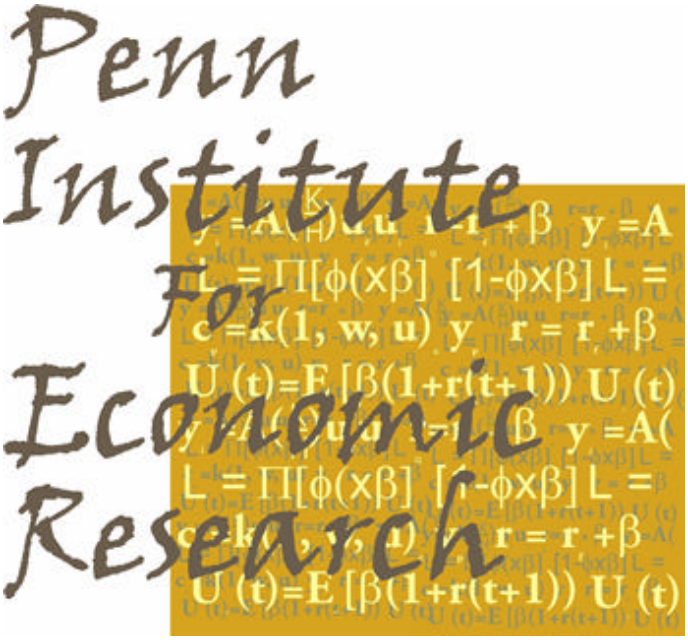


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"Trade Policies Based on Political Externalities: An Exploration"

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# Trade Policies Based on Political Externalities: An Exploration

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# Trade Policies Based on Political Externalities: An Exploration

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**Abstract:** During the past half century, multilateral trade liberalization has reduced tariffs to historically low levels. The Received Theory of multilateral trade agreements, based solely on terms-of-trade externalities between national governments, offers an explanation that has become the conventional wisdom among international trade theorists. But this explanation displays two puzzles that render it inconsistent with actual trade policy and actual trade agreements: the Terms-of-Trade Puzzle and the Anti-Trade-Bias Puzzle. This paper addresses inter-governmental political externalities in a model with terms-of-trade externalities. The model resolves the Terms-of-Trade Puzzle if and only if political externalities dominate terms-of-trade externalities. But it resolves the Anti-Trade-Bias Puzzle, and delivers results consistent with what we actually observe, only if terms-of-trade externalities play *no* role whatsoever.

**Keywords:** Political externalities, trade agreements, the Received Theory, the Terms-of-Trade Puzzle, the Anti-Trade-Bias Puzzle

***JEL* Classification Codes:** F02, F13

**Outline:**

# Trade Policies Based on Political Externalities: An Exploration

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A PROMINENT TWENTIETH-CENTURY ACCOMPLISHMENT of international trade theory was its theory of international trade policy and trade agreements. Building on Harry Johnson's classic paper (1953/54), scores of contributions developed and elaborated what can be called the "Received Theory". The deservedly influential work of Bagwell and Staiger (1999, 2002) may justly be seen as triumphantly completing the research agenda implied by Johnson nearly half a century earlier. The multilateral trade liberalization of the previous half century may well be the most successful deliberate exercise of economic policy in human history, so understanding it may well be the most important task of applied economic theory.

A second strand[1] of the Received Theory, emphasizing political economy, emerged in the 1980s. Grossman and Helpman (2002) expound its most widely used component.

However, two prominent puzzles draw into serious question the relation to reality of the Received Theory. This paper explores the Received Theory to address these puzzles. In the process of doing so, a third puzzle emerges, and is also addressed.

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[1]See, for example, Hillman (1982, 1990), Hillman, Long, and Moser (1995), and Hillman and Moser (1996). Surveys of the literature on the political economy of trade policy may be found in Hillman (1989), Magee (1994), Nelson (1988) and Rodrik (1995).

# I. Introduction: Two Puzzles

The central premise of the Received Theory is that trade agreements arise *solely* because countries with market power are concerned, to at least *some* degree, with the fact that trade barriers, imposed for *whatever* reason, can move the terms of trade in their favor, shifting real income there from the rest of the world.

As pointed out in Ethier (2004), the Received Theory is inconsistent with actual multilateral trade agreements, which do ***not*** prevent countries from trying to influence their terms of trade. I refer to this discrepancy as the *Terms-of-Trade Puzzle*.

Nothing in the GATT prevents a country from implementing export taxes. In their schedules of negotiated concessions, countries have bound their import taxes: They have *not*, with very rare exception, bound export taxes. If the EU, for example, were to decide, for *whatever* reason, to impose aggressively a set of export taxes that could improve its terms of trade, its outstanding multilateral trade obligations would *not* prevent it from doing so.

The more sophisticated and realistic contributions to the Received Theory — notably Bagwell and Staiger (1999, 2002) — do not assume that governments care only about aggregate social welfare, but allow them to be concerned with any number of internal or political-economy objectives that relate to the domestic relative price of imports in terms of exports. This price can be manipulated unilaterally with trade policy, but, if a country has market power, such manipulation will impact the terms of trade, creating an international externality that shifts part of the cost of the policy onto the rest of the world. Dealing with this terms-of-trade externality is the *sole* reason for trade agreements in these models.

Large countries will negotiate *only* trade agreements that constrain terms-of-trade manipulation. Trade agreements that do not do this would, *for no reason*, surrender the use of trade policy for domestic objectives. In reality we observe exactly the opposite. Countries negotiate trade agreements that do *not* prevent terms-of-trade manipulation, and *do not* negotiate multilateral agreements that would prevent it.

A fascinating feature of the Terms-of-Trade Puzzle is that it has been ignored in the international-trade-theory literature. For over four decades, successive GATT rounds have produced trade agreements that do not prevent terms-of-trade manipulation while trade theorists have produced theories of trade agreements in which such prevention is the sole object. More often than not, these theories have been based on two-good models in which an import tariff is completely equivalent to an export tax. Thus the GATT has been analyzed in

a context in which the actual GATT would be completely meaningless! As far as I can tell, over these four decades no one has ever noted or addressed this problem.

A second puzzle was emphasized by Rodrik in his survey (1995, p1476-7): "why is trade policy systematically used to transfer resources to import-competing sectors and factors rather than to export-oriented sectors and factors?" He concludes, "[o]n this puzzle we get very little help from the literature." Indeed, Levy (1999, p 346-7) argues "that in a symmetric version of the Grossman and Helpman" (1994, 2002) "model, export subsidies exceed import tariffs in sectors with lobbies. ... Thus, this approach to modeling political economy may explain trade promotion rather than trade protection!" I refer to this as the *Anti-Trade-Bias Puzzle*.

In sharp contrast to the Terms-of-Trade Puzzle, the Anti-Trade-Bias Puzzle has been widely recognized. But it has not been successfully addressed. Papers dealing with the political economy of trade policy typically either ignore this problem or eliminate it by arbitrarily constraining the ability of the government to adopt export-promotion policies. One approach is simply to assume, in a political-economy model, that import-competing sectors organize politically while export sectors do not. This is convenient but arbitrary.

Another approach is to rule out export subsidies by pointing to countervailing-duty laws, whose existence are not explained. Indeed, I confess to having done this myself (in Ethier (2004)). This accords well with reality but suffers from the fact that the countervailing-duty laws are themselves essential components of the commercial policy that is to be explained.

These two puzzles are not just puzzling with respect to the trade-theory literature: They're puzzling in relation to each other as well. A natural response to the Terms-of-Trade Puzzle would be to deny the practical importance of the terms-of-trade externalities upon which the Received Theory has been erected. But the Received Theory can offer a ready explanation of the Anti-Trade-Bias Puzzle: terms-of-trade externalities!

Ethier (2004) argued that a theory of trade agreements based on political externalities could resolve the Terms-of-Trade Puzzle. That paper assumed away terms-of-trade externalities, and its analysis of political externalities was not based on an explicit microeconomic model. Here I confront the puzzles directly by going beyond that preliminary effort in four ways. First, I develop such a microeconomic model. Second, I complement the earlier paper by introducing a type of political externality different from that employed there. Third, I allow an interaction between political and terms-of-trade externalities. Fourth, I explicitly allow export subsidies in order to address the Anti-Trade-Bias Puzzle.

