The Value of Trade Agreements in the Presence of Political Pressures

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An argument often heard in favor of trade agreements is that, by committing to free trade, a government can credibly distance itself from domestic lobbies. But several existing models of endogenous protection suggest that governments have no interest in foreclosing interest group pressures since governments derive rents from the political process. We develop a small-country model in which factors are sector-specific in the short run but mobile in the long run. We show that in this setting a government may be worse off in the political equilibrium than under commitment to free trade, and hence it may value a trade agreement.

I. Introduction

The trade literature has offered several explanations for the existence of international trade agreements. A classical explanation draws on the work by Johnson (1954), who argued that an individual government has an incentive to impose trade barriers in order to improve its terms of trade at the expense of its trading partners. When all governments pursue this beggar-thy-neighbor policy, they end up worse off than under free trade. Governments may then seek

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trade agreements to escape a terms-of-trade prisoners' dilemma. Mayer (1981) rigorously examined this explanation for international trade agreements between welfare-maximizing governments. Grossman and Helpman (1995*b*) show that this argument applies also when governments are subject to pressures from domestic lobbies; also in this case, governments impose externalities on each other via terms-of-trade effects, creating a prisoners' dilemma and a reason for trade agreements. Bagwell and Staiger (1996) further argue that, whether or not governments are politically motivated (in the sense of attaching extra weight to the producer surplus of one or more industries), internalizing terms-of-trade externalities is the *only* rationale for reciprocal trade agreements.

This explanation of trade agreements may not be the whole story, for at least two reasons. First, this theory does not explain why small economies seem to reduce their trade barriers significantly as they enter a trade agreement such as the World Trade Organization (WTO). Second, as Bagwell and Staiger (1996) show, this theory implies that trade agreements would *increase*—rather than reduce—export subsidies, a prediction that is contrary to what is observed in actual trade negotiations.

Another strand of models point to time-inconsistency problems in the domestic arena as a distinct possible reason for countries to join international trade agreements; namely, international trade agreements may provide a government with valuable commitment ability vis-à-vis domestic economic actors. The literature has pointed out various time-inconsistency problems in trade policy; among others, see Staiger and Tabellini (1987) and Tornell (1991). This rationale for trade agreements is valid even in the absence of terms-of-trade considerations (e.g., for a small country, which cannot influence terms of trade); thus these models offer an explanation for why a government may have incentives to unilaterally commit to free trade.

The sources of time inconsistency pointed out in the literature have a purely economic nature; there is no indication that the presence of domestic special-interest groups lobbying for protection might induce a government to seek commitment to free trade. At the informal level, however, an argument often heard in favor of trade agreements is that they provide a way for the government to credibly distance itself from the domestic special-interest groups that lobby for protection; the idea is that, by committing to free trade, a government may be able to foreclose political pressures at home. To our knowledge, there has been no rigorous examination of this argument, in spite of the fast-growing literature on the political economy of trade policies. In fact, some of the recent models

that explain trade policies as the result of pressures from domestic interest groups seem to suggest that a government may prefer to leave the door open to such domestic pressures rather than foreclose them. A prominent example is Grossman and Helpman (1994), in which special-interest groups lobby for protection by offering contributions to the government. In that model, the government ends up at least as well off in the political equilibrium as under free trade.

In this paper we take a closer look at this question, asking whether the presence of domestic political pressures may induce a government to unilaterally join a free-trade agreement. We do not address issues of reciprocal trade liberalization; we restrict our attention to the incentives of a small-country government to enter a preconstituted free-trade agreement such as the European Union, the North American Free Trade Agreement (NAFTA), or the WTO.[1] We assume that such a free-trade organization is able to enforce the small country's commitment to free trade; we do not address issues of imperfect enforcement of agreements.

To examine this issue, we focus on a small-country, two-sector model in which capital is immobile in the short run but mobile in the long run and only one industry is able to coalesce into a lobby. In the short run our model is similar to Grossman and Helpman (1994), where the government offers protection in exchange for contributions from the lobby, with the difference that we give the government some bargaining power vis-à-vis the lobby. We argue that in the short run the government is fully compensated (or more than fully, if it has some bargaining power) for the distortions caused by protection, whereas in the long run the government does not get compensated for the distortion in the allocation of capital. The government may thus end up worse off than under a free-trade agreement.

Within this general theme, we identify three distinct reasons why a government may want to commit to free trade. In Section III we consider an economy that specializes incompletely under free trade. We show there that the political process distorts the equilibrium allocation of resources, causing the politically organized industry to be larger than it would be under free trade. Political contributions compensate the government for this distortion only if the government's bargaining power—or, in other words, its ability to extract rents from the political process—is relatively large; if it is small, the government prefers to commit to free trade.

[1] Here we should mention Grossman and Helpman's (1995*a*) work on the political viability of regional trade agreements. In contrast to our paper, they focus mainly on the trade diversion and trade creation effects of regional agreements and their implications in terms of political support for those agreements.

In Section IV we consider a somewhat different situation, where an industry is relatively inefficient and would not produce under free trade, but has the potential of forming a lobby. In this situation, the mechanism that leads to overinvestment in the politically organized sector as examined in Section III does not apply. The reason is that, if the economy starts from a situation of free trade, no capital is allocated to the inefficient sector; therefore, there is no lobbying for protection in that sector. It would thus seem that the overinvestment problem that creates demand for commitment to free trade is not present in this case. This intuition is only partially correct, however, because if enough resources are invested in the industry under consideration, this industry may become influential enough to obtain a level of protection that justifies that investment. In Section IV we examine this issue and show that under some conditions the political process creates multiple equilibria, including one in which capital is invested in the ''wrong'' sector. A free-trade agreement may serve here to eliminate the ''bad'' equilibrium.

Section V highlights another reason why a government may value commitment to free trade, namely, that the political process may cause a distortion in the speed at which resources exit from a declining industry. This happens when investors can control the speed of reallocation of their capital and incur convex costs of adjustment. Suppose that there has been an adverse terms-of-trade shock in the politically organized sector, so that some capital will exit that sector. Since investors rationally expect the government to protect that sector, they will exit at a slower rate than they would under free trade. We argue that the government gets compensated for this distortion in the speed of adjustment only if its bargaining power is relatively large; if it is small, the presence of declining sectors will reinforce the government's demand for commitment.

Overall, the analysis points out that the government's decision to commit to free trade depends critically on two key parameters. First, a stronger bargaining position vis-à-vis the lobby makes the government less likely to enter a free-trade agreement. The reason is that a government with a strong bargaining position derives large rents from the political process, and hence the cost of joining a free-trade agreement in terms of forgone rents outweighs its benefit in terms of improved allocation of resources in the long run. We do not attempt to model the factors affecting the government's bargaining position, but we have in mind that such a position may be weaker in countries with more open political systems. For example, we would expect that a parliamentary regime in which several different coalitions can be formed to grant trade protection would be more likely to join a free-trade agreement than a dictatorship. Interpreted in

the reverse way, the model leads to the paradoxical result that countries in which lobbies have more bargaining power are more likely to end up in a free-trade organization.

