no trade agreement.

The Value of a Trade Agreement Governments seek a trade agreement in order to achieve mutually beneficial changes in trade policy. If governments set Nash tariffs in the absence of a trade agreement, it follows that a trade agreement is valuable to governments if it results in tariff changes that generate Pareto improvements in government welfare beyond that achieved in the Nash equilibrium. This is possible, of course, if and only if the Nash equilibrium is inefficient (relative to government preferences). We therefore next discuss the efficiency frontier and its relationship to the Nash equilibrium.

We make three observations.⁶ The first observation is that the Nash equilibrium is inefficient. This is intuitive. When a government sets its trade policy unilaterally, it is able to shift some of the costs of its policy onto its trading partner, through the change in the terms of trade that its policy implies. In the absence of a trade agreement, therefore, governments do not have the incentive to set trade policies in an efficient manner. The second observation is that both governments can experience welfare gains relative to the Nash equilibrium only if they both agree to set tariffs below their Nash levels. The necessity of reciprocal trade liberalization is intuitive, too. In a Nash equilibrium, governments set tariffs that are higher than is efficient, since they each recognize that some of the costs of a higher tariff can be passed on to the trading partner. Not surprisingly, then, if both governments are to benefit from a trade agreement, then each must lower its tariff below its Nash level. Evidently, governments are attracted to trade agreements that result in reciprocal trade liberalization, whether or not the governments maximize national welfare.

The terms-of-trade externality is clearly one reason that the Nash equilibrium is inefficient. But are there also political externalities that create an additional reason for a trade agreement? To answer this question, we consider a hypothetical world in which governments are not motivated by the terms-of-trade implications of their trade policy choices.⁷ If unilateral tariff choices would be efficient in such

⁶For formal proofs of these observations, see Bagwell and Staiger (1999, 2002).

⁷Our assumption here is not that governments fail to understand the terms-of-trade effects

a world, then it follows that the terms-of-trade externality is the *only* rationale for a trade agreement. We therefore define *politically optimal tariffs* as any tariff pair (τ^{PO}, τ^{*PO}) that satisfies the following two conditions:

$$W_p = 0 \text{ and } W_{p^*}^* = 0.$$

In the special case where governments maximize national welfare, politically optimal tariffs correspond to reciprocal free trade. More generally, government objectives may also reflect political considerations, and then there is no expectation that politically optimal tariffs correspond to reciprocal free trade.

We come now to our third observation: politically optimal tariffs are efficient. To gain some intuition, suppose that each government sets its trade policy in order to achieve its preferred local price, so that tariffs are set at their politically optimal levels, and consider a small increase in the domestic tariff. The tariff increase has three effects. First, it causes a small increase in the local price in the domestic country. Given that the domestic government initially has its preferred local price, however, this effect has no first-order impact on the domestic government's welfare. Second, the domestic tariff increase generates a small decrease in the local price of the foreign country. The foreign government, however, also initially has its preferred local price, and so this effect has no first-order impact on the foreign government's welfare. Third, the small increase in the domestic tariff induces a decrease in the world price. This terms-of-trade change, however, represents a pure international transfer in tariff revenue and thus cannot generate an efficiency gain. We may conclude that, if the terms-of-trade motivation is eliminated from the trade-policy choices of governments, then there is no potential for further Pareto improvements.

We pause now to remark on our large-country assumption. For the moment, suppose that the politically motivated governments preside over small countries. In this case, the terms-of-trade motivation would be eliminated from the trade-policy decisions of each government, simply because each government would recognize that it is unable to alter the terms of trade with its tariff selection. The governments of small countries would thus select the politically optimal tariffs,

of their tariff choices. Instead, we consider a hypothetical situation in which governments are not motivated by these effects. In the context of (2.7), we allow that governments understand that $\lambda < 0$, but we now suppose that their welfare functions are such that $W_{p^w}^{\sim} \equiv 0$. After identifying the tariffs that would be selected by governments with these hypothetical preferences, we evaluate the efficiency of these tariffs with respect to actual government preferences.

and their policies thus would be efficient. Consequently, in the leading political-economy models of trade policy, there is no reason for the governments of small countries to form a trade agreement among themselves, regardless of the political motivations that these governments may possess. The value of trade agreements thus stems not from political motivations but rather from the terms-of-trade externality that is associated with the trade-policy choices of large countries.

To gain additional intuition, we return to Figure 1. Once again, suppose that tariffs are initially at point A and that the domestic government evaluates a tariff increase that would generate the point C . Consider first the possibility that the domestic government is motivated by the terms-of-trade consequences (i.e., the movement from D to C) of its tariff policy. The domestic government then recognizes that some of the costs of achieving the higher local price at C are shifted onto its foreign trading partner, through the reduced world price, and this makes the tariff increase especially attractive. For this reason, Nash tariffs are always inefficient, with tariffs (trade volumes) that are too high (low). Consider second the possibility that the domestic government is not motivated by the terms-of-trade implications of its trade policy. In this case, it would prefer point C to point A if and only if it also prefers point D to point A . The potential appeal of point C is now separate from any cost-shifting benefits that derive from the consequent world price change; therefore, the domestic government now has the “right” incentives when evaluating the tariff increase.⁸ When both governments reason in this manner, the resulting consistent set of tariffs is politically optimal and efficient.

Figure 2 offers a compact summary of the observations.⁹ In agreement with the first observation, the Nash tariffs (point N) lie off of the efficiency locus (depicted by the curve $E \rightarrow E$). The figure also represents the Nash iso-welfare curves and thereby illustrates the second observation: a trade agreement can give both governments greater-than-Nash welfare only if the agreement results in a reduction in both tariffs. Finally, as the third observation requires, the politically optimal tariffs (point PO) rest on the efficiency locus. Of course, the iso-welfare

⁸A movement from A to D in Figure 1 induces no externality through the terms of trade. It does cause a change in the foreign local price; however, if the foreign government also selects politically optimal tariffs, then a small change of this kind has no first-order effect on foreign welfare.

⁹In this figure, we assume that a unique Nash equilibrium exists, a unique political optimum exists, and that the political optimum lies on the contract curve (i.e., it is on that portion of the efficiency locus at which each government obtains greater-than-Nash welfare). The political optimum rests on the contract curve, provided that countries are sufficiently symmetric.

curves are tangent at every point along the efficiency locus. At the politically optimal tariffs, however, the iso-welfare curves are also tangent to the iso-world-price locus (the locus \tilde{p}_{PO}^w). The contract curve is represented by the bold portion of the efficiency locus.