This paper proceeds as follows. The next section describes an economic model, and the following section adds a model of lobbying. The latter is a version of the familiar model of Grossman and Helpman (1994, 2002), simplified as useful for my own purposes or for

clarity. I then show that, in a two-country context, my alternative approach can deliver what the Received Theory cannot: trade agreements that do not necessarily constrain export taxes. With sufficiently important political externalities, countries *choose* not to tax exports. If political externalities *completely* dominate terms-of-trade externalities (to the extent that the latter are ignored), countries will not subsidize exports either. The concluding section concludes.

## II. The Model: Economics

Assume two countries (*H*ome and *F*oreign), two factors (*K*apital and *L*abor), and three traded goods (*0*, *1*, and *2*). Good *0* is a numeráire good, produced by labor alone. Goods *1* and *2* are produced by capital and labor, with capital specific to each of these sectors. *H* imports good *1* and exports good *2*.

Ownership of each specific factor is distributed uniformly over a fraction $\alpha_i$ of the population (labor force), with each individual owning some of one of the specific factors. Normalize so that $L = 1 = \alpha_1 + \alpha_2$. Choose units so that a unit of good *0* is produced by a unit of labor. Thus, assuming good *0* is actually produced, the wage $w = 1$.

Each individual in each country has preferences that can be summarized by the utility function $U = c_0 + u_1(c_1) + u_2(c_2)$ where $c_i$ denotes consumption of good *i*. This implies individual demand functions $d_i = d_i(P_i)$, $i = 1, 2$, where $P_i$ denotes the relative price of good *i* in terms of good *0*. Residual income is all spent on the numeráire good *0.* I assume that endowments in both countries are such that each both produces and consumes good *0*.

Each country may tax or subsidize either imports or exports. For *H*, let $Q_i$ and $P_i$ denote, respectively, the domestic and international relative price (in terms of the numeráire) of good *i*, and $\tau_i$ one plus the *ad-valorem* trade tax $t_i$. Thus $Q_1 = \tau_1 P_1$ and $Q_2 = P_2 / \tau_2$. Analogous *F* variables will be distinguished by asterisks.

## International trade

Equilibrium in the world market for good *1* is represented by $M_1(\tau_1 P_1) = X_1^*\left(P_1 / \tau_1^*\right)$. *H*'s import tax and *F*'s export tax thus determine $P_1$, independently of sector *2*. This in turn implies the following.

$$\frac{\tau_1}{P_1}\frac{dP_1}{dt_1} = -\frac{e_1}{e_1 + f_1^*}$$

and

$$\frac{\tau_1}{Q_1}\frac{dQ_1}{dt_1} = \frac{\tau_1}{P_1}\frac{dP_1}{dt_1} + 1 = \frac{f_1^*}{e_1 + f_1^*}$$

where $e_1 \equiv -\frac{\tau_1 P_1 M_1'}{M_1} > 0$ and $f_1^* \equiv \frac{P_1 X_1'}{\tau_1^* X_1^*} > 0$.

Similarly, equilibrium in the world market for good *2* can be represented by $M_2^*(\tau_2^* P_2) = X_2(P_2 / \tau_2)$. Thus,

$$\frac{\tau_2}{P_2}\frac{dP_2}{dt_2} = \frac{f_2}{f_2 + e_2^*}$$

and

$$\frac{\tau_2}{Q_2}\frac{dQ_2}{dt_2} = \frac{\tau_2}{P_2}\frac{dP_2}{dt_2} - 1 = -\frac{e_2^*}{f_2 + e_2^*}.$$

*H* imports of good *1* need not equal in value *H* exports of good *2*: Trade balance is reached with a net exchange of good *0.*

The population consists of two groups, distinguished by which specific factor they own. The real income of each group is given by the following.

$$\tilde{W}_i = \alpha_i + \pi_i(Q_i) + \alpha_i R + \alpha_i\left[s_1(Q_1) + s_2(Q_2)\right]. \qquad \textbf{(1)}$$

Here $\pi_i$ denotes the income of specific factor *i*, $R = t_1 P_1 M_1 + t_2 Q_2 X_2$ equals the trade tax revenue (redistributed to the populace in lump-sum fashion), and consumer surplus equals $s_i(Q_i) = u_i\left(d_i(Q_i)\right) - Q_i d_i(Q_i)$.

## Trade policy for welfare maximization

To establish a frame of reference, consider the trade policy that would maximize national welfare $W = W_1 + W_2$. Noting that $\pi_i' = x_i$ (production of good *i*) and that $s_i' = -d_i$, the first-order condition for the optimal choice of $t_1$ is

$$\frac{dW}{dt_1} = -M_1\frac{dP_1}{dt_1} + P_1 t_1 M_1'\left[P_1 + t_1\frac{dP_1}{dt_1}\right]$$

$$= \frac{Q_1 P_1}{t_1} M_1'\left\{-\left(\frac{M_1}{-Q_1 M_1'}\right)\frac{t_1}{P_1}\frac{dP_1}{dt_1} + t_1\left[1 + \frac{t_1}{P_1}\frac{dP_1}{dt_1}\right]\right\} = 0.$$

This in turn reduces to

$$t_1 = \frac{1}{f_1^*},$$

the familiar optimum-tariff formula. Similarly, the condition $dW/dt_2 = 0$ reduces to

$$t_2 = \frac{1}{e_2^*}.$$

If both governments use trade policy to maximize national welfare, the Nash equilibrium in trade policy becomes the following.

$$t_1 = \frac{1}{f_1^*\left(t_1, t_1^*\right)} \qquad t_2 = \frac{1}{e_2^*\left(t_2, t_2^*\right)} \tag{2}$$

$$t_1^* = \frac{1}{e_1\left(t_1, t_1^*\right)} \qquad t_2^* = \frac{1}{f_2\left(t_2, t_2^*\right)}$$

**Proposition 1** *With welfare-maximizing governments, the Nash equilibrium in trade policy is given by* ***(2)****. Each government taxes both imports and exports.*

Note the following.

**Remark 1** *Because of separability, the Nash equilibrium* $t_i$ *and* $t_i^*$ *are jointly determined, for each i, independently of the other two trade taxes.*

**Remark 2** *Because the model has three traded goods, in the Nash Equilibrium each country taxes* both *imports and exports of non-numeráire goods.*

# III. The Model: Lobbying

I now introduce the political-economy side of my model. For this I use a simplified version of the now-familiar model of Grossman and Helpman (1994, 2002).

## Lobbies

I assume that $\alpha_1$ and $\alpha_2$ each organizes a lobby to bargain with the government over trade policy and lobby contributions. By contrast, Grossman and Helpman (1994) allow some sectors to be organized and some not. Since I wish to address the Anti-Trade-Bias Puzzle, it would not do to pre-determine the outcome by assuming that one sector organizes and one does not.

As Austen-Smith (1991, p 84) points out, " ... lobbying activity is predominantly not financial, but rather to do with information transmission." In a world of imperfect information, a critical function of lobbying is to convey to the government information relevant to possible policy choices. Each lobby possesses inside information regarding its own industry and, therefore, presumably has a comparative advantage in lobbying about measures that directly affect that industry. But acquiring significant expertise to enable it also to lobby about policies directly influencing other sectors is costly. Thus lobbies in practice concen-

trate their efforts on influencing those policies that impact most directly on their members. I capture this by assuming that $\alpha_1$ lobbies the government only about $t_1$ and that $\alpha_2$ lobbies only about $t_2$. Nobody lobbies for policy regarding the numeráire good. Grossman and Helpman (1994), by contrast, assume that each organized sector lobbies about all trade policies.

> *Each group* $\alpha_i$ *organizes itself into a lobby to bargain with the government* only *about* $t_i$. *The government negotiates independently with each lobby.* **(A1)**

The contrast with Grossman and Helpman (1994) can be characterized as follows.