Second, we show that the government's responsiveness to contributions relative to social welfare affects its incentive to join a free-trade agreement in a nonmonotonic way, provided that the government's bargaining power is relatively low. If the government cares little about political contributions, there will be a low level of protection in the political equilibrium and the consequent misallocation of resources will be negligible; thus the government's incentive to commit to free trade is small. At the other extreme, if the government cares little about social welfare, it will not be willing to forgo political contributions by signing a free-trade agreement. Only if the government cares significantly about both social welfare and contributions does it have a strong incentive to enter a free-trade agreement.

II. Preliminaries

A. *The Economic Structure*

The economy is composed of two sectors, numeraire (N) and manufacturing (M), and there are two factors of production, land and capital. Landownership is spread evenly over the population, which is constituted by a continuum of agents. The size of the population is normalized to one. The total quantity of capital is fixed and equal to K; the capital allocated to sector N (M) is denoted by K_N (K_M). To simplify, we assume that capital is owned by a negligible fraction of the population.[2] The economy is small in the sense that it cannot influence international prices. The international price of the manufacturing good relative to the numeraire good is denoted by p^*.

We limit the government's policy options to trade taxes and subsidies. Effectively, the government can control the domestic relative price of the M good, which we denote by p. Note that $p > p^*$ implies an export subsidy if this good is exported and implies an import tariff if it is imported. The revenues (positive or negative) from trade policy are distributed evenly to all agents.

Production of the manufacturing good requires only capital, according to the production function $Q_M = K_M$. Production of the numeraire good requires both capital and land, according to the constant-returns production function $Q_N = F(K_N, T)$. Letting $x \equiv K_M$, we can write the marginal productivity of capital in the N sector

[2] Formally, the population can be represented as a square of size one and the set of capitalists as an edge of this square. Thus investors are a continuum of "small" agents even though they are a measure zero subset of the population.

as $\pi_N(x) \equiv F_K(K - x, T)$, where F_i denotes the partial derivative of F with respect to factor i. Diminishing returns to capital in the N sector implies $\pi'_N(x) > 0$. Since the domestic price of the N good is normalized to one, $\pi_N(x)$ also represents the rate of return to capital in the N sector. On the other hand, the rate of return to capital in the M sector is simply given by p. Finally, the rate of return to land is given by $z(x) \equiv F_T(K - x, 1)$.

Consumer preferences are given by $q_N + u(q_M)$, where q_i is the quantity consumed of good $i = N, M$. We assume that $u(q_M) = vq_M - (q_M^2/2)$. With these preferences, the demand for good M, implicitly defined by $u'(d(p)) = p$, is given by $d(p) = v - p$. The linearity of demand is not essential for our main results but simplifies their derivation and presentation. The indirect utility for an agent with income y is $y + s(p)$, where $s(p) = u(d(p)) - pd(p)$. Social welfare is taken to be the aggregate utility of all agents, which equals aggregate income (inclusive of revenues from trade policy) plus consumer surplus. Since the size of the population is normalized to unity, social welfare can be written as

$$w(p, x) = z(x)T + \pi_N(x)(K - x) + px + r(p, x) + s(p),$$

where $r(p, x) \equiv (p - p^*)[d(p) - x]$ denotes the revenues (positive or negative) from trade protection.

B. *The Political Structure*

We assume that the owners of capital in the manufacturing sector are able to solve the free-rider problem and organize a lobby, whereas in the numeraire sector capitalists and landowners fail to do so. To compensate the government for the protection granted, the lobby collects contributions from capitalists in proportion to the amount of capital they have in the manufacturing sector. Let c be the contribution paid to the government per unit of capital, so that the total contribution to the government is given by cx. The lobby seeks to maximize the welfare of capitalists in the manufacturing sector. Since capital is extremely concentrated, its objective reduces to maximizing the returns to capital in the M sector net of contributions:[3] $(p - c)x$.

[3] We are assuming for simplicity that a capitalist must have all his capital in one sector. Therefore, an owner of K_j units of capital who has allocated his capital to the manufacturing sector has utility $(p - c)K_j + z(x)T + r(p, x) + s(p)$. Summing over all capitalists who have allocated their capital to the manufacturing sector, we get

$$(p - c)x + \alpha_M[z(x)T + r(p, x) + s(p)],$$

where α_M is the proportion of the population who have allocated capital to the manufacturing sector. Since we assume that capital is extremely concentrated, so that only a measure zero set of people own any capital, necessarily $\alpha_M = 0$. So this expression reduces to $(p - c)x$.

Following Grossman and Helpman (1994), we assume that the government's objective is a weighted average of total welfare and contributions from the lobby:

$$\Omega = w(p, x) + acx. \tag{1}$$

If $a = 0$, the government will set prices so as to maximize total welfare and hence will choose free trade. If a is positive, however, the government will deviate from free trade if the appropriate contributions are forthcoming.

An important assumption we make is that interest groups can coalesce only along sectoral lines, not along factor lines, and therefore only ''short-run'' lobbies influence the government. In our barebones setting, this amounts to assuming that capital owners are not able to form an economywide lobby. This assumption seems reasonable as a first step, especially if one thinks that solving the free-rider problem is much harder at the economywide level than at the sectoral level. We also assume that capitalists cannot coordinate their investment decisions. We can thus think of the manufacturing lobby as an independent player that takes as given the allocation decisions of capitalists.

The timing of the game is as follows. In the first stage, capitalists choose where to invest their capital. Each investor is ''small,'' so he behaves nonstrategically. The variable x summarizes the choices of investors in the first stage. In the second stage, government and lobby engage in bargaining over trade policy and contributions. This timing captures the idea that the government (as well as the lobby) lacks commitment vis-à-vis investors. To keep the structure as simple as possible, we model the bargaining process as a Nash bargaining game, in which government and lobby have bargaining powers σ and $1 - \sigma$, respectively. The threat point is assumed to be the status quo situation, in which the lobby contributes nothing to the government and the government implements free trade.

An implicit assumption here is that the government is stable enough to care about the long-run state of the economy. The same insights should carry over to a setting in which the incumbent politicians are concerned about their chances of reelection; in this case, the median voter's concern about long-run welfare should be reflected to some extent in the government's objective.

III. The Basic Story

Let us first determine the equilibrium allocation of capital under free trade, which will be an important benchmark. Since the return to capital allocated to the N sector is increasing in x, the curve $\pi_N(x)$

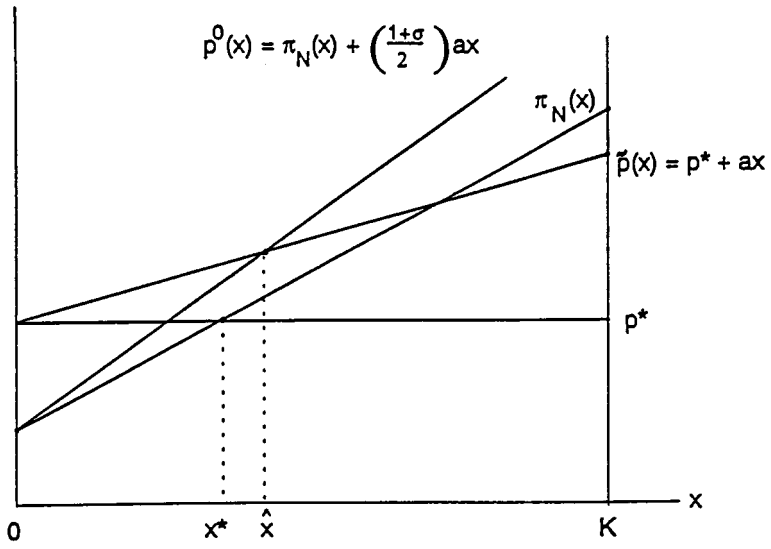

FIG. 1

is upward sloping and intersects the horizontal line p^* at most once. We assume $\pi_N(0) < p^* < \pi_N(K)$ to ensure that there is an interior intersection. The level of x at the intersection, denoted by x^*, represents the equilibrium allocation of capital under free trade (see fig. 1).