Figure 2 illustrates the basic task facing governments that seek to design a trade agreement. Non-cooperative governments would set trade policies unilaterally and obtain the Nash outcome N . A trade agreement is then appealing to governments as a means to facilitate cooperation, so that tariffs may be moved from the inefficient Nash point to some alternative point on the contract curve. Among the tariffs on the contract curve, the politically optimal tariffs are focal: these tariffs remedy the terms-of-trade inefficiency in a direct way. As Figure 2 illustrates, the efficiency locus need not pass through the free-trade point, when governments have political concerns. But while governments' political motivations affect their preferences over tariffs (e.g., the location of the efficiency locus), it is the terms-of-trade externality that creates a problem that a trade agreement might solve.

The Interpretation of the Terms-of-Trade Externality The discussion above confirms a simple idea: governments can gain from a cooperative trade agreement, if otherwise each would attempt to shift costs onto the other and thus adopt inefficient unilateral policies. In this context, the terms-of-trade externality is simply the means through which such cost shifting would occur.

As explained in the Introduction, however, many economists are skeptical of the practical relevance of the terms-of-trade argument for trade agreements. One objection to this argument is that it is traditionally advanced in the company of the counter-factual assumption that governments maximize national income. We have just established, however, that the essential elements of the terms-of-trade argument are maintained whether or not governments have political motivations. A second objection is that the argument is based on abstract general equilibrium reasoning that seems to emphasize a logic that would not likely weigh heavily in the practical minds of policy makers.

We now address this second objection. The key point is that the terms-of-trade argument also may be interpreted in other ways, which are less abstract and thus suggest greater practical relevance. First, the theory may be developed in a partial-equilibrium framework. Cost shifting then occurs via the terms-of-trade externality if foreign exporters bear some of the *incidence* of the import tariff. Unilateral tariffs are now inefficient for an immediately plausible reason:

the domestic government fails to internalize the harm to foreign exporters that its import tariff implies.¹⁰ Second, the terms-of-trade theory is easily translated into the *market-access* language that dominates real-world trade policy negotiations. To see the point, suppose that the home government raises its import tariff and thereby shifts in its import demand curve. Notice that the resulting “price effect” (i.e., the home country’s terms-of-trade improvement) then has a corresponding “volume effect” (i.e., the foreign country’s reduction in access to the home market). Viewed in this light, it is natural that trade-policy negotiators emphasize the market-access implications of trade policy.

Rules versus Power Our discussion to this point indicates that the purpose of a trade agreement is to provide an escape from a terms-of-trade driven Prisoners’ Dilemma. In essence, we have supposed that a trade agreement enables governments to move from the inefficient Nash equilibrium, as depicted by the point N in Figure 2, to a point on the contract curve. This discussion, however, leaves open two important questions. First, how might governments best structure their negotiations in order to successfully navigate their way from the Nash equilibrium to the contract curve? Second, once governments leave the Nash equilibrium, each has some incentive to cheat (deviate to its reaction curve), and it therefore becomes important to ask: How is a trade agreement enforced? We begin our discussion of the first question here, and we consider both questions in some detail in Section 4.

A broad distinction can be made between two approaches to the structure of trade-policy negotiations. In particular, following Jackson (1997, pp. 109-112), we draw a distinction between “power-based” and “rules-based” approaches to negotiation. Under a power-based approach, governments would bargain over tariffs in a direct fashion that is not constrained by agreed-upon principles of negotiation. For example, the negotiation between governments might be characterized by the Nash Bargaining Solution. Such a negotiation would deliver a point on the contract curve; however, the exact location of the negotiated outcome would depend upon the Nash payoffs (i.e., the “threat point”). Consequently, the negotiated outcome would reflect existing “power asymmetries” across negotiation partners.

By contrast, under the approach to negotiations embodied in GATT/WTO,

¹⁰This interpretation is developed further in Bagwell and Staiger (2001), where we use a partial equilibrium model and derive the three observations mentioned above. In Bagwell and Staiger (2002), we refer to empirical studies and argue for the presumption that foreign exporters are unable to “pass through” an import tariff.

governments identify and agree upon certain principles by which subsequent negotiations must abide. The negotiation approach used in GATT/WTO is thus better described as a rules-based approach. Of course, to gain some understanding of the trade-policy negotiated outcome that might be induced by GATT/WTO rules, it is first necessary to identify the specific rules by which member governments must abide. We may then consider whether these rules can serve to reduce, or even eliminate, existing power asymmetries across negotiating partners. From the perspective of the terms-of-trade theory, if these rules induce large countries to behave as if they were small countries, and thereby guide the outcome of trade negotiations toward the political optimum, then we may conclude that GATT/WTO rules indeed do reduce power asymmetries.

3. The History and Design of GATT/WTO

Having discussed the theory of trade agreements, we now present a brief overview of the history and design of GATT/WTO. This overview provides an institutional context that guides our discussion in the next section.

The Origin of GATT and the WTO GATT arose in response to the protectionist trade policies of the 1920s and 1930s. As is well known, trade barriers became increasingly restrictive following World War I. The situation worsened when the U.S. enacted the Smoot-Hawley Tariff Act in 1930. Average U.S. tariffs then increased from 38 to 52%. U.S. trading partners were, of course, not pleased, and a spate of retaliatory tariffs were imposed. Ultimately, the major powers imposed tariff rates that were generally on the order of 50%.

As Hudec (1990, p. 5) explains, “the postwar design for international trade policy was animated by a single-minded concern to avoid repeating the disastrous errors of the 1920’s and 1930’s.” In terms of Figure 2, we may think of the Nash point N as corresponding to the “tariff war” that is associated with the Smoot-Hawley tariffs. The challenge before governments was then to find some means by which to implement a more cooperative trade-policy relationship, such as represented in Figure 2 by the efficiency locus.

During the 1920s and 1930s, there were, in fact, many multilateral attempts to achieve such a cooperative trade-policy relationship. The World Economic Conference of 1927 is one prominent example. These attempts were not successful, however. The interesting point here is that a general awareness among governments that mutual gains from cooperation were possible did not, by itself,

result in the spontaneous emergence of cooperative behavior. In this regard, it is notable that the interwar attempts proceeded without an institutional structure that provides a set of rules under which governments could conduct negotiations, understand clearly their obligations and enforce compliance. Without this structure, the initial multilateral efforts among governments, while well intentioned, failed to get traction.