> *In Grossman and Helpman, some sectors may not organize, but all organized sectors lobby equally about everything. Here, all individuals and sectors organize, but no sector lobbies about everything.*

I've argued that the assertion that different lobbies have comparative advantages with regard to distinct policy tools is realistic. But it also serves my purposes. As indicated above, I must, to address meaningfully the Anti-Trade-Bias Puzzle, assume that either both groups organize or that neither does. I also intend to address the Terms-of-Trade Puzzle by giving trade-policy determination a political dimension. But if neither group organizes there is no politics, and if both organize there is again no political dimension to policy choice because, as Grossman and Helpman (1995, footnote 11) point out, the efforts of the two groups exactly cancel in this regard. Allowing each group a comparative advantage in lobbying over the instrument directly pertaining to its sector offers an escape from this conundrum. For then I can allow both sectors to organize while still giving a political dimension to policy choice, because their efforts will not cancel out.

The assumptions that there are but two non-numeráire goods and that all sectors organize are only for expositional clarity or, as just argued, to suit my purposes. Relaxing them would only complicate the algebra in ways already familiar from Grossman and Helpman. Although the assumption that each lobby addresses only one policy is more extreme than necessary, the idea that different lobbies have different comparative advantages in addressing different policies is, as I have pointed out, realistic.

**(A1)** also contrasts with Ethier (2004). That paper justifies political externalities on the basis of imperfect information, but there the imperfection is a limited ability to observe the link between economic outcomes and policy choices. Here the justification is based on

asymmetric information endowing distinct lobbies with distinct abilities to lobby about different policies.

## Trade policies and international externalities

The $\alpha_1$ lobby bargains with the government about $t_1$ and the contribution $C_1$ which that lobby will make. Unlike Grossman and Helpman (1994), I assume the government's objective function gives no direct weight to national welfare. This will sharpen my results without altering them in any essential way.

$W_1$ denotes the joint surplus of the government and the $\alpha_1$ lobby, as they regard it, associated with $t_1$.

$$W_i = \alpha_i + \pi_i(Q_i) + \alpha_i R_i \rho + \alpha_i\left[s_1(Q_1) + s_2(Q_2)\right]. \tag{3}$$

Here $\rho$ denotes the relative importance the agents attach to tariff revenue. If $\rho = 1$, $\tilde{W}_i = W_i$, and this conventional case will be the point of reference in what follows. But I want also to allow consideration of the possibility that $\rho < 1$, in recognition of the fact that public debate in industrial countries about trade policy almost never concerns itself with the consequences of such policies for government revenue.

From **(3)**, a change in $t_1$ produces the following effect on the joint surplus.

$$\frac{dW_1}{dt_1} = \alpha_1 \frac{P_1 M_1}{\pi_1} \frac{e_1 f_1^*}{e_1 + f_1^*}\left\{\left[\frac{1}{f_1^*} - t_1 + \frac{\pi_1}{e_1}\right]\rho + \left[\frac{1-\alpha_1}{\alpha_1}\frac{x_1}{M_1} - 1\right]\frac{\pi_1}{e_1}\right\}. \tag{4}$$

In the conventional case $\rho = 1$ this reduces to the following.

$$\frac{dW_1}{dt_1} = \alpha_1 \frac{P_1 M_1}{\pi_1} \frac{e_1 f_1^*}{e_1 + f_1^*}\left\{\left[\frac{1}{f_1^*} - t_1\right] + \left[\frac{1-\alpha_1}{\alpha_1}\frac{x_1}{M_1}\frac{\pi_1}{e_1}\right]\right\}. \tag{5}$$

The two bracketed terms within the braces on the right-hand side of each expression respectively reflect what Grossman and Helpman (1995, p 688) refer to as the *terms-of-trade* and *political-support* motives for trade policy. The former term is perhaps slightly unsatisfactory because, although both motives are driven by a relative-price change, that relative price is $P_1$, not the terms of trade.[2] But I will use this term both because it is familiar from Grossman and Helpman and because it does capture well the essential distinction between the two motives.

It's clear from **(3)** that a change in $t_i$ influences $W_i$ in three ways: through its effect on the income of the factor specific to sector *i*, on consumer surplus, and on trade-tax revenue. The latter two are deflated by the relative size of the *i* lobby, but the first is not. Thus when $t_i$ is manipulated to maximize $W_i$ its effect on the income of the factor specific to sector *i* is relatively more important than when $t_i$ is manipulated to maximize social welfare. This accounts for the political-support motive. When the $\alpha_1$ lobby coincides with the entire population ($\alpha_1 = 1$) this motive disappears.

The political-support effect on the right-hand side of **(4)** involves a balance of the effect on specific-factor income, which calls for more protection, and the effect on consumer surplus, which calls for less. Since the case where the former influence dominates is likely to be the situation of practical relevance, I shall occasionally impose the following assumption.

$$\frac{1-\alpha_1}{\alpha_1} \geq \frac{M_1}{x_1}$$

$$\frac{1-\alpha_2^*}{\alpha_2^*} \geq \frac{M_2^*}{x_2^*} \qquad \textbf{(A2)}$$

Note also the role that $\rho$ plays with regard to the terms-of-trade motive in **(4)**.

**Remark 3** *A terms-of-trade motive can be present only to the degree that agents are motivated by a concern for trade-tax revenue.*

A change in $t_1$ also has an impact on the analogous foreign joint surplus, $W_1^*$,

[2]The Home terms of trade is given by the index $P_2/P_1$, with either the numerator or the denominator (but not both) augmented by unity weighted to reflect the relative volume of trade in the numeráire good.

$$\frac{dW_1^*}{dt_1} = -\alpha_1^* \frac{P_1 X_1^*}{\tau_1 \tau_1^*} \frac{e_1}{e_1 + f_1^*} \left\{ \frac{1}{\sigma} \left[ f_1^* + 1 \right] t_1^* + \left[ \frac{1 - \alpha_1^*}{\alpha_1^*} \frac{x_1^*}{X_1^*} + 1 \right] \right\}. \quad \textbf{(6)}$$

The two bracketed terms within the braces on the right-hand side respectively reflect the international *terms-of-trade* and *political-support* externalities of trade policy.

**Remark 4** *An increase in the Home tariff will exert a negative political-support externality on the Foreign government-cum-export lobby. The magnitude of the terms-of-trade externality depends upon the Foreign export policy, and could be positive if exports are subsidized.*

**Remark 5** *A terms-of-trade externality can be present only to the degree that agents are motivated by a concern for trade-tax revenue.*

If I were to delete good *2* from my model, so that *H* imports good *1* from *F* in exchange for the numeráire good, my model would reduce to a special case of that used by Bagwell and Staiger (1999). In this case $\alpha_1^* = 1$, so that the political externality would drop out and only the terms-of-trade externality would remain. The assumption that the terms-of-trade externality is the *only* international externality is the point of departure of Bagwell and Staiger (1999).

## Policy choice

Following Goldberg and Maggi (1999), I assume the bargaining solution maximizes the joint surplus $W_1$ of both parties. In doing so I am in effect assuming that the asymmetric information, which presumably causes the asymmetric influence of the respective lobbies, does not result in strategic behavior that precludes an efficient bargaining solution.[3] The first-order condition for this implies the following Home tariff on good *1*.

$$t_1 = \frac{1}{\sigma} \frac{1}{f_1^*} + \left[ \left( 1 - \frac{1}{\sigma} \right) + \left( \frac{1}{\sigma} \right) \frac{1 - \alpha_1}{\alpha_1} \frac{x_1}{M_1} \frac{\tau_1}{e_1} \right] \frac{\tau_1}{e_1},$$

[3] Alternatively, I seek to describe the efficient solution, irrespective of whether the actual bargaining process will produce it.

which reduces to the following when ρ = 1:

$$t_1 = \frac{1}{f_1^*} + \frac{1-\alpha_1}{\alpha_1}\frac{x_1}{M_1}\frac{\pi_1}{e_1}.$$

Note that, for the importable sector, the terms-of-trade and political-support motives *reinforce* each other in the protectionist direction.