We shall show that the presence of the manufacturing lobby leads to a larger manufacturing sector than under free trade. More important, we shall show that, under some conditions, this misallocation of capital makes the government eager to ''close the doors'' to lobbying by committing to free trade, even though this implies forgoing contributions.

To solve for the political equilibrium, we proceed by backward induction. In the second stage, given the investors' choices (summarized by x), the outcome of the bargaining, $(\tilde{p}(x), \tilde{c}(x))$, satisfies the following two conditions.

i) The term $\tilde{p}(x)$ maximizes $w(p, x) + apx$.[4] This expression can

[4] One technical problem here is that, given the linearity of demand, when p increases above v, consumption of the M good falls to zero. An increase in p above v would cause no consumption distortion (and no allocation distortion, since x is given when p is selected), thereby effecting a zero-distortion transfer from consumers to owners of capital in the M sector. The government and lobby would then want to increase p as much as possible, effectively transferring all consumers' income to capitalists in the M sector. To rule this out and keep the linear specification, we assume that the feasible values of p are bounded above by v. Also, we assume that v is large enough, namely, $v > p^* + aK$, so that $\tilde{p}(x)$ never reaches its upper bound v.

be interpreted as the joint surplus of government and lobby. It is direct to verify that

$$\tilde{p}(x) = p^* + ax. \tag{2}$$

The schedule $\tilde{p}(x)$ can be interpreted as the ''short-run'' equilibrium price, given the allocation of capital. Notice that the level of protection is increasing in the size of the sector. This result is a direct consequence of the fact that $\tilde{p}$ maximizes the joint surplus of government and lobby. If $a = 0$, the joint surplus is simply welfare, which is maximized by p^*. If $a > 0$, extra weight is attached on the profit component px, and since a bigger manufacturing sector implies a higher marginal profitability of protection, the optimal $\tilde{p}$ increases with x.

ii) The term $\tilde{c}(x)$ is a weighted average of the welfare loss from protection and the lobby's willingness to pay for protection (both expressed per unit of capital):

$$\tilde{c}(x) = (1 - \sigma)\left[\frac{w(p^*, x) - w(\tilde{p}(x), x)}{ax}\right] + \sigma[\tilde{p}(x) - p^*]. \tag{3}$$

Note that if $\sigma = 0$, contributions are just enough to compensate the government for the welfare distortions caused by protection. On the other hand, if $\sigma = 1$, the government extracts all the surplus derived by capitalists from protection, which equals $[\tilde{p}(x) - p^*]x$. Plugging (2) into (3) and simplifying, we obtain

$$\tilde{c}(x) = \left(\frac{1 + \sigma}{2}\right)ax. \tag{4}$$

In the first stage, investors place their capital in the more profitable sector, anticipating the trade policy and contribution levels that will be selected. At a subgame-perfect equilibrium, no investor must be able to profitably deviate and move capital to a different sector. Therefore, in equilibrium, either (i) the net returns to capital must be equal in the two sectors or (ii) all capital must be allocated in the sector with higher net returns.

To derive the equilibrium conditions, let $p^0(x)$ be the price at which the returns to capital (net of contributions) are equal across sectors, given the level of x. This price is the one that solves

$$p - \tilde{c}(x) = \pi_N(x). \tag{5}$$

Plugging (4) into (5) yields the following expression for the ''equal-returns'' price curve $p^0(x)$:

$$p^0(x) = \pi_N(x) + \left(\frac{1+\sigma}{2}\right)ax. \tag{6}$$

If $p > p^0(x)$, capital earns higher returns in the manufacturing sector than in the numeraire sector; the opposite happens when $p < p^0(x)$. In figure 1 we have drawn the short-run equilibrium price curve $\tilde{p}(x)$ and the equal-returns curve $p^0(x)$; to ensure that these curves intersect exactly once, it is sufficient to assume that returns in the N sector decrease fast enough and in particular that

$$\pi_N'(x) > \frac{p^* - \pi_N(0)}{K} + \left(\frac{1-\sigma}{2}\right)a \quad \text{for all } x.$$

We let $\hat{x}$ denote the level of x at the intersection. (Similar results arise if the curves do not intersect, with $\hat{x}$ replaced by K.) Since $\hat{x}$ is the only allocation for which the short-run equilibrium price equalizes returns across sectors (and since complete specialization clearly cannot be an equilibrium), $\hat{x}$ constitutes the unique equilibrium allocation. The ''long-run'' equilibrium domestic price is then given by $\hat{p} \equiv \tilde{p}(\hat{x})$.

Figure 1 indicates that $\hat{x}$ is higher than the free-trade allocation, x^*.[5] The intuition is the following. Suppose for a moment that the allocation of capital is given by $x = x^*$. At this allocation, returns to capital would be equal across sectors if there were no protection. Since a small amount of protection causes a second-order welfare loss but a first-order gain for the lobby, the lobby can profitably ''buy'' protection from the government at a low price, thereby making the returns to capital in the manufacturing sector higher than in the numeraire sector. In terms of our notation, this means that $\tilde{p}(x^*) > p^0(x^*)$. As a consequence, an investor in the N sector has an incentive to move her capital to the M sector, thereby driving x above x^*. As one would expect, political pressures cause the manufacturing sector to be larger than under free trade.

It is interesting to note that the extent of overinvestment ($\hat{x} - x^*$) is decreasing in the government's bargaining power σ and is zero when $\sigma = 1$. Consider the extreme case $\sigma = 1$. From (2) and (6), we have $\tilde{p}(x^*) = p^0(x^*)$; so—starting at the free-trade allocation—there is no entry into the manufacturing sector, which remains at

[5] To see this formally, note that $\hat{x}$ solves the equation $\tilde{p}(x) = p^0(x)$, which (with [2], [4], and [5]) can be written as $p^* = \pi_N(x) - [(1-\sigma)/2]ax$, whereas x^* solves the equation $p^* = \pi_N(x)$.

the free-trade size, $\hat{x} = x^*$. This happens because when the government has all the bargaining power, the price that the lobby must pay for protection is so high that the net returns to capital do not increase as a result of protection. On the other hand, notice that the equilibrium level of protection, $\hat{p} - p^*$, is positive also when $\sigma = 1$. This suggests that when the government is ''strong'' vis-à-vis the lobby, the organized sector still obtains trade protection, but this need not result in a distorted allocation of resources. The next proposition summarizes these findings.