Over the interwar period, trade-policy cooperation instead took place through bilateral trade agreements. In the U.S., Secretary of State Cordell Hull's efforts led to the U.S. Reciprocal Trade Agreement Act of 1934. An important advocate of reciprocity, Hull proposed that the U.S. offer import tariff reductions in exchange for reciprocal reductions in foreign import tariffs. Hull also offered support for the principle of non-discrimination: when the U.S. lowered a tariff in a bilateral negotiation, that tariff cut would extend without discrimination to all trading partners of the U.S. that had been granted MFN status.

Encouraged by its success in the bilateral arena, the U.S. sought to build upon the key components of the Reciprocal Trade Agreements Act and establish a multilateral institution. In 1946, negotiations began for the creation of an International Trade Organization (ITO). Under the ITO, negotiations between governments would result in reciprocal and mutually advantageous reductions in tariffs, and the principle of non-discrimination would then ensure that the reduced tariffs would be extended to all member countries. An interim agreement, known as the General Agreement on Tariffs and Trade (1947), was reached in 1947. While GATT was intended as an interim agreement, the ITO was never ratified by the U.S. Congress.

What is the purpose of GATT? According to the Preamble of GATT, the objectives of the contracting parties include "raising standards of living, ensuring full employment and a large and steadily growing volume of real income and effective demand, developing the full use of the resources of the world and expanding the production and exchange of goods." The Preamble also states the contracting parties' belief that "reciprocal and mutually advantageous arrangements directed to the substantial reduction in tariffs and other barriers to trade and to the elimination of discriminatory treatment in international commerce" would contribute toward these goals. Importantly, "free trade" is not the stated objective of GATT.

There have been eight rounds of GATT negotiations. The primary focus of the earlier rounds was the reduction of import tariffs on goods. In the most recent round, known as the Uruguay Round, governments ventured into a number of new issues (e.g., investment and intellectual property) and formed the WTO. This

organization embraces the rules and agreements made in GATT negotiations, but it is also a full-fledged international organization, with an explicit organizational charter and a unified dispute-settlement system. In effect, with the creation of the WTO, participating governments fulfilled their original quest with the ITO for an official international organization.

The Rules of GATT/WTO GATT/WTO membership carries with it an obligation to abide by a set of rules. GATT listed these rules in a series of 39 articles. The WTO has incorporated these GATT articles, and as well extended the principles embodied in them to a variety of new issues. Here, we simply offer an overview of the GATT/WTO legal structure by focussing on the principles embodied in these articles.

To understand this structure, it is useful to distinguish between three elements: substantive obligations, exceptions and dispute settlement procedures. The substantive obligations of a GATT/WTO member refer to tariff commitments, MFN treatment and a set of other commitments that together comprise a “code of conduct” in the international-trade arena. Broadly speaking, these provisions define an obligation to concentrate national protective measures into the form of tariffs, to apply them on a non-discriminatory basis, and to honor any tariff bindings made in a GATT/WTO negotiation.

GATT/WTO also provides for exceptions to these obligations. One class of exceptions is for “original” actions, such as when a member seeks to withdraw a previous concession through renegotiation. The rationale for including exceptions is that a government is more likely to make a substantial tariff commitment, if the government knows that the legal system has “safeguards” so that its concessions can be withdrawn under appropriate conditions. Of course, a tariff commitment is meaningful only if exceptions for original actions are subject to some disciplining structure. For this reason, GATT/WTO rules also permit a second class of exceptions for “retaliatory” actions. In particular, if a government seeks to withdraw a previous concession, then GATT/WTO rules recognize the cost borne by its trading partner. This partner may seek “compensation” from the government (e.g., a tariff reduction on some other good), and if this fails it is allowed to achieve compensation through retaliation. The meaning of retaliation is that the trading partner can then reciprocate by withdrawing a concession of a “substantially equivalent” nature.

But how are these rules enforced? This question leads to the third element mentioned above: the GATT/WTO dispute settlement procedures. In

GATT/WTO disputes, a central issue is whether the actions by one country serve to “nullify or impair” the benefits expected under the agreement by another country. Nullification or impairment includes actions taken by one country “...which harmed the trade of another, and which ‘could not reasonably have been anticipated’ by the other at the time it negotiated for a concession” (Jackson, 1997, p. 115). The typical case is a “violation complaint.” This occurs when a country is alleged to have failed to carry out its GATT/WTO obligations, as when a tariff binding is broken.

It is important to distinguish between the procedures associated with safeguard exceptions and those that are associated with nullification or impairment. The safeguard procedures provide for the *lawful* withdrawal of negotiated concessions and specify the permissible retaliatory responses of trading partners. The dispute settlement procedures govern retaliation against a country that takes a harmful action which its trading partners could not have anticipated under GATT/WTO rules. In the typical case, the offending country has violated GATT/WTO rules, and retaliation here is more directly concerned with the enforcement of rules.

The procedure for settling disputes involves three stages: consultation among the involved parties; investigation, ruling and recommendation by a GATT/WTO panel (or Appellate Body); and as a last resort, authorization of retaliation. Resolution may be achieved in the first stage or it may follow the panel ruling. If the panel finds that nullification or impairment has occurred, then it recommends that the offending country correct any illegal measures. The offending country may be unwilling to do so, however. In this case, it may seek a negotiated resolution by offering the harmed country compensation via MFN tariff reductions on some other goods. If compensation is not offered, or rejected, then the harmed country may follow through with the last-resort response: an authorized and discriminatory suspension of tariff concessions. In practice, the number of authorized retaliations has been small.¹¹ As Rhodes (1993, p. 109) argues, however, the threat of authorized retaliation is often the catalyst that ensures resolution in the earlier stages.

¹¹Under GATT, retaliation was authorized in only one case, concerning the U.S. and the Netherlands, and even then the Netherlands never acted on that authorization (Jackson, 1997, p. 116). The dispute settlement procedures under the WTO are considerably strengthened. Under the WTO, further cases have emerged in which retaliation has been authorized - and used. These include the well-known banana and beef-hormone cases. Further discussion is offered by Mavroidis (2000) and WTO (2001, p. 28).