Turning next to the export sector,

$$\frac{dW_2}{dt_2} = \alpha_2 Q_2 X_2 \frac{e_2^*}{e_2^* + f_2}\left\{\rho\frac{f_2}{e_2^*} - \frac{1-\alpha_2}{\alpha_2}\frac{x_2}{X_2}\frac{1}{\pi_2} - \rho\frac{t_2}{\pi_2}(1+f_2) + \left(\rho - \frac{1}{\pi_2}\right)\right\}.$$

Thus, if $t_2$ is initially zero, $\left.\frac{dW_2}{dt_2}\right|_{t_2=0} < 0$ for all $\rho \leq 1$ if and only if the following holds.

$$\frac{1-\alpha_2}{\alpha_2}\frac{x_2}{X_2}\frac{1}{f_2} > \frac{1}{e_2^*}. \qquad \textbf{(7)}$$

Here the terms-of-trade and political-support motives work at cross purposes. If political-support motives dominate, so that the inequality is satisfied, an export subsidy would increase the joint surplus $W_2$. If, on the other hand, that inequality is violated, an export tax is called for. So, the analysis has reached a fork in the road. To address the two cases, consider the following assumption.

$$\frac{1-\alpha_2}{\alpha_2}\frac{x_2}{X_2}\frac{1}{f_2} > \frac{1}{e_2^*}$$

$$\frac{1-\alpha_1^*}{\alpha_1^*}\frac{x_1^*}{X_1^*}\frac{1}{f_1^*} > \frac{1}{e_1} \qquad \textbf{(A3)}$$

**(A3)** in effect says that the political-support motive outweighs the terms-of-trade motive in each country. Consider two cases separately.

## IV. Terms-of-trade dominance

Suppose, first, that both inequalities in **(A3)** are *reversed.* In this case, terms-of-trade motives outweigh political-support motives, and an export tax is called for in each country, though it will be less than if political-support motives were absent.

If Foreign trade policy is derived analogously, the following Nash equilibrium in trade policy emerges when $\rho = 1$.

$$t_1 = \frac{1}{f_1^*} + \frac{1-\alpha_1}{\alpha_1}\frac{x_1}{M_1}\frac{\tau_1}{e_1} > 0$$

$$t_2 = -\frac{e_2^*}{e_2^*-1}\left[\frac{1-\alpha_2}{\alpha_2}\frac{x_2}{X_2}\frac{1}{f_2} - \frac{1}{e_2^*}\right] > 0$$

$$t_1^* = -\frac{e_1}{e_1-1}\left[\frac{1-\alpha_1^*}{\alpha_1^*}\frac{x_1^*}{X_1^*}\frac{1}{f_1^*} - \frac{1}{e_1}\right] > 0 \qquad \textbf{(8)}$$

$$t_2^* = \frac{1}{f_2} + \frac{1-\alpha_2^*}{\alpha_2^*}\frac{x_2^*}{M_2^*}\frac{\tau_2^*}{e_2^*} > 0$$

The formulae for export taxes yield positive values because of second-order conditions: Neither country would wish to operate on an inelastic portion of its partner's import-demand curve. I have the following.

**Proposition 2** *If **(A1)** holds and both parts of **(A3)** are violated (i.e., terms-of-trade motives outweigh political-support motives) and trade taxes are fully valued ($\rho = 1$),*

*the Nash equilibrium in trade policy is given by* ***(8)****. It features both import taxes and export taxes by both countries.*

To put this result in perspective relevant to the literature, note the following.

**Remark 6** *If, as here, all individuals and sectors organize in the Grossman-Helpman model, their efforts cancel out and the governments implement welfare-maximizing policies* ***(2)****: See Grossman and Helpman (1995, footnote11). My different result is due to the assumption, in* ***(A1)****, that organized sectors cannot lobby over all policies.*

In my model no agent is concerned about cross effects, such as the effect on $W_1$ of a change in $t_2$. If, as in Grossman and Helpman (1994), the government gave some weight to national welfare, it would take such cross effects into account. This would alter **(8)** to cause it more nearly to resemble **(3)**. But, as long as the organized sectors cannot lobby over all policies and the government gives at least *some* weight to contributions, a distinction will remain. Ignoring a possible government concern with national welfare simply sharpens that distinction.

**Remark 7** *Bagwell and Staiger (1999) exclude political-support effects, as I have defined them, so that, in my terminology, terms-of-trade effects always dominate regardless of how important the government thinks them to be absolutely. In my model, this implies taxing both imports and exports, as indicated in Proposition 2. But Bagwell and Staiger's trade model exhibits Lerner symmetry, so that export taxes are redundant there,* **if** *import taxes are* **not** bound.

## V. Political-Support Dominance

Next, suppose that **(A2)** and **(A3)** hold,[4] so that political-support motives dominate terms-of-trade motives. In his case the Nash equilibrium in trade policy is as follows.

[4]The case where one inequality in **(A3)** holds and one is violated will be left to the dedicated reader.

$$t_1 = \frac{1}{\mathscr{E}_1^*} + \left[\left(1 - \frac{1}{\varepsilon}\right) + \left(\frac{1}{\varepsilon}\right)\frac{1-\alpha_1}{\alpha_1}\frac{x_1}{M_1}\right]\frac{\tau_1}{e_1} > 0$$

$$t_2 = -\frac{e_2^*}{e_2^* - 1}\left[\left(\frac{1}{\varepsilon}\right)\frac{1-\alpha_2}{\alpha_2}\frac{x_2}{X_2}\frac{1}{f_2} - \frac{1}{e_2^*}\right] < 0 \qquad \textbf{(9)}$$

$$t_1^* = -\frac{e_1}{e_1 - 1}\left[\left(\frac{1}{\varepsilon}\right)\frac{1-\alpha_1^*}{\alpha_1^*}\frac{x_1^*}{X_1^*}\frac{1}{f_1^*} - \frac{1}{e_1}\right] < 0$$

$$t_2^* = \frac{1}{\mathscr{E}_2} + \left[\left(1 - \frac{1}{\varepsilon}\right) + \left(\frac{1}{\varepsilon}\right)\frac{1-\alpha_2^*}{\alpha_2^*}\frac{x_2^*}{M_2^*}\right]\frac{\tau_2^*}{e_2^*} > 0$$

**Proposition 3** *With **(A1)**, **(A2)**, and **(A3)**, the Nash equilibrium in trade policy is given by **(9)**. Neither country taxes exports.*

**Remark 8** *In contrast to the Received Theory, export taxes fail to emerge here because governments* **choose** *not to implement them, not because trade agreements prevent them from doing so.*

This is due to **(A1)** and to the assumption, in **(A3)**, that political-support motives outweigh terms-of-trade motives.

**Remark 9** *Proposition 3 offers a potential resolution of the Terms-of-Trade Puzzle.*

When political-support motives dominate, governments have no desire to tax exports. Thus trade agreements need not constrain them from doing so.

# VI. Properties of Equilibrium When Political-support Motives Dominate

Consider an initial situation in which each country neither taxes nor subsidizes exports and sets the import tariff that constitutes its best response to its partner's zero export tax. This situation is not a Nash equilibrium, since, by **(A3)**, **(7)** implies that either country can gain by an export subsidy. In Figure 1 below, *J* denotes *H*'s best response to $\tau_1^* = 1$, and *B* denotes *F*'s best response to $\tau_1 = 1$. *B* corresponds to an export subsidy by *F*, reflecting the assumption **(A3)** that political-support motives dominate terms-of-trade motives.

## Best responses

The $\phi$ locus depicts all those combinations of $\tau_1$ and $\tau_1^*$ implying the same value of $Q_1$ as at *J*: $Q_1 = Q_1^J$. Thus $\phi$ is the locus of solutions to

$$M_1(Q_1') = X_1^*\left(Q_1'/\tau_1\tau_1^*\right),$$

so that $\phi$ is a rectangular hyperbola. Since $Q_1^*$ is uniquely related to $Q_1$ via the market-clearing condition for good *1*, it too is constant along $\phi$.

Now, suppose *F* were to depart from *J* by imposing an export subsidy $dt_1^* < 0$. Then an increase in the *H* tariff of $dt_1 = -\tau_1\, dt_1^*$ will hold $Q_1$ and $Q_1^*$ unchanged: We move upwards and to the left along $\phi$. This will maintain the initial situation except that *R* will rise by $-Q_1 M_1\, dt_1^*$ and $R^*$ will fall by $Q_1^* M_1\, dt_1^*$. Thus the real income of both interest groups in *H* rises, and the reverse in *F*. This countervailing increase in its tariff constitutes a beneficial *H* response to *F*'s adoption of an export subsidy.