PROPOSITION 1. (i) The equilibrium allocation $\hat{x}$ is decreasing in σ, with $\hat{x} > x^*$ for all σ in [0, 1) and $\hat{x} = x^*$ for $\sigma = 1$. (ii) The equilibrium domestic price $\hat{p}$ is decreasing in σ, with $\hat{p} > p^*$ for all σ in [0, 1].

It is worth emphasizing the role of the bargaining power for the determination of trade policy. In the short run, the bargaining power has no impact on the equilibrium trade policy; it affects only the distribution of the surplus between government and lobby. When resources are mobile in the long run, however, the distribution of the surplus and the determination of trade policy are no longer separate. A change in the government's bargaining power affects the allocation of resources, and through this channel it influences the equilibrium level of protection. In particular, a higher bargaining power on the part of the government leads to lower investment in the politically organized industry, which translates into lower protection.

A. The Value of Commitment to Free Trade

Suppose now that the government has an option to commit to free trade at an earlier stage, say $t = 0$. Assume that the manufacturing lobby starts operating only after investors have sunk their capital in the M sector, so that there is no lobbying at $t = 0$; in Section VI we discuss how results are likely to change if this assumption is relaxed. To examine the value of commitment to free trade, we derive the government's payoff in the political equilibrium and compare it with the payoff it would derive by committing to free trade. The utility of the government in the political equilibrium can be derived from equations (1), (2), and (3):

$$\Omega = w(p^*, \hat{x}) + \frac{\sigma a^2 \hat{x}^2}{2}.$$

On the other hand, if the government commits to free trade, its utility is given by $\Omega^c = w(p^*, x^*)$.

To understand the relationship between Ω and Ω^c, let us first consider two extreme cases.

Case 1: $\sigma = 0$.—From proposition 1 we know that in the political equilibrium the capital allocation is given by $\hat{x} > x^*$. Since $w(p^*, x)$ has a peak at x^* (because the free-trade allocation is efficient), it follows that Ω^c is higher than Ω.

Case 2: $\sigma = 1$.—In this case $\hat{x} = x^*$, so the equilibrium level of x is the same as under commitment to free trade. The only difference between Ω and Ω^c arises from the fact that under no commitment the government receives contributions from the lobby, which obviously implies that $\Omega > \Omega^c$.

Next, note that Ω is increasing in σ because of two effects: first, because Ω is directly increasing in σ and, second, because $\hat{x}$—and hence the equilibrium distortion—is decreasing in σ. A continuity argument then establishes the following result.

PROPOSITION 2. There exists a level of σ, $\overline{\sigma}$, such that $\Omega < \Omega^c$ if and only if $\sigma < \overline{\sigma}$.

Note that if σ is low, this result contrasts with the prediction that obtains if the allocation of resources is exogenous, as in Grossman and Helpman (1994). In that case the government is at least as well off in the political equilibrium as under commitment to free trade, since its reservation utility in the negotiation with the lobby is given by its free-trade utility. To gain some intuition, consider the extreme case $\sigma = 0$. In the second period, the government chooses a certain level of protection for the organized industry and receives its reservation utility, which is the level of welfare that would obtain under free trade *given the current allocation of capital*. In the first period, since investors rationally expect protection in the following period, they overinvest in the politically organized industry. Consequently, the government's reservation utility is given by the free-trade level of welfare given a distorted allocation of capital. This is lower than the free-trade level of welfare given the undistorted allocation of capital, which would prevail were the government to commit to free trade from the start.[6]

In the more general case in which the government has some bargaining power ($\sigma > 0$), the trade-off facing the government can be

[6] McLaren (1997) shows that a small-country government (in the absence of political pressures) may not want to sign a free-trade agreement with a big country if the agreement can be renegotiated. The reason is that, anticipating the agreement, investors will lock their capital in a single sector, and this will undermine the government's future bargaining position vis-à-vis the big country. Although the points made in the two papers are very different, they share the feature that investors' anticipation of future trade policies can undermine the government's future bargaining position (vis-à-vis interest groups in our paper and vis-à-vis the foreign government in McLaren's paper).

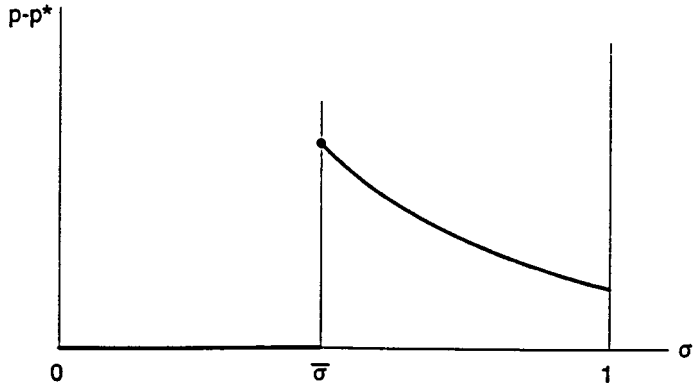

FIG. 2

described in the following way. The political process—and the trade protection that arises from it—leads to three effects: (*a*) A consumption distortion is generated; since the government's reservation utility is given by the free-trade welfare level given x (i.e., $w(p^*, x)$), this distortion is always compensated for by the lobby's contributions. (*b*) The government receives contributions in excess of its reservation utility, according to its bargaining power; the extent of these "rents" represents the cost of joining the free-trade agreement. (*c*) A resource allocation distortion arises in the long run. This distortion is present even if the government-lobby negotiation breaks down, so the government does not get compensated for it. Thus this distortion represents the cost of *not* joining the agreement. The government ultimately weighs effects *b* and *c* against each other, and a higher σ tilts the balance against the agreement.

It is also interesting to consider how the bargaining power σ affects the equilibrium level of protection when the government can exercise the option of joining a free-trade agreement. If σ is low, the government signs the free-trade agreement, implying a zero level of protection. If σ is higher than a critical level, the government chooses not to commit to free trade, and the outcome entails positive protection. However, as σ increases further, the equilibrium level of protection decreases (because as σ increases, equilibrium contributions increase, the net returns in the manufacturing sector decrease, and so does the size of the manufacturing sector). When the government has the option of committing to free trade, the model thus predicts little or no protection when the government is very weak or very strong vis-à-vis the lobby and maximum protection when the government's strength is intermediate. Figure 2 illustrates.

Next we analyze how the parameter a, which captures the government's responsiveness to political pressures, affects the value of commitment to free trade. Letting

$$G(a) \equiv w(p^*, x^*) - \left[w(p^*, \hat{x}(a)) + \frac{\sigma a^2 \hat{x}(a)^2}{2} \right]$$

denote such a value, we are interested in knowing the shape of $G(a)$. We first state the result and then provide intuition. The proof is in Appendix A.

PROPOSITION 3. If σ is relatively low, $G(a)$ is nonmonotonic, reaching a maximum at some value a^* and turning negative at some value $\bar{a}$. If σ is relatively high, $G(a)$ is negative for all $a > 0$.