Reciprocity in GATT/WTO As the preceding discussion confirms, the enforcement provisions of GATT/WTO are elaborate. The representation of reciprocity in GATT/WTO, however, may be less apparent. In GATT/WTO, the principle of reciprocity refers to the ideal of mutual changes in trade policy which bring about changes in the volume of each country’s imports that are of equal value to changes in the volume of its exports. The preceding discussion contains two instances in which a reference to reciprocity arises. First, when governments negotiate in GATT/WTO rounds, they do so with the presumed goal of obtaining mutually advantageous arrangements through reciprocal reductions in tariff bindings. In particular, it is often observed that governments approach negotiations seeking a “balance of concessions,” whereby the tariff reduction offered by one government is balanced against an “equivalent” concession from its trading partner. Second, when a government seeks to renegotiate and withdraws a previous concession as an original action, GATT/WTO rules allow that substantially affected trading partners may retaliate in a reciprocal manner, by withdrawing “substantially equivalent concessions.”

4. The Theory of GATT/WTO

We now consider the theoretical interpretation of two key GATT/WTO features: reciprocity and enforcement.

Reciprocity We begin with the principle of reciprocity. While we describe above the ideal of reciprocity, our first task here is to offer a formal definition of reciprocity. Utilizing the general equilibrium model of trade presented above and following Bagwell and Staiger (1999), our next task is to show that the concept of reciprocity can be given a very simple formal characterization. Finally, we consider in further detail the application of reciprocity in GATT/WTO.

How might the concept of reciprocity be formally defined? Suppose that a tariff negotiation results in a change from an initial pair of tariffs, (τ^0, τ^{*0}) , to a subsequent pair of tariffs, (τ^1, τ^{*1}) . The initial world and domestic local prices may be denoted as $\tilde{p}^{w0} \equiv \tilde{p}^w(\tau^0, \tau^{*0})$ and $p^0 \equiv p(\tau^0, \tilde{p}^{w0})$; likewise, the subsequent world and domestic local prices may be represented as $\tilde{p}^{w1} \equiv \tilde{p}^w(\tau^1, \tau^{*1})$ and $p^1 \equiv p(\tau^1, \tilde{p}^{w1})$. We may now say that the tariff changes conform to *the principle of reciprocity* provided that

$$\tilde{p}^{w0}[M_x(p^1, \tilde{p}^{w1}) - M_x(p^0, \tilde{p}^{w0})] = [E_y(p^1, \tilde{p}^{w1}) - E_y(p^0, \tilde{p}^{w0})] \quad (4.1)$$

where changes in trade volumes are valued at the existing world price.

We next use the trade balance condition (2.1) and offer a characterization of reciprocity. Given balanced trade at the initial tariffs, we know that $\tilde{p}^{w0}M_x(p^0, \tilde{p}^{w0}) = E_y(p^0, \tilde{p}^{w0})$; thus, (4.1) may be rewritten as

$$\tilde{p}^{w0}M_x(p^1, \tilde{p}^{w1}) = E_y(p^1, \tilde{p}^{w1}).$$

Balanced trade at the subsequent tariffs means that $\tilde{p}^{w1}M_x(p^1, \tilde{p}^{w1}) = E_y(p^1, \tilde{p}^{w1})$; therefore, with this further application of the trade balanced condition, (4.1) may be rewritten as

$$[\tilde{p}^{w1} - \tilde{p}^{w0}]M_x(p^1, \tilde{p}^{w1}) = 0. \quad (4.2)$$

We thus come to a striking characterization: mutual changes in trade policy conform to the principle of reciprocity if and only if the world price is unchanged.

The potential significance of this characterization is apparent, when it is recalled from Section 2 that a government sets its tariffs in an inefficient manner if and only if it is motivated by the *change* in the world price that its tariff choice implies. To gain further insight, we consider the application of reciprocity within GATT/WTO practice. As discussed above, reciprocity arises in GATT/WTO practice in two ways.

The first application of reciprocity reflects the balance of concessions that governments seek through a negotiated agreement. This informal principle of reciprocity contrasts with a standard economic argument that free trade is a country's optimal unilateral policy. As we now demonstrate, however, the terms-of-trade theory offers a simple interpretation of this application of reciprocity.

Suppose that governments begin at the Nash equilibrium point. At the Nash point, we may use (2.4), (2.7) and (2.8) to conclude that $W_p < 0 < W_{p^*}$. If governments were to reduce tariffs in a reciprocal manner that preserved the world price, then the domestic local price p would fall and the foreign local price p^* would rise; consequently, the domestic-government welfare would rise (since $W_p < 0$) and the foreign-government welfare would also rise (since $W_{p^*} > 0$). Intuitively, at the Nash equilibrium, both governments would prefer more trade, if the increase in trade volume could be obtained without a terms-of-trade loss. Neither government is willing to liberalize unilaterally, since its country would then experience a decline in the terms of trade. But if the liberalization occurs under the principle of reciprocity, with one country's tariff reduction balanced against that of the other, then the terms of trade are held constant. Each government can then gain from an expansion in trade volume without experiencing a terms-of-trade loss.

The central ideas are summarized in Figure 3. In Figure 3a, the case of symmetric countries is illustrated. The iso-world-price locus that runs through the Nash point N then also extends to the politically optimal point PO . As governments liberalize under reciprocity, they move down the Nash iso-world-price locus, and each experiences welfare gains along the way until the political optimum is reached. Once the political optimum is obtained, the governments are on the efficiency locus and have no incentive for further negotiations. The case of asymmetric countries is depicted in Figure 3b, wherein the Nash iso-world-price locus does not run through the politically optimal point. Liberalization under reciprocity that begins at the Nash point still raises the welfare of each government; however, the mutual benefits from further liberalization are extinguished before the efficiency frontier is reached. For example, in Figure 3b, the mutual benefits from further liberalization terminate at point Z where the home government has achieved its preferred local price (i.e., at the Nash world price, $W_p = 0$ at point Z).

The second application of reciprocity in GATT/WTO concerns the rules under which trade agreements may be renegotiated. GATT Article XXVIII allows that a country may propose to withdraw a concession agreed upon in a previous round of negotiation. If the country and its trading partner are unable to agree upon a renegotiated tariff structure, then the country may carry out its proposed change anyway, with the understanding that the trading partner may then reciprocate with its own change. In this context, the notion of reciprocity is used to moderate the response of the trading partner, who is allowed to withdraw substantially equivalent concessions of its own.

This discussion suggests that GATT/WTO negotiations may be understood as a multi-stage game. Governments first agree to an initial set of tariffs in a round of negotiations. Second, each government considers whether it would prefer to raise its tariff, given that the outcome of any renegotiation must conform to reciprocity and thus preserve the world price.