In like manner, $\phi^F$ depicts the iso-domestic-price locus corresponding to free trade $(\tau_1\tau_1^* = 1)$, and $\phi^*$ that corresponding to *B*. Since these three loci (all rectangular hyperbolae) correspond to different values of the domestic prices, they cannot intersect. Moving northwest along any one of these loci leaves all demands and supplies unchanged: The only effect is to shift trade-tax revenue from *F* to *H*.

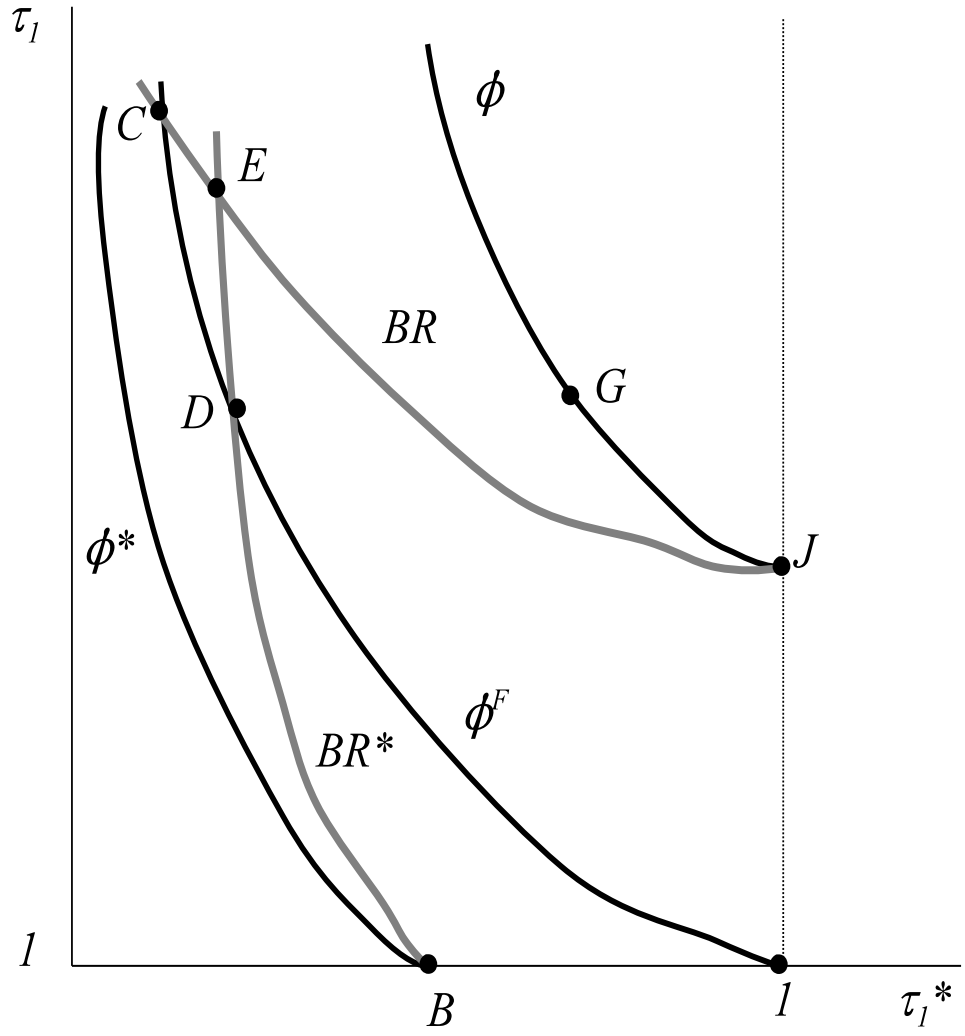


**Figure 1 Political-Support Dominance**

At a point on $\phi$ such as *G* in Figure 1, *H* completely countervails an export subsidy by *F*. But could *H* do even better with a different response? Since *J* is an *H* best response, a small reduction in $\tau_1$ from *J* will produce a zero first-order effect on $W_1$. A small reduction in $\tau_1$ from *G* would produce exactly the same result as a similar reduction from *J*, with just one exception. Since $\tau_1$ is larger at *G* than at *J*, the increase in $M_1$ produced by the fall in $\tau_1$ would produce a greater increase in tariff revenue. Thus $W_1$ would increase, so that the *H* best-response curve (*BR*) must pass below $\phi$.

To verify this intuition, note that **(4)** can be written as follows.

$$\frac{dW_1}{dt_1} = \alpha_1 P_1 M_1 \frac{e_1 f_1^*}{e_1 + f_1^*}\left\{\left[\frac{1}{\pi_1 f_1^*} - \frac{t_1}{\pi_1} + \frac{1}{e_1}\right]\rho + \left[\frac{1-\alpha_1}{\alpha_1}\frac{x_1}{M_1} - 1\right]\frac{1}{e_1}\right\}$$

$$\equiv F(Q_1, t_1).$$

Since point $J$ denotes an $H$ best response, $F(Q_1^J, t_1^J) = 0$. Also,

$$\frac{\partial F_1(Q_1^J, t_1)}{\partial t_1} = -\frac{\rho}{\pi_1^2}\left[\frac{1}{f_1^*} + 1\right] < 0. \qquad \textbf{(10)}$$

Thus, along the $\phi$ locus, $\partial W_1/\partial t_1 < 0$ if $t_1 > t_1^J$, so that $H$'s best response lies below that locus.

**Proposition 4** H*'s best response to an export subsidy by* F *is to countervail the subsidy* incompletely.

If $H$ were to adopt a policy of completely countervailing an export subsidy, $F$ would not offer to pay one. $H$ is willing to countervail only partially, thereby allowing $F$ to stimulate exports, to capture for itself a portion of the subsidy by taxing imports.

**Remark 10** *To stimulate exports,* F *must subsidize* H *as well as subsidizing its own exporters.*

Note that, from **(10)**, $H$'s temptation to countervail incompletely is *positively* related to $\rho$ and, therefore, to the strength of the terms-of-trade motive, even though the *opportunity* to countervail, incompletely or not, would not arise if terms-of-trade motives dominated political-support motives.

**Remark 11** *An increase in the importance attached to trade-tax revenue, and, therefore, to the terms-of-trade motive, increases the motive to countervail only partially.*

Since $B$ is an $F$ best response, a small reduction in the export subsidy (*i.e.*, a rise in $\tau_1^*$) from $B$ will produce a zero first-order effect on $W_1^*$. A small rise in $\tau_1^*$ from any point northwest of $B$ on $\phi^*$ will produce exactly the same result as a similar rise from $B$, except that the fall in $X_1^*$ produced by the rise in $\tau_1^*$ will produce a greater reduction in the total export subsidy. Thus $W_1^*$ increases and the $F$ best- response curve ($BR^*$) must pass above $\phi^*$.

Formally, note that

$$\frac{dW_1^*}{dt_1^*} = \frac{\alpha_1^* Q_1^* X_1^*}{\tau_1^*} \frac{e_1}{e_1 + f_1^*} \left\{ \left[ \frac{f_1^*}{e_1} + 1 \right] \rho - \left[ \frac{1 - \alpha_1^*}{\alpha_1^*} \frac{x_1^*}{X_1^*} + 1 \right] - \rho t_1^* f_1^* \frac{e_1 - 1}{e_1} \right\} \quad \textbf{(11)}$$

$$\equiv F^*\left(Q_1^*, t_1^*\right).$$

At point $B$, $F^*\left(Q_1^{B*}, t_1^{B*}\right) = 0$, since $B$ is a $F$ best response. Thus, at any other point on $\phi^*$, where $t_1^* < t_1^{B*} < 0$, $dW_1^*/dt_1^* = F^*\left(Q_1^{B*}, t_1^*\right) > 0$. So $BR^*$ lies to the right of $\phi^*$.

**Remark 12** *An increase in the importance attached to trade-tax revenue, and, therefore, to the terms-of-trade motive, increases the motive to nullify only partially an import duty with an export subsidy.*

## Equilibrium: the third puzzle

The above detail about best responses now permits a closer look at the politically-dominant Nash equilibrium **(9)**. Allow each country to choose whether to adopt ($A = Y$) or not to adopt ($A = N$) a countervailing duty law. Adoption of such a law will constitute a commitment by that country to countervail exactly any export subsidy by its trading partner with a tariff of its own. Each country's strategy now consists of a policy triple: the two trade taxes or subsidies and setting $A$ equal to $Y$ or $N$. In each country, the government bargains with the import-competing lobby over the tariff and $A$, and it bargains independently with the export lobby over the export tax or subsidy.