To gain intuition for this result, notice first that if $a = 0$, commitment to free trade has no value since even in the absence of commitment the government would not grant any protection. If a is large, on the other hand, the government cares very little about welfare, and the cost of the resource misallocation caused by protection becomes negligible in the government's objective. Thus a free-trade agreement has a negative value. Finally, consider intermediate levels of a. If σ is sufficiently low, the cost of committing to free trade, given by the forgone rents, is small relative to the cost of being involved in the political process, given by the allocation distortion, and hence the government has an incentive to commit to free trade. If σ is close to one, on the other hand, the government's rents from the political process are high, so the government does not want to commit.

IV. Multiple Equilibria

Consider an industry that is relatively inefficient and would not produce under free trade, but has the potential to form a lobby. Under free trade, no capital would be present in this industry; therefore, there would be no lobbying for protection. This might lead one to think that the overinvestment problem analyzed in Section III, which gives the government an incentive to commit to free trade, is not present in this case. However, we shall argue that industries with these characteristics may create (or reinforce) a government's demand for commitment to free trade. The idea is that if investors expect the government to protect the inefficient industry, they will move resources to that industry; and if this becomes large enough, it may be able to extract substantial trade protection from the government, in turn fulfilling the original expectations. In other words, the political process may create multiple equilibria, including one in which capital is invested in the ''wrong'' sector. A free-trade agree-

ment may then serve to eliminate the ''bad'' equilibrium. The conceptual difference with respect to the situation of Section III is that here the misallocation of resources does not necessarily arise; it arises only under certain expectations, namely, if investors expect the inefficient sector to be protected.[7]

To make this point in the simplest way, we modify the model of the previous section only by assuming that the production function in the N sector is given by $F(T, K_N) = T + K_N$. The rate of return to capital in the N sector is then given by $\pi_N(x) = 1$. We focus on the case in which the economy has a comparative advantage in the sector that is not politically organized (N), which corresponds to the condition $p^* < 1$. Then, in the absence of political pressures, the economy specializes in sector N. This two-sector Ricardian structure is very special but should not be interpreted literally; the qualitative insights of the analysis apply more generally to situations in which a potentially organized industry is relatively inefficient and would be inactive under free trade.

Next we examine the political equilibrium. Notice first that $p^0(x)$ is flatter than $\tilde{p}(x)$ (except when $\sigma = 1$, in which case the two curves are parallel). Here, politics can potentially upset the economic comparative advantage and lead the country's capital to specialize in the wrong sector. Let us identify the parameters under which this will happen. First notice that, since $\tilde{p}(0) < p^0(0)$, complete specialization in the N sector ($x = 0$) is always an equilibrium. Second, since $\tilde{p}(x)$ is steeper than $p^0(x)$, the former can intersect the latter only from below. If this happens, say at point $\hat{x}$, two more equilibria arise: $x = \hat{x}$ and $x = K$.

To understand why there may be multiple equilibria, one has to understand the political externality that characterizes investment in the M sector. It is not obvious that there is a positive externality because as x increases, both the level of protection, $\tilde{p}(x)$, and the contributions per unit of capital, $\tilde{c}(x)$, increase with x, so one needs to understand why $\tilde{p}(x)$ increases faster than $\tilde{c}(x)$. Let us focus on the case in which $\sigma = 0$. When there is entry into the M sector, the lobby can continue to ask for the same level of protection, in which case the *total* contribution would not change because the consumption distortion, which is the only distortion that the lobby must compensate the government for, would not change.[8] A larger x then im-

[7] It should be mentioned that the possibility of multiple equilibria when industries can lobby for protection and resources are mobile in the long run was noted in independent work by Werner (1995). He does not address the issue of commitment to free trade.

[8] To see this, notice that the consumption distortion is given by $w(p^*, x) - w(p, x)$. Since (it can be checked that) the cross derivative $w_{px} = 0$, the consumption distortion is independent of x.

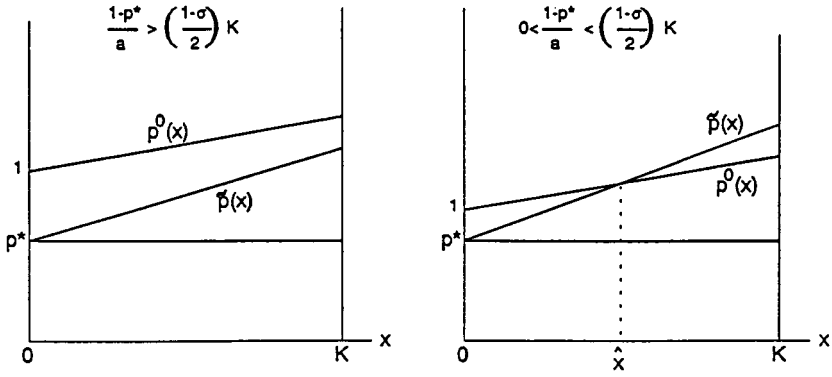

FIG. 3

plies that contributions *per unit of capital* fall, thereby increasing the returns to capital in the manufacturing sector. The fact that the lobby has the option of asking for even more protection as the size of the manufacturing sector increases (and indeed it does; see eq. [2]) serves only to strengthen this effect.

A necessary and sufficient condition for multiple equilibria to arise is $\tilde{p}(K) \geq p^0(K)$. Using expressions (2) and (6) and rearranging, we can express this condition as[9]

$$0 < \frac{1 - p^*}{a} \leq \left(\frac{1 - \sigma}{2}\right) K. \tag{7}$$

This condition has an appealing interpretation: the ratio $(1 - p^*)/a$ captures the strength of the economic comparative advantage relative to the government's responsiveness to political contributions or, more loosely, relative to the importance of politics. Multiple equilibria arise if and only if this ratio does not exceed the critical level given by the right-hand side of (7). Figure 3 illustrates. Notice the impact of the government's bargaining power on this critical level: higher σ makes multiple equilibria less likely. The intuition is that the higher σ is, the higher the price that the lobby pays for protection; hence the lower the returns to lobbying and the lower the importance of the political externality. Also note that if the government has all the bargaining power ($\sigma = 1$), multiple equilibria never arise; in this case, even if the lobby manages to buy protection, the price it pays is so high that the net profitability of capital is the same

[9] We assume here that $v > 1$. This ensures that both possibilities (unique equilibrium and multiple equilibria) are compatible with the restriction $p^* + aK < v$, imposed earlier.

as in the absence of lobbying and hence lower than in sector N. The next proposition describes the equilibria of the economy as a function of the ratio $(1 - p^*)/a$.

PROPOSITION 4. (i) If $0 < (1 - p^*)/a \leq [(1 - \sigma)/2]K$, the economy admits three equilibria, $x = 0$, $x = K$, and $x = \hat{x} \in (0, K)$. (ii) If $(1 - p^*)/a > [(1 - \sigma)/2]K$, the unique equilibrium allocation is given by $x = 0$.

Intuition suggests that the incomplete-specialization equilibrium $\hat{x}$ is unstable. For example, if starting from $\hat{x}$ some capital enters sector M, the lobby will be able to extract more protection, thereby attracting even more capital, a process that continues until the economy specializes in sector M. For this reason, we shall disregard the intermediate equilibrium when studying the government's incentive to commit to free trade.[10] At any rate, taking this equilibrium into account would only complicate the exposition, without affecting the qualitative results.