A figure can capture the key ideas. Figure 4 depicts three possible tariff pairs, A , B and PO , that might represent an efficient initial agreement. The iso-world-price loci for each tariff pair are also depicted. As well, the loci for which $W_p = 0$ and $W_{p^*} = 0$ are represented. For simplicity, these loci are assumed downward sloping. As Bagwell and Staiger (1999) show, each locus intersects the efficiency frontier only at the politically optimal point PO .

Now consider an initial agreement at point A . The foreign government would prefer to move up the iso-world-price locus to the point A' , where it achieves its

preferred local price. It would thus request a renegotiation to raise its tariff to the value corresponding to point A' , with the understanding that the domestic government would then withdraw a substantially equivalent concession that would preserve the world price and therefore deliver the tariff pair at point A' . The efficient tariff pair at point A thus fails to be robust against the type of renegotiation that GATT/WTO allows. A similar argument applies for the efficient tariff pair associated with point B . At this tariff pair, it is the domestic government that withdraws its original concession in order to induce the point B' . In fact, there is only one efficient tariff pair that is robust to the possibility of renegotiation. The politically optimal tariff pair is the only point on the efficiency locus at which both governments achieve their preferred local prices given the associated world price.

It is interesting to compare the hypothetical world which led to the definition of politically optimal tariffs with what governments achieve under reciprocity. In the hypothetical world, governments were assumed not to value the terms-of-trade movements caused by their tariff choices, and they were thus led to select politically optimal tariffs. Reciprocity corresponds to a related experiment, in which governments ignore the terms-of-trade movements associated with their tariff increase, because the mutual changes in tariffs under reciprocity guarantee that the terms of trade are, in fact, fixed. Reciprocity thus induces governments to act *as if* they did not value the terms-of-trade movements caused by their tariff selections.¹²

In effect, governments are “penalized” under the GATT/WTO reciprocity rule if they attempt to negotiate an efficient tariff pair other than the political optimum. Consider, for example, point A in Figure 3. At this point, the home government enjoys greater welfare than it would at the political optimum; however, some of the benefit to the home government of point A would be lost in the subsequent renegotiation to the point A' . The home government therefore may be less desirous of pushing negotiations away from the political optimum and toward point A . As illustrated by this example, the reciprocity rule helps to mitigate the power asymmetries that governments might otherwise wield at the bargaining table. As a consequence, it encourages governments to select the politically optimal

¹²Formally, as (2.7) indicates, if $\lambda W_{p^w}^{\sim} = 0$, then the domestic government’s preferred tariff satisfies $W_p = 0$. In turn, if the government were hypothesized not to value a change in the terms of trade (i.e., if $W_{p^w}^{\sim} \equiv 0$), then $\lambda W_{p^w}^{\sim}$ would be zero. Likewise, if the government were to expect a reciprocal tariff adjustment from its trading partner that would result in no change in the terms of trade (i.e., if $\lambda = 0$), then $\lambda W_{p^w}^{\sim}$ would be zero.

tariffs.

Enforcement In the context of Figure 2, suppose that governments have formed a trade agreement that specifies rules under which they negotiate from the Nash point N to a point on contract curve, such as the political optimum, PO . How is this agreement enforced?

Unfortunately, the temptation for a government to select a high tariff and shift costs does not evaporate just because an agreement is signed. Each government has a short-term incentive to deviate to a higher-than-is-efficient tariff and enjoy the associated terms-of-trade gain. Unlike many agreements reached under domestic law, a trade agreement is not enforced through the threat of incarceration. There is no “world jail” into which government leaders are thrown if they violate a trade agreement. Rather, a trade agreement must be “self-enforcing”: a government will be dissuaded from violating the agreement only if the short-term gains lead to long-term losses, once other governments retaliate in kind. Viewed this way, the tariffs that governments can achieve as part of a self-enforcing trade agreement reflect a balance between the short-term benefit of protection and the long-term cost of retaliation. The “most-cooperative” tariffs that governments can enforce may not be fully efficient, but the most-cooperative tariffs are more efficient than Nash tariffs.

As McMillan (1986, 1989), Dixit (1987) and Bagwell and Staiger (1990) emphasize, the theory of repeated games may be used to analyze the enforcement issues that are associated with trade agreements. Formally, we may regard the static framework described above as the stage game of an infinitely repeated game. As governments cooperate by imposing low tariffs that rest below the tariff reaction functions, each government perceives a short-run benefit from a unilateral tariff increase. Each government, however, may be concerned that such a deviation, once discovered, could lead to retaliation. At the extreme, recalcitrant behavior could undermine the entire agreement and ultimately lead countries back to the inefficient Nash outcome. This long-term cost may serve as an effective deterrent, provided that the short-term incentive to cheat is not too great. Thus, even if governments cannot cooperate fully, some cooperation can be sustained.

We now argue that this repeated-game perspective is consistent with the GATT/WTO enforcement provisions as described in Section 3. The creation of GATT and its nullification-or-impairment procedures may be interpreted as an attempt to replace the Nash outcome with a more efficient equilibrium outcome. To accomplish this, governments agreed through GATT to limit the use of retalia-

tion along the equilibrium path and reposition it as an off-equilibrium-path threat that enforces rules. It must be stressed, however, that a limited role for retaliation indeed does arise along the equilibrium path. This occurs, for example, when a government seeks a retaliatory exception to obtain compensation for an original tariff modification by its trading partner, where the original modification is a legal exception such as allowed under GATT Article XXVIII (renegotiation). The role of retaliation in GATT/WTO is thus more subtle than a standard application of repeated-game theory might suggest.

The distinction between the on- and off-equilibrium-path roles of retaliation may be further clarified with the consideration of two situations. First, suppose that a foreign government raises its tariff above its bound rate and justifies its behavior as a legal exception under the rules for renegotiation. If the parties are unable to reach an agreement on compensation, then the home government may take its own retaliatory exception, with a “substantially equivalent” tariff hike. Here, retaliation is best interpreted as an on-equilibrium-path event. It serves to discipline the use of legal exceptions, so that their application reflects a legitimate purpose (e.g., changed circumstances) rather than an opportunistic desire to shift costs onto a trading partner.

Second, suppose that the home government complains that the foreign trade policy has changed in a manner that nullifies or impairs the access to the foreign market that the home government initially expected. Suppose further that the case is brought before a dispute panel, the panel finds in favor of the foreign government, and the home government nevertheless imposes unauthorized retaliatory tariffs. Such defiant behavior is best interpreted as an off-equilibrium-path deviation. What deters this deviant behavior?