If terms-of-trade motives outweigh political-support motives, the choice of $A$ is of no significance because neither country wishes to subsidize exports: Equilibrium is described by

**(8)** in either event. When political-support motives dominate, however, the choice of $A$ is potentially significant.

As mentioned above, papers on trade policy sometimes have assumed away export subsidies and justified this by appealing to the existence of countervailing-duty laws. I now enquire whether this latter fact is consistent with the present model by allowing the choice of $A$ to be endogenous.

At the free-trade point, $\tau_1 = 1 = \tau_1^*$, a small reduction in $\tau_1$ must lower $W_1$, since this point is below $BR$. Moving up the $\phi^F$ locus, a small reduction in $\tau_1$ must continue to produce the same effect, except that the increase in tariff revenue implied by the increase in imports becomes progressively greater. This can be made as high as wanted by moving far enough up the locus. Thus $BR$ must eventually cut this locus, as shown at point $C$ in Figure 1. By an argument analogous to that above, $BR^*$ must cut $\phi^F$ at some point, shown as $D$ in the figure.

Since $BR$ and $BR^*$ both cut $\phi^F$, and from different sides, they must cut each other as well, shown by $E$ in Figure 1. This corresponds to **(9)**. If $H$ decides $A = N$ (*i.e.*, does not implement a countervailing-duty law), $E$ will be the equilibrium. Were $H$ instead to set $A = Y$, $F$ would be constrained to operate on $\phi$ and would therefore choose $J$. From $H$'s point of view, $E$ is better than the point on $\phi$ directly above it, and that point is in turn better than $J$. So $H$ chooses $A = N$ and the policy pair is given by $E$.

**Proposition 5** *With **(A1)**, **(A2)**, and **(A3)**, the Nash equilibrium in trade policy is given by **(9)**. Neither country implements a countervailing duty law, both subsidize exports, and each appropriates part, but not all, of its partner's export subsidy with a tariff.*

What's going on is the following. The fact that an import tax-cum-foreign export subsidy produces an international transfer in effect implies that to stimulate exports $F$ must subsidize not just its own exporters but the $H$ government as well, to induce it to less-than-completely-countervail in equilibrium. If political-support motives are strong relative to terms-of-trade motives (which work through trade-tax revenue), $H$ will demand a high subsidy and $F$ will be willing to pay it. The Nash equilibrium will be characterized by large tariffs, large export subsidies, and consequently large transfers, but not necessarily by large effects on actual trade flows. With the opposite going on in the other sector, the net international transfer need not be significant, but each trade flow itself accomplishes a large transfer.

It has long been clear that an export subsidy together with an appropriate tariff by the trading partner can effect an international transfer that does not influence relative prices. This is convenient theoretically in enabling countries to achieve, using only trade policies, a *cooperative* trade agreement that requires an international transfer for both countries to

benefit.[5] See Dixit (1987) and Grossman and Helpman (2002). My assertion here is that, *when* political-support motives dominate, such an argument is also crucial for the nature of a *non-cooperative* equilibrium.

**Remark 13** *When political-support motives dominate terms-of-trade motives, the model generates the counterfactual predictions of no countervailing-duty laws, extensive export subsidization, and significant international transfers.*

I refer to this counterfactual implication of the model as the *Export-Subsidy-Transfer Puzzle*.

Note that, as implied by Remarks 11 and 12, a reduction in $\rho$ (from unity perhaps) reduces the incentive for *H* and *F*, respectively, to depart from $\phi$ and from $\phi^*$. This implies a presumption that the respective best-response curves hug $\phi$ and $\phi^*$ more closely, shifting the equilibrium *E* in Figure 1 to the northwest. This would increase the tariff, the subsidy, and the transfer, with an ambiguous effect on actual trade.

**Remark 14** *The model implies a presumption that a reduction in the significance* $\rho$ *that agents attach to trade-tax revenue (and, therefore, in the relative importance of terms-of-trade motives) will* **accentuate** *the Export-Subsidy-Transfer Puzzle*.

Turn next to the Anti-Trade-Bias Puzzle. If *C* lies northwest of *D*, as shown in Figure 1, *E* will lie above $\phi^F$, so that the policy pair on balance restricts trade. If the relative positions of *C* and *D* are reversed, the policy pair on balance stimulates trade. The international transfer implicit at point *C* is the minimum transfer the *H* government-cum-import competing lobby must be paid to induce it to accept the free-trade outcome, and the transfer implicit at point *D* is the largest the *F* government-cum-lobby is willing to pay for that outcome.

**Proposition 6** *If* ***(A1)****,* ***(A2)****, and* ***(A3)*** *hold, the equilibrium in trade policy will have an anti-trade or a pro-trade bias according as* H *would require a greater or a lesser transfer to accept the free-trade outcome than* F *would be willing to pay.*

There appears to be no reason why one or the other circumstance should hold, so the Anti-Trade-Bias Puzzle is apparently not resolved.

[5] Whether this has ever been relevant in reality is something else.

**Remark 15** *If political-support motives dominate terms-of-trade motives, the Terms-of-Trade Puzzle is resolved, the Anti-Trade-Bias Puzzle is not resolved, and the Export-Subsidy-Transfer Puzzle is introduced.*

If terms-of-trade motives dominate, the Anti-Trade-Bias Puzzle is resolved and the Export-Subsidy-Transfer Puzzle does not appear, but the Terms-of-Trade Puzzle reappears. In either case, the Grossman-Helpman model in this three-good simplification delivers results dramatically at odds with reality. This simplification puts the counterfactual implications of the Grossman-Helpman approach into sharp relief: It does not generate them.

## VII. Complete Political-Support Dominance

I now take the analysis of the preceding section to its logical extreme by considering the possibility that *H* and *F* care nothing about trade-tax revenue. I call this case Complete Political-Support Dominance, since it implies no weight at all is given to terms-of-trade motives. To allow determinate outcomes, suppose that agents value trade taxes in a lexicographic sense: I'll pay anything for something, but I'll pay no more than nothing for nothing.

$\rho$ = *0, but, other things equal, agents prefer more trade-tax revenue to less.* **(A4)**

Then, given **(A2)** and **(A4)**, **(4)** implies that $dW_1/dt_1 > 0$, so that *H* will wish a positive tariff on good 1. Furthermore, an increase in $t_1$ will raise $x_1/M_1$, so that it remains true that $dW_1/dt_1 > 0$: *H* will wish to set $t_1$ at the prohibitive level. Also, **(A4)** implies that *H* will be unwilling to surrender any of its market to *F* to obtain trade-tax revenue. So, if point *J* in Figure 1 corresponds to *H*'s prohibitive tariff, its best-response curve will coincide with $\phi$.

From **(11)**, **(A4)** implies that *F* will wish to subsidize exports. In particular, this is true at any point on *H*'s best-response curve: There is no Nash equilibrium in $t_1$ and $t_1$* alone!

With **(A4)** holding, viewing policy choice as a triple now becomes crucial for an equilibrium to exist. If *H* sets $t_1$ equal to its prohibitive level and chooses $A = Y$, it commits itself to

$\phi$. Then the best $F$ can do is to set $t_1^* = 0$ and thereby choose $J$. I now have the following equilibrium in policy.

$$\begin{aligned} & t_1 \quad \textbf{prohibitive} \\ & t_2 = t_1^* = 0 \\ & t_2^* \quad \textbf{prohibitive} \\ & A = A^* = Y \end{aligned} \tag{12}$$

**Proposition 7** *With* **(A1)**, **(A2)**, **(A3)**, *and* **(A4)**, *the equilibrium in trade policy is given by* ***(12)****. It features countervailing-duty laws, neither export taxes nor export subsidies, and prohibitive tariffs.*

**Remark 16** *Countervailing-duty laws emerge here as the result of non-cooperative choices by the two governments,* **not** *as a result of a trade agreement.*

In reality it is true that the GATT, in Article XVI, attempts to curtail the use of export subsidies and also provides a code of conduct regarding countervailing-duty laws for WTO members. But such laws were in existence *long* before the GATT.