A. *The Value of Commitment to Free Trade*

If the government commits to free trade, no political pressures can arise; so the only equilibrium is $x = 0$, and the government's payoff is $\Omega^c = w(p^*, 0)$. If the government does not commit, we have to distinguish between two parameter regions. Recall from proposition 4 that if $(1 - p^*)/a > [(1 - \sigma)/2]K$, there is a unique equilibrium characterized by efficient allocation of resources; therefore, for this parameter range, commitment has no value. If $0 < (1 - p^*)/a \leq [(1 - \sigma)/2]K$, on the other hand, there are two complete-specialization equilibria, one of which entails inefficient allocation of capital ($x = K$). Here we take the view that if there are multiple equilibria, the government cannot influence the process of equilibrium selection and attaches a positive probability to each equilibrium outcome.[11] Let Ω^k denote the government's payoff evaluated at the inefficient

[10] If the model is cast in continuous time along the lines of Sec. V, three steady states arise, which correspond to the three equilibria in proposition 4. Depending on the initial conditions (in particular, the initial value of x), there may be a unique equilibrium path (i.e., history rules the outcome) or two equilibrium paths, one converging to $x = 0$ and the other converging to $x = K$ (i.e., expectations matter). Following a technique of analysis developed in Hammour (1991), one can show that the incomplete-specialization steady state is unstable.

[11] A way to make this story consistent from the game theory point of view is to suppose that there is a publicly observable signal that is realized between $t = 0$ and the time at which investors allocate their capital across sectors N and M, and can assume two possible values, with probabilities μ and $1 - \mu$. Here we are focusing on the "sunspot" equilibrium, in which investors condition their actions on the value of the signal. In this equilibrium, μ and $1 - \mu$ represent the ex ante probabilities that each outcome will be selected.

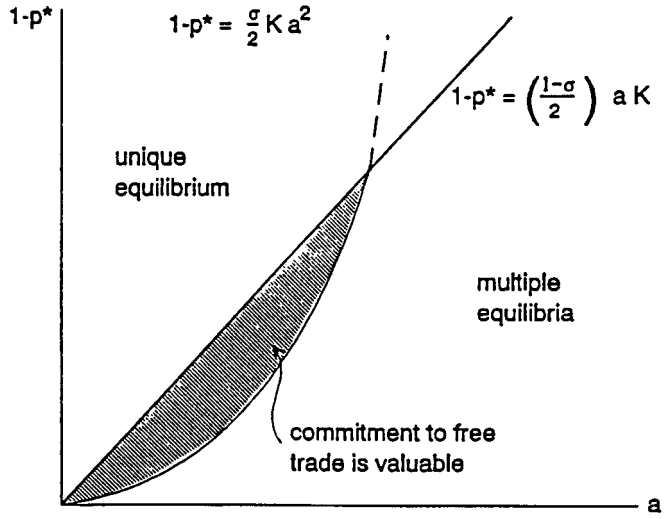

FIG. 4

equilibrium $x = K$. Then the government chooses between a sure payoff of $w(p^*, 0)$ and a lottery with payoffs $w(p^*, 0)$ and Ω^k. Commitment is then valuable if and only if

$$\Omega^k < w(p^*, 0). \tag{8}$$

Straightforward algebra reveals that inequality (8) can be rewritten as

$$1 - p^* > \frac{\sigma a^2 K}{2}. \tag{9}$$

Condition (9) expresses the parameter range for which the government prefers to commit to free trade, given that parameters are in the multiple-equilibrium region, that is, $0 < (1 - p^*)/a \leq [(1 - \sigma)/2]K$. In figure 4, the shaded area represents the region in $(a, 1 - p^*)$ space for which commitment to free trade is valuable. The next proposition summarizes.

PROPOSITION 5. The government wants to commit to free trade if and only if $0 < (1 - p^*)/a \leq [(1 - \sigma)/2]K$ and $1 - p^* > \sigma a^2 K/2$.

This result suggests that a government has an incentive to sign a free-trade agreement only when the comparative disadvantage of the politically organized sector $(1 - p^*)$ and the importance of politics (a) assume intermediate values. To gain intuition, focus on $1 - p^*$ first. If $1 - p^*$ is small, there is an equilibrium in which the economy specializes in the wrong sector; however, the efficiency loss from

the resource misallocation is small and is more than compensated by the rents that the government extracts from the political process. Thus the government would rather get involved in politics than sign a free-trade agreement. If $1 - p^*$ is intermediate, the loss from specializing in the wrong sector outweighs the contributions received by the government, and hence the government would rather get the lobby off its back by committing to free trade. If $1 - p^*$ is sufficiently high, the country's comparative advantage is so strong that the bad equilibrium disappears, and there is no gain from committing to free trade.

Also the impact of a on the government's trade-off admits a simple intuition. If a is low, the only equilibrium involves the right specialization, so there is no gain from commitment. As a crosses a critical value, a bad equilibrium arises and (if σ is small) the efficiency loss from the bad specialization exceeds the value of contributions. However, as a increases further, the value of contributions increases, whereas the efficiency loss remains constant; so for a high enough the value of commitment becomes negative.

Notice also that an increase in σ shrinks the parameter region for which the government desires to commit to free trade, for two reasons. First, a higher σ makes multiple equilibria less likely; second, if σ is high, the government's rents from the political process are high, and commitment to free trade becomes less valuable.

V. Declining Sectors

In this section we consider the impact of trade politics on the speed of adjustment after an industry has been hit by a negative shock. In particular, we show that a government's power to protect an industry may lead to a slower-than-optimal rate of exit from a declining industry. We shall argue that the government does not get compensated for this distortion in the speed of adjustment unless its bargaining power is relatively large; if it is small, the presence of declining sectors creates a further incentive to commit to free trade.

To make this point we extend the model of Section IV to a continuous-time setting. We keep the production functions unchanged, but now we model the imperfect mobility of capital by assuming (following Hammour [1991]) that resources must be expended in order to reallocate capital; an increase in the rate at which these resources are spent decreases the expected time it takes for the reallocation to occur. The reallocation time is distributed exponentially with instantaneous arrival rate γ. An investor must spend $\gamma^2/2$ units of the numeraire good to obtain arrival rate γ; thus investors can increase the mobility of their capital at a cost. Since investors

in a given sector are symmetric and will make the same choices in equilibrium, we let γ_i denote the arrival rate chosen by capitalists in sector i.

At each point in time, government and lobby bargain over p and c. In order to use well-known noncooperative equilibrium notions, it is convenient to formalize this as a noncooperative bargaining process, in the following way: With probability σ the government gets to make a take-it-or-leave-it offer, and with probability $1 - \sigma$ the lobby gets this chance; if the offer is rejected, there is no protection and no contribution. Government and lobby are assumed to be risk neutral, so in expected terms this bargaining process is equivalent to a Nash bargaining game with bargaining powers σ and $1 - \sigma$. This two-stage bargaining sequence should be thought of as compressed in an instant of time. The current payoffs of government and lobby are the same as in the previous sections. We do not need to write down the full dynamic payoffs of these players since we shall argue shortly that in equilibrium they maximize their current payoffs.