Of course, the foreign government then may be authorized to retaliate against the unauthorized retaliatory tariffs. But this may only extend the cycle: the home government may respond with yet another unauthorized retaliatory response. The fundamental deterrent to such contumacious behavior, and the deterrent that rests at the foundation of all others, is the fear of initiating a breakdown in the entire cooperative arrangement and thereby causing a “trade war” (i.e., a return to the Nash point, N). As in the repeated-game model, this breakdown threat is the ultimate off-equilibrium-path retaliation, and it discourages deviant behavior of this second kind.

5. Conclusion

In the discussion above, we offer two main conclusions. First, whether or not governments have political motivations, the purpose of a trade agreement is to offer a means of escape from a terms-of-trade-driven Prisoners' Dilemma. Second, GATT/WTO's reciprocity and enforcement rules are well designed to facilitate such an escape.

Given space restrictions, there are a number of further issues that are not treated here. We refer the reader to our book (Bagwell and Staiger, 2002) for a more thorough treatment of the topics raised above, an analysis of the efficiency properties of other GATT/WTO rules (e.g., the MFN rule and those rules that concern the treatment of preferential trading agreements and agricultural subsidies), a discussion of several new trade-policy issues that currently confront the WTO (e.g., the treatment of labor and environmental standards as well as competition policy), and a variety of important modeling extensions (e.g., many goods, multiple trading partners). Instead, we use this concluding section to highlight three important areas for future research.

A first area concerns the purpose of a trade agreement. Our representation of government preferences includes those used in the leading political-economy models of trade policy. Nevertheless, an alternative formulation might point to a novel problem that a trade agreement could solve. One approach is to allow that governments face a time-consistency problem, in which case a government might use a trade agreement to facilitate its commitment to a liberalization process. Recent analyses that emphasize this possibility are offered by Maggi and Rodriguez (1998), McLaren (1997) and Staiger and Tabellini (1999). A second approach is to relax the market-clearing assumption that underlines our general equilibrium model. For example, in line with Keynesian theory, if markets are characterized by rigid markups, then the externalities from trade policy are not channeled through changes in the terms of trade; rather, an import tariff harms foreign exporters by reducing the trade volume on which they enjoy fixed markups. It remains to be seen if these alternative approaches offer an interpretation of the rules of GATT/WTO. This is an important direction that should be pursued in future research.

A second area concerns the role of the GATT/WTO institution in achieving a cooperative trade-policy outcome. At a theoretical level, given the efficiency-enhancing properties of the rules of GATT/WTO, it is not obvious why governments could not come to a tacit understanding to follow these rules. Why is it

necessary to have an actual institution? The natural response to this question emphasizes the coordination difficulties in achieving a common and cooperative understanding between multiple participants over a complex set of issues. In particular, while GATT/WTO rules may be understood as the codification of supergame strategies, in the real world, it may be difficult for a large number of countries trading thousands of goods to come to a common and tacit understanding of such strategies. The failed attempts at cooperation in the 1920s and 1930s are indicative of this formidable coordination problem. An actual institution, with a set of rules that makes explicit the obligations of governments and the manner in which these obligations are enforced, may be necessary to get traction in the multilateral journey from a non-cooperative relationship toward the efficiency frontier. Ambitious future work would provide a theoretical framework on the basis of which this response might be affirmed or rejected.¹³

Relatedly, it is not obvious why governments should favor a rules-based institution like GATT/WTO over a power-based approach. While we argue that the existing rules-based approach has an attractive design, could not governments do better by eliminating the constraints that rules imply and negotiating directly over tariffs on the efficiency frontier? This question suggests that future work might look for a problem that arises under power-based negotiations and is moderated or eliminated under a rules-based approach. One such problem may be associated with equity considerations: a power-based approach favors the strong, and this may be objected on equity grounds. Another approach is to argue that power-based negotiations lead to inefficiencies. Building on McLaren's (1997) ideas, we argue in Bagwell and Staiger (1999, 2002) that power-based negotiations may lead to inefficient participation, since weaker governments may fear being "held up" in subsequent negotiations with stronger governments. Power-based negotiations also may lead to inefficiencies, if governments dissipate rents (e.g., through signaling activities) in order to become (or seem) stronger, so as to enjoy the greater benefits that stronger parties enjoy in a power-based system. A rules-based approach may limit such inefficiencies. Important future work would explore a broader game, with potential inefficiencies for power-based negotiations, and determine the equity and efficiency differences between rules- and

¹³One thought is that an explicit multilateral institution enhances cooperation by facilitating the exchange of information. For example, as Maggi (1999) suggests, GATT/WTO may provide a forum in which deviations may be publicized, so that third-party punishments may be brought forth. Likewise, as Athey and Bagwell (2001) argue in the context of collusion theory, actual meetings may be necessary, if the form of optimal cooperation requires the (incentive-compatible) communication of private information.

power-based approaches to trade-policy negotiations.

A third area for future research is empirical. Our discussion emphasizes the terms-of-trade externality as the reason for a trade agreement. In Bagwell and Staiger (2002), we argue that there is strong support for the presumption that trade policies generate important terms-of-trade externalities. But this area of work is still quite new, and there is much more to be learned about the size and pattern of terms-of-trade externalities across trading partners.