**Remark 17** *Proposition 7 offers a resolution of the Export-Subsidy-Transfer Puzzle.*

The suggestion is that, in each country by itself, the government and the export lobby can indeed increase their joint surplus by encouraging exports (given **(A3)**), but actually doing so is not consistent with equilibrium in a two-country, non-cooperative, policy-setting context, given **(A4)**.

**Remark 18** *Proposition 7 offers a resolution of the Anti-Trade-Bias Puzzle.*

This follows from the endogenous introduction of countervailing-duty laws. Another implication of this endogenous introduction is the following.

**Remark 19** *If political-support motives dominate terms-of-trade motives* **(A3)** *and no agent addresses trade-tax revenue* **(A4)**, *each government is powerless to offer its export lobby anything in Nash equilibrium*.

This will turn out to be the essential reason for negotiations to reach trade agreements of the sort actually observed. It's crucial to realize that this environment is *not* assumed: It's a direct consequence of the requirements for equilibrium when political-support effects *completely* outweigh terms-of-trade effects.

So, finally, the model offers a resolution of all the embarrassing puzzles. But to do so it imposes $\rho = 0$ and implies prohibitive tariffs. It's time to take stock. I offer two comments.

*First*, $\rho = 0$ and prohibitive tariffs may or may not be to the reader's taste. It may or may not offer a reasonable explanation for, say, the Smoot-Hawley tariff. It is, though, linked to a key feature of the Grossman-Helpman approach to trade policy. With **(A4)**, deciding whether to extend protection to a sector amounts to weighing the positive effect on the sector's specific-factor income against the negative effect on consumer surplus. With **(A3)**, the former effect dominates, and this dominance increases as protection raises supply in the sector and reduces demand. A desire for trade-tax revenue (*i.e.* the negation of **(A4)**) is the sole potential motive for agents to impose less than prohibitive protection. This logic does not depend upon either of my simplifications that there are but two lobbies and that each lobbies only about the policy instrument directly affecting its own sector. Adding unorganized sectors would allow trade in those sectors, but would not affect the above logic with regard to organized sectors. Use of the Grossman-Helpman approach requires one to accept either the radical surgery of **(A4)** or a model clearly at odds with reality in the sense that it must display some combination of the three puzzles.

*Second*, imposing **(A4)** can not be regarded as a simple approximation to the idea that trade-tax revenue is less important to agents than other income ($\rho < 1$). Giving trade-tax revenue a reduced role in the objective functions just makes things *worse* by shifting *E* in Figure 1 further to the northwest. Such revenue must receive *no* weight at all to imply outcomes consistent with reality. The outcome implied by **(A4)** is a singularity, not the limiting case as $\rho$ goes to zero.

**Remark 20** *The current approach to modeling trade policy formation requires either the toleration of some combination of the three puzzles or the imposition of* ***(A4)***.

# VIII. Trade Agreements

Now suppose that the *H* and *F* governments can undertake negotiations for a trade agreement that would stipulate the trade taxes or subsidies. In the event of such negotiations, each interest group would lobby its government about the taxes in the agreement that pertain directly to it. I inquire whether there is a basis for such negotiations, what such a basis might be, and how it relates to the various alternative cases described above.

## The exchange of market access

A large literature insists that trade agreements seek to *exchange market access*: I'll grant your exporters increased access to my market in exchange for increased access to your market for my exporters. For an institutional approach, see Hauser (1986), Finger (1988, 1991), and Moser (1990); for a more formal approach, see, Hillman, Long, and Moser (1995), and Hillman and Moser (1996). Bagwell and Staiger use similar terminology to describe their approach. For example, they state (2002, pp 28–29), "we may interpret 'cost shifting,' 'terms-of-trade gain,' and 'market-access restriction' as three phrases that describe ... [a] single economic experience." The earlier literature, it seems clear, had "something else" in mind. But drawing an analytical distinction has proved elusive, largely because the earlier literature, when it expressed its ideas in formal terms, did so in models that, as Bagwell and Staiger (2002, p 20) correctly observe, were very often special cases of their own.

The present analysis provides a formal basis to define trade agreements based on the exchange of market access and to distinguish them from those that are not. The basic idea behind the exchange of market access seems to be that each country, for whatever reason, agrees to allow increased imports of a particular good in exchange for increased exports of another particular good. That is, such trade agreements are necessarily *inter-sectoral*.

My model features extensive separability: Equilibrium policies in each sector are determined independently of those in the other sector. This has so far been a matter of expositional convenience, but now it serves another purpose as well. With policies in each sector determined independently, there could be an incentive for independent sector-by-sector international negotiations not involving inter-sectoral trade-offs, such as the 1965 US-Canada automobile agreement. In such an *intra-sectoral* negotiation the governments would

bargain over $t_1$ and $t_1$*, with any implied change in $M_1 = X_1$* settled by a change in the trade volume of the numeráire good.

I can now pose the following question. With policy determination in each sector independent of that in the other sector, is it *necessary* in order for trade negotiations to serve a useful purpose that they address inter-sectoral trade-offs? If so, I regard the negotiations as motivated by a desire to exchange market access.

**Definition** *Trade agreements are said to be based on the exchange of market access if and only if there is no reason for sector-by-sector negotiations.*

Note that this definition requires the necessity of inter-sectoral negotiations. Since in this model agents ignore cross-sectional effects, negotiations addressing those effects could well be useful, as would national policy-making addressing those effects. So defining the exchange of market access on the *sufficiency* of inter-sectoral negotiations would not be a useful discriminatory device.

In the rest of this section I address in turn each of the three significant cases identified above: terms-of-trade dominance (where **(A2)** and **(A4)** do not hold), political-support dominance (where **(A2)** holds but **(A4)** does not), and complete political-support-dominance (where **(A4)** holds). In each case I ask whether there is a basis for trade negotiations and, if so, whether it is based on the exchange of market access as defined above.

## Terms-of-trade dominance

Here the Nash equilibrium in trade policy is given by **(8)**, which is, in effect, two independent Nash equilibria in the two sectors. For the usual reasons, a cooperative equilibrium in $t_1$ and $t_1$* can improve over the non-cooperative one, and likewise for sector 2; in each sector, an appropriate reduction in one country's import tariff and the other country's export tax will be mutually beneficial. I spare the reader the familiar details.

**Proposition 8** *If **(A1)** holds, both parts of **(A2)**are violated, and* $\rho = 1$*, the two countries have an incentive to negotiate a trade agreement* **not** *based on the exchange of market access that* **does** *constrain export taxes.*

That is, such negotiations are not based on the exchange of market access, by the above definition, and they produce trade agreements that are subject to the Terms-of-Trade Puzzle. As this seems less than satisfactory, I proceed to the next case.

## Political-support dominance

In this case the Nash equilibrium in trade policy is given by **(9)**, which is, again, two independent Nash equilibria in the two sectors. Again for the usual reasons, a cooperative equilibrium in $t_1$ and $t_1^*$ can improve over the non-cooperative one, and likewise for sector 2; in each sector, an appropriate reduction in one country's import tariff and the other country's export subsidy will be mutually beneficial. I again spare the reader the familiar details.

> **Proposition 9** *If **(A1)** and **(A2)** hold and* $\rho = 1$*, the two countries have an incentive to negotiate a trade agreement* **not** *based on the exchange of market access that does constrain but* **not** *in general eliminate export subsidies.*

As this again seems to correspond uncomfortably with reality, I now proceed to the final case.

## Complete political-support dominance

The equilibrium described in **(12)** offers no opportunity for an intra-sectoral trade agreement, in sharp contrast to the two preceding cases. In sector 1, for example, *H* has a prohibitive tariff in place. Retreating from this would impose a first-order cost on $W_1$, since the gain in consumer surplus would be strictly less than the reduction in specific-factor income. If constrained to use $t_1^*$, *F* can offer nothing in return: With $\rho = 0$, *H* would not value a transfer in trade-tax revenue produced by a countervailed *F* export subsidy. Thus any trade agreement must be based on the exchange of market access.