We now have a dynamic game with x as the state variable. We focus on Markov equilibria, that is, subgame-perfect equilibria in which players' actions are conditioned only on x (see Fudenberg and Tirole [1991] for a more detailed explanation of Markov equilibria). The determination of the Markov equilibrium is significantly simplified by the fact that only the actions of capitalists matter for the dynamics of x. That is, the dynamics of x are completely determined by the strategies of investors, $\{\gamma_N(x), \gamma_M(x)\}$:

$$\dot{x} = (K - x)\gamma_N(x) - x\gamma_M(x). \tag{10}$$

This condition states that the rate of change in x is the difference between the rate of entry into the M sector and the rate of exit from the M sector. The term $(K - x)\gamma_N(x)$ represents the fraction of capital in the N sector that can be reallocated to the M sector, and $x\gamma_M(x)$ represents the rate of exit from the M sector. Since government and lobby take the investors' strategies $\gamma_i(x)$ as given, they take the path of x as given, and hence expectations about the future do not influence their choices today. This implies that they simply maximize their *current* returns. In other words, they behave *as though* they were myopic.[12] This observation allows us to immediately derive the outcome of the bargaining given x, $(\tilde{p}(x), \tilde{c}(x))$. This outcome is just

[12] Note that investors' expectations about the future do matter for their choices because, unlike those of the government and the lobby, investors' decisions carry a real commitment (due to the stickiness of allocation decisions); thus their decisions depend crucially on the trade policy they expect for tomorrow.

the same as in the previous sections, namely given by equations (2) and (4).

The next step is to derive the investors' equilibrium strategies, which will determine the equilibrium path of x and hence the equilibrium dynamics of the whole game. Here we describe the findings and provide intuition; the details of the derivation are in Appendix B.

First, in a result that is the dynamic counterpart of part ii of proposition 4, if $(1 - p^*)/a > (1 - \sigma)K/2$ the unique steady state is $x = 0$. For these parameters, the comparative advantage in the N sector is strong enough relative to the government's valuation of contributions so that multiple equilibria do not arise. In this case there would be no reason for the government to commit to free trade if the speed of adjustment were exogenous. So by restricting parameters to satisfy $(1 - p^*)/a > (1 - \sigma)K/2$ for all σ, we can focus sharply on the role of the endogenous speed of adjustment for the value of commitment.

We have a case of ''declining'' industry if at time 0 the allocation of capital is $x > 0$. In this case, the equilibrium path entails continuous exit from the M sector (i.e., declining x) until $x = 0$. The speed at which this process of exit occurs is determined endogenously by the choices of capitalists in the M sector. These capitalists will choose to exit faster the higher the capital gains that can be realized by shifting their capital to the N sector. Such capital gains in turn are higher the less protection they expect to be granted to the M sector. Thus, by decreasing such capital gains, protection of the M sector lowers reallocation expenses, thereby slowing down the rate of exit.

Next, notice that the rate of exit under free trade is the socially optimal one, so protection of the M sector causes a suboptimally low rate of exit. In the case $\sigma = 0$, the government does *not* get compensated for this welfare loss because protection at time t does not affect the rate of exit, since the capital gains associated with exit from the M sector depend on the *future* levels of protection. Therefore, the government is not compensated for the distortion in the rate of exit, and hence it prefers to commit to free trade at time 0.

On the other hand, if σ is close to one, net returns to capital in the M sector are close to their free-trade level (as in Sec. III), and so are the capital gains associated with exit. Therefore, if σ is close to one, the speed of adjustment is close to the welfare optimum, and since the government extracts sizable rents from the political process, it will not want to commit to free trade. Intuitively, the government will commit to free trade only if σ is lower than a critical level, as in proposition 1. This result is shown formally in Appendix B.

The analysis of this section has pointed out that the presence of declining industries *may* provide incentives for a government to commit to free trade. A natural question is, Does the model have anything to say about the widespread use of escape clauses and safeguard actions, which are granted to troubled industries in many trade agreements? First, it should be noted that such exceptions to free trade vary greatly across sectors. For example, sectors such as textiles and agriculture tend to receive a more lax treatment than others (e.g., in NAFTA they are the only sectors that are granted safeguards). A broad interpretation of the model suggests that if a government is able to negotiate sectoral exceptions to free trade, it will seek exceptions for those sectors in which the resource misallocation (and for declining sectors, the distortion in the speed of adjustment) is small compared to the rents that it derives from the interaction with lobbies. Second, our model examines a government's *demand* for commitment to free trade; therefore, an alternative interpretation of the observed exceptions to free-trade agreements is that the international organization may not be strong enough to enforce free trade under all circumstances. It is conceivable, for example, that NAFTA grants fewer exceptions than the WTO because enforcement in NAFTA is more effective. This interpretation is consistent with existing theories that explain safeguards as a way to alleviate a government's incentive to cheat in periods in which such an incentive is higher, if the agreement is not perfectly enforceable (see Staiger [1995] for a comprehensive discussion of these theories).

VI. Extensions and Conclusion

In this paper we have argued that a government may want to commit to free trade in order to foreclose domestic political pressures, even though this implies forgoing political contributions from the lobbies. We have identified three related but distinct reasons why a government may want to commit to staying out of the political process. The common aspect is that committing to free trade prevents a distortion in the allocation of resources for which the government may not get compensated by lobbies (unlike price distortions); this benefit may outweigh the cost of committing to a free-trade agreement, which is given by the rents that the government derives from the political process. The distortion in the allocation of resources may entail overinvestment of resources in a politically organized sector (as in Sec. III), it may involve a ''bad'' equilibrium in which there is investment in a sector that would not be active under free trade (as in Sec. IV), or it may take the form of an inefficiently slow

rate of exit in an industry hit by an adverse shock (as in Sec. V). A limit of the analysis is that it focuses separately on these different kinds of industries rather than combining them in a multisector model. Still, we think that something can be learned from this analysis on how industries with different characteristics create incentives, or disincentives, for a government to join a free-trade agreement.

There are several assumptions in our model that merit discussion. We have implicitly assumed that free-trade agreements are the only way for governments to sustain free trade. But there are of course other possibilities. In particular, if the game among investors, the lobby, and the government is repeated indefinitely, free trade can be sustained if investors react to past protection by forming expectations of future protection; if players' discount rates are low enough, reputational mechanisms of this kind may provide the government with incentives to maintain free trade. However, there is no guarantee that agents will form expectations in this particular way, and a repeated game would admit a plethora of ''bad'' equilibria along with the free-trade equilibrium. Commitment to free trade via international agreements may still be valuable here, even if discount rates are low, since it can remove all ''bad'' equilibria (which is akin to the point we make in Sec. IV).

The model allows for only one industrial lobby. In a more general multisector, multilobby model, the outcome would depend critically on the intensity of political competition among lobbies: more intense political competition would imply larger rents for the government and a lower likelihood of joining the free-trade agreement.[13] Broadly interpreted, the basic prediction of our model should carry over to this setting, in the sense that the incentive to commit to free trade should be higher if the resource misallocation problem is more severe relative to the rents that the government extracts from the political process.