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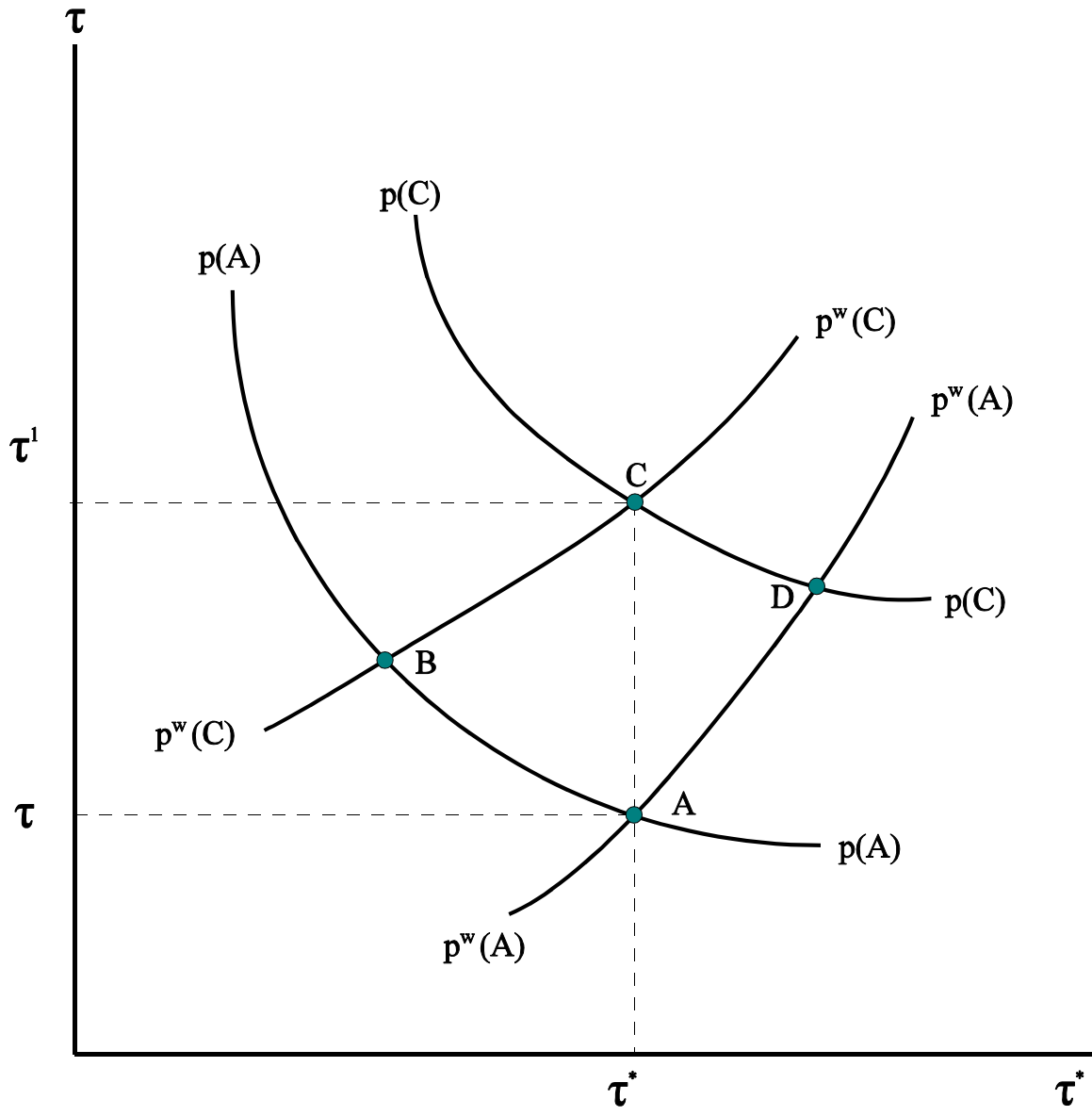