The motive for a trade agreement based on the exchange of market access would be to enable each government to offer its export sector something while taking something less from its import-competing sector. It is true that, with the equilibrium **(12)**, each government is powerless to offer its export sector something in any other way. But it is not clear that it will be tempted to use this way. The reason is that, since retreating from the $t_1$ in **(12)** would impose a first-order cost on $W_1$, doing so would be tempting to *H* only if the implied

negotiated rise in $W_2$ is large enough. It is not clear that a trade agreement can be found that would do this for both countries simultaneously.

To investigate this, note that **(3)** and its analogs imply, when $\rho = 0$, that a departure from **(12)**, where $x_1 = d_1$ and $x_2^* = d_2^*$, will produce the following.

$$\frac{\partial W_1}{\partial t_1} = \left(1 - \alpha_1\right) x_1 \frac{dQ_1}{dt_1}$$

$$\frac{\partial W_2}{\partial t_2^*} = \left(1 - \alpha_2\right) x_2 \frac{dQ_2}{dt_2^*}$$

$$\frac{\partial W_1^*}{\partial t_1} = \left(1 - \alpha_1^*\right) x_1^* \frac{dQ_1^*}{dt_1} \qquad \textbf{(13)}$$

$$\frac{\partial W_2^*}{\partial t_2^*} = \left(1 - \alpha_2^*\right) x_2^* \frac{dQ_2^*}{dt_2^*}$$

Now consider a hypothetical trade agreement stipulating $dt_1 < 0$ and $dt_2^* = \alpha\, dt_1$ for some parameter $\alpha$. Such an agreement will raise the joint surplus in each country, and so be perceived as beneficial by each government, if and only if the following holds.

$$\frac{\partial W_1}{\partial t_1} + \alpha \frac{\partial W_2}{\partial t_2^*} > 0$$

$$\frac{\partial W_1^*}{\partial t_1} + \alpha \frac{\partial W_2^*}{\partial t_2^*} > 0$$

This will in turn be possible for some choice of $\alpha > 0$ if and only if the following condition is met.

$$\left(\partial W_1^* / \partial t_1\right)\left(\partial W_2 / \partial t_2^*\right) > \left(\partial W_1 / \partial t_1\right)\left(\partial W_2^* / \partial t_2^*\right) \qquad \textbf{(14)}$$

Figure 2 illustrates how satisfaction of **(14)** is equivalent to the existence of a mutually beneficial trade agreement. The vectors labeled $\mathbf{t_1}$ and $\mathbf{t_2^*}$ depict the effects of reductions in the respective tariffs on the two joint surpluses. When these vectors have the relative slopes illustrated, reflecting **(14)**, an appropriate linear combination, such as at point **TA**, will be mutually beneficial.[6]

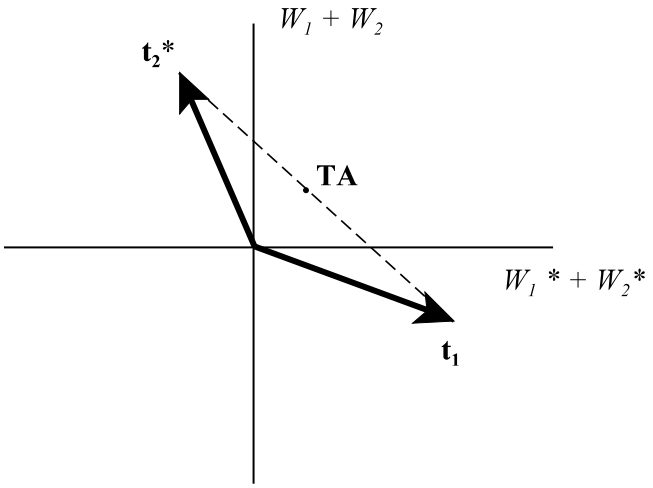


**Figure 2 Mutually Beneficial Exchange of Market Access**

Now, in the equilibrium **(12)**, $M_1(\tau_1 P_1) = X_1^*(P_1)$, with $P_1 = Q_1^*$ determined by $X_1^*(Q_1^*) = 0$ and $\tau_1$ determined by $M_1(\tau_1 Q_1^*) = 0$. The situation for good 2 is analogous. Utilizing this information along with **(13)** allows **(14)** to be rewritten as follows.

[6]The attentive reader will recognize this logic as that behind the familiar Hawkins-Simon (1949) condition for the feasibility of an input-output system.

At the equilibrium given by **(12)**,

$$\frac{1-\alpha_1^*}{\alpha_1^*}\frac{x_1^*}{X_1^{*\prime}}\frac{-M_2^{*\prime}}{x_2^*} > \frac{1-\alpha_1}{\alpha_1}\frac{x_1}{-M_1^{\prime}}\frac{X_2}{x_2} \qquad \textbf{(A5)}$$

So we have the following result.

**Proposition 10** *With **(A1)** – **(A5)** a mutually-beneficial trade agreement is feasible. This agreement is based on the exchange of market access, and it need not constrain export taxes.*

So, given the *complete* dominance of political-support motives, the model can deliver trade agreements resembling those that actually exist.

# IX. Concluding Remarks

The Received Theory of international trade agreements, the result of half a century of research by international trade theorists, suffers from fundamental puzzles that call into question its very relevance to reality. The *Terms-of-Trade Puzzle*: The Received Theory assumes that the sole purpose of trade agreements is to address terms-of-trade externalities, but actual GATT multilateral trade agreements just do not do this. The *Anti-Trade-Bias Puzzle*: Actual trade policies have always tried to restrict trade much more often than they have tried to stimulate it, but the models used by the Received Theory do not imply this result, unless doctored up to produce it.

To address these problems I have explored a model, based on Grossman and Helpman (2002), simplified for transparency[7] by assuming just three goods and by allowing each lobby a (realistic) comparative advantage in lobbying over the policy instrument of direct relevance to it. This produced the following argument.

[7]The attentive reader will have observed that I have followed the research strategy described in Jones (1977).

- An exercise of trade policy produces both a terms-of-trade effect and a political-support effect for the government implementing the policy, plus both a terms-of-trade externality and a political-support externality on the foreign government.

- If terms-of-trade motives dominate, each government will (counter-factually) employ both import tariffs and export taxes in Nash equilibrium. Any trade agreement would presumably wish to address export taxes (the Terms-of-Trade Puzzle).

- If political-support effects dominate, in equilibrium each government will tax imports but not tax exports (the Terms-of-Trade Puzzle resolved). But the policies might on balance either restrict or stimulate trade (the Anti-Trade-Bias Puzzle not resolved), and (counter factually), neither country will implement a countervailing-duty law, and each will attempt, by implement an export subsidy, that is only partly countervailed by its partner, to "bribe" the other government into allowing more imports than it otherwise would (the Export-Subsidy-Transfer Puzzle is introduced).

- If political-support effects *completely* dominate, each government taxes imports, implements a countervailing-duty law, and neither taxes nor subsidizes exports (thereby offering a resolution of all three puzzles. But the assumption of complete political-support dominance is strong and leaves each government with no reason to refrain from pushing protection to prohibitive levels in the absence of a trade agreement.

- If terms-of-trade motives dominate, the governments have an incentive to conclude sector-by-sector trade agreements. Such agreements would not be motivated by the exchange of market access and would require export taxes to be constrained.

- If political-support motives dominate, the governments have an incentive to conclude sector-by-sector trade agreements. Such agreements would not be motivated by the exchange of market access, and would require export subsidies to be constrained but would not attempt to eliminate them altogether.

- If political-support effects *completely* dominate, neither government can unilaterally deliver anything to its export lobby, nor can sector-by-sector negotiations achieve anything. The two governments have an incentive to negotiate a trade agreement to exchange market access, and such an agreement would resolve all three puzzles.

So, this paper offers a potential resolution of the three puzzles. But a special circumstance is required: *complete* political-support dominance.

I draw two bottom-line implications from this exploration. **i** The presumed dominance of terms-of-trade externalities, central to the Received Theory for half a century, must be junked. **ii** The following question must be faced:

> *Should the assumption of complete political-support dominance* ***(A4)*** *be embraced,* **or** *should the Grossman-Helpman approach to trade policy be junked?*

The answer, tender reader, I leave you to decide for yourself.

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