Figure 1

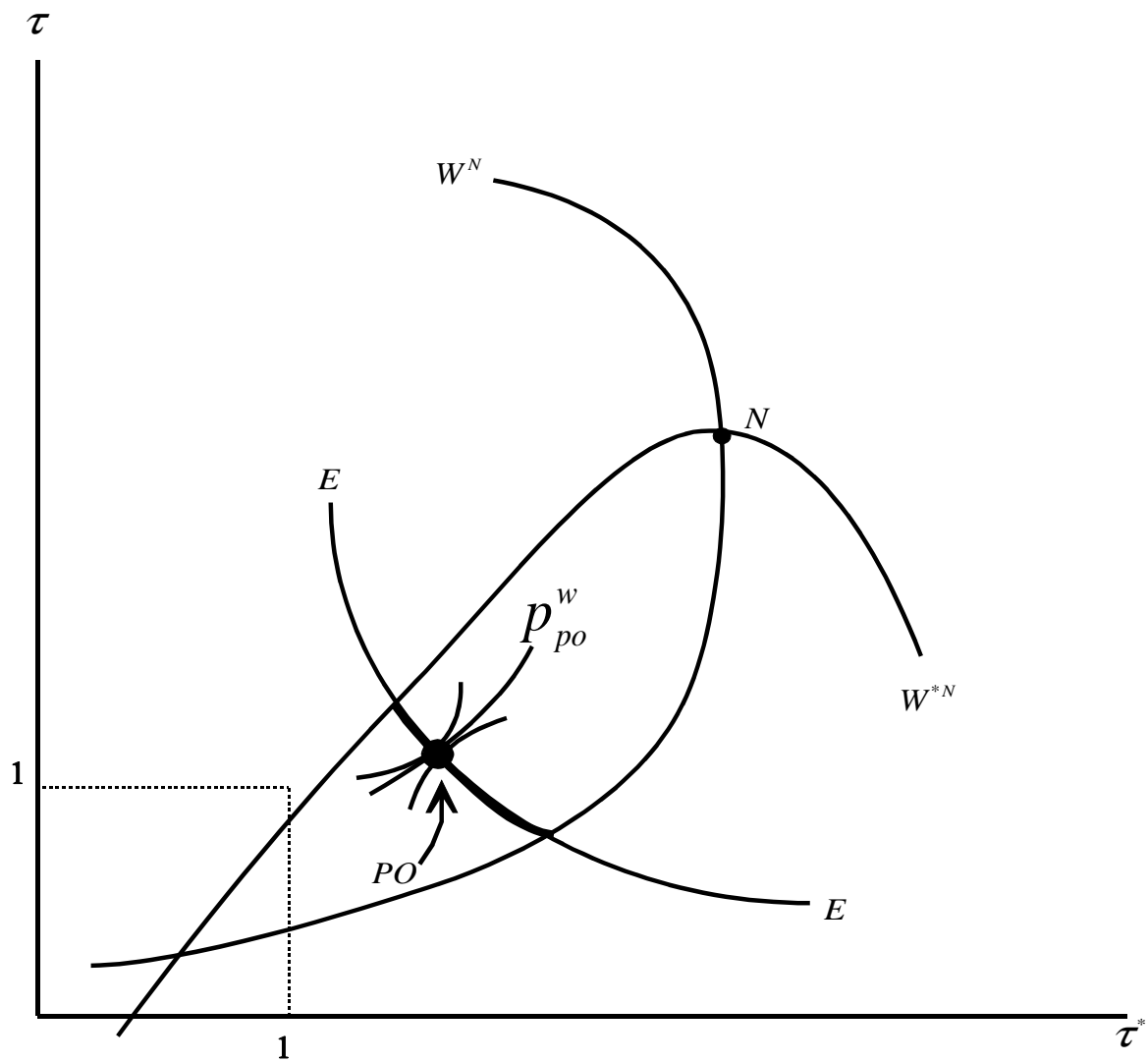


Figure 2

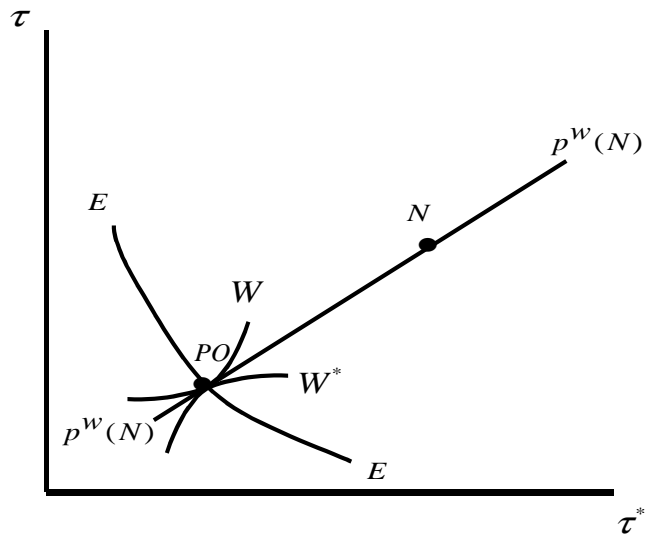


Figure 3a

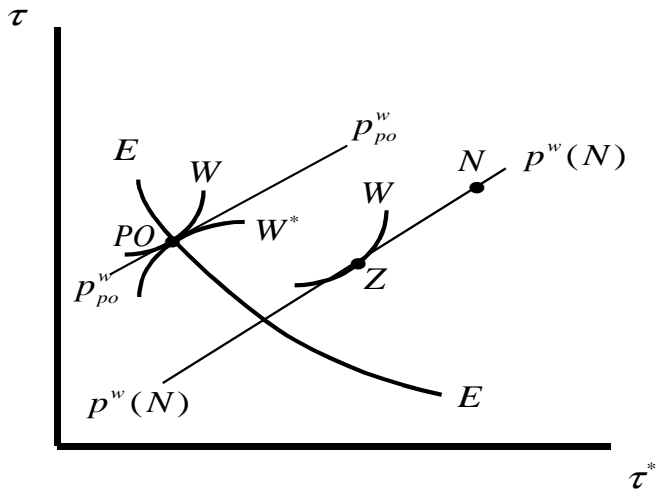


Figure 3b

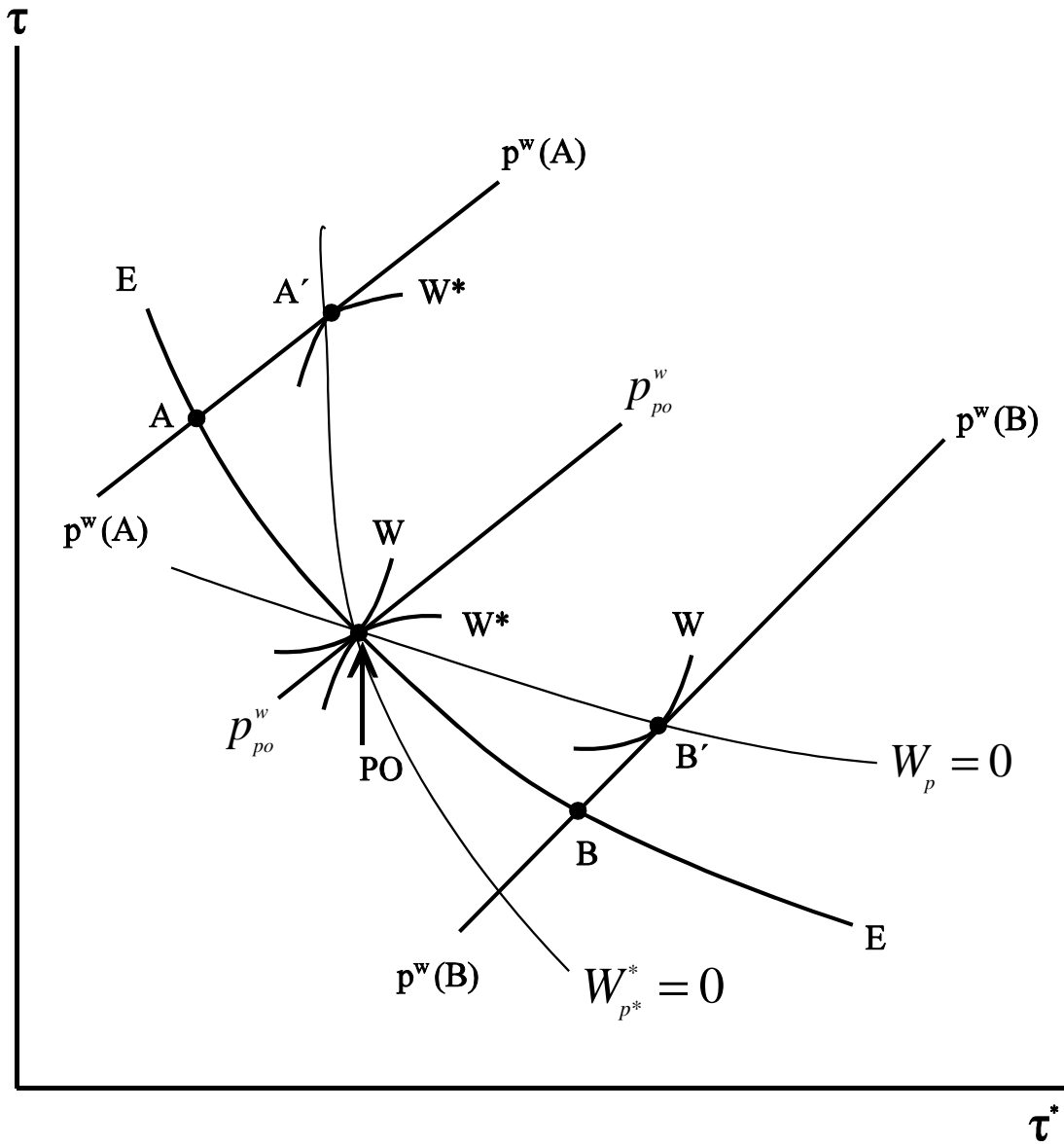


Figure 4