We have restricted our analysis to trade agreements involving zero tariffs. If the government could commit to an arbitrary tariff binding, results would change in interesting ways. If the government has no bargaining power ($\sigma = 0$), then it will choose to commit to a zero tariff, because a positive tariff binding would lead to an allocation distortion without generating any rents for the government. If, on

[13] Political competition among lobbies can stem from two sources: First, factor owners in a given sector will push for lower protection in all other sectors because as consumers they are interested in lower prices; second, intermediate-good and final-good lobbies will have conflicting interests regarding protection of the intermediate goods. Levy (1993) also argues that in a two-country world, if export instruments are not available, exporting groups will lobby against importers' groups, in favor of trade liberalization.

the other hand, the government is able to extract rents from the lobby ($\sigma > 0$), it will prefer to commit to a positive tariff binding, although lower than the no-commitment tariff. The reason is that granting a little protection causes a second-order welfare loss, whereas it generates a first-order increase in the government's rents. A nontrivial question, which we do not address here, is whether the optimal commitment tariff would be monotonic in σ.

For a large country, the government's trade-off would be more complex than in the small-country model examined here. Since a large country has an incentive to impose tariffs for terms-of-trade reasons, there is an additional cost in joining a free-trade agreement, since this implies giving up the ability to manipulate the terms of trade. On the other hand, there are two additional effects that could push in either direction. First, in a large country, import tariffs tend to be higher and export subsidies lower than in a small country; thus capitalists will tend to overinvest in importing sectors. This distortion may reinforce or mitigate the distortion that arises in a small country, depending on which sectors are politically organized. Second, in a large country the threat point in the government-lobby negotiations is endogenous to the capital allocation (since the optimal tariff that the government would choose in the absence of the lobby depends on x), in contrast to a small country. This would introduce subtle additional effects, the sign of which is hard to assess a priori. A full analysis of trade agreements in a two-country world would be an interesting task for future research.

Another important extension of the model would be to allow for lobbying at the time the government is presented with the option to commit ($t = 0$). In this case, a lobby could promise a one-shot contribution conditional on the government's rejection of the free-trade agreement. The lobby's contribution would have to compensate the government for the long-term losses of not committing to free trade. This extension would tend to change results in the direction of shrinking the parameter ranges for which the government desires to join the free-trade agreement. However, the impact of ex ante lobbying against the agreement may be limited by a number of factors: (i) Since capital can be reallocated between sectors in the long run, owners of capital *currently* in the sectors threatened by the trade agreement will not be willing to pay very much to maintain the option of *future* protection. (ii) If new goods and sectors can emerge in the future, the lobbies that will represent those sectors are not around when the government decides whether to join the free-trade agreement, and hence they cannot influence this decision. This can be said both for industries that will emerge in the future because of product innovations and for industries that are

currently inactive but could spring up tomorrow if expectations change (i.e., if a different equilibrium emerges, as in Sec. IV). (iii) A lobby may not be able to compensate the government for the present value of long-term losses through a one-shot contribution, for example if it is liquidity constrained.

Appendix A

Let us first check whether $G(a)$ is increasing or decreasing in a right neighborhood of $a = 0$. Note first that $G'(a) = -w_x(p^*, \hat{x}(a))\hat{x}'(a) - \sigma a\hat{x}(a) - \sigma a^2\hat{x}(a)\hat{x}'(a)$. Using the facts that $\hat{x}(0) = x^*$ and $w_x(p^*, x^*) = 0$, we have $G'(0) = 0$. Turning to the second derivative, one finds

$$G''(0) = -w_{xx}(\cdot)\frac{(1-\sigma)^2 x^{*2}}{4(\pi_N')^2} - \sigma x^*,$$

using $\hat{x}'(a) = (1-\sigma)\hat{x}/[2\pi_N' - (1-\sigma)a]$, which is found by implicitly differentiating the condition that defines $\hat{x}$. Since $w_{xx} < 0$, we clearly have $G''(0) > 0$ if σ is close to zero and $G''(0) < 0$ if σ is close to one. Therefore, if σ is relatively small, $G(a)$ is increasing in a right neighborhood of $a = 0$; if σ is relatively high, $G(a)$ is decreasing.

Next we argue that, for a fixed level of $\sigma > 0$, when a is high enough, $G(a)$ is negative. To see this, note that if a is higher than some critical level, then $\hat{x}(a) = K$, and hence $\hat{x}'(a) = 0$. This immediately implies that for a high enough, $G'(a)$ becomes negative and bounded away from zero, so $G(a)$ must turn negative. This is sufficient to conclude that if σ is positive and relatively small, $G(a)$ is nonmonotonic, reaching a maximum for some level of a and then turning negative. To show that if σ is high $G(a)$ is decreasing, notice that for σ close to one, $\hat{x}(a)$ is close to x^* for all a. Therefore, $w_x(p^*, \hat{x}(a))$ is small, and hence $G'(a) < 0$ for all a.

Appendix B

Here we formally derive the results of Section V. Let $V^N(x)$ and $V^M(x)$ be the values of a unit of capital in the N and the M sectors, respectively, and let $\Delta V(x) \equiv V^M(x) - V^N(x)$. Since each investor is small, he disregards the effects of his decisions on the path of x. Capitalists in the N sector then choose γ to maximize $\gamma I_+(\Delta V(x)) - (\gamma^2/2)$, where $I_+(z) = z$ if $z > 0$ and zero otherwise; that is, they maximize expected capital gains minus reallocation expenses. Capitalists in the M sector maximize $\gamma I_+(-\Delta V(x)) - (\gamma^2/2)$. This yields

$$\gamma_N(x) = I_+(\Delta V(x)) \tag{B1}$$

and

$$\gamma_M(x) = I_+(-\Delta V(x)). \tag{B2}$$

To complete the equilibrium conditions, it remains to determine the dy-

namics of ΔV. Let $\dot{V}^j = (d/dt)V^j(x(t))$, $j = N, M$. Then the following no-arbitrage conditions must hold along an equilibrium path:

$$1 - \frac{[\gamma_N(x)]^2}{2} + \dot{V}^N + \gamma_N(x)I_+(\Delta V) = rV^N$$

and

$$\tilde{p}(x) - \tilde{c}(x) - \frac{[\gamma_M(x)]^2}{2} + \dot{V}^M + \gamma_M(x)I_+(-\Delta V) = rV^M.$$

These no-arbitrage conditions state that the returns to capital plus the capital gains (which are the sum of the rate of change of the value of capital plus the expected gain arising from reallocating capital to the sector in which capital is better valued) must be equal to the real interest rate (we assume that there is costless access to the world capital market, where the real interest rate is constant and equal to r) times the value of capital. From (B1) and (B2), these no-arbitrage conditions become, respectively,

$$1 + \dot{V}^N + \frac{[I_+(\Delta V)]^2}{2} = rV^N \tag{B3}$$

and

$$\tilde{p}(x) - \tilde{c}(x) + \dot{V}^M + \frac{[I_+(-\Delta V)]^2}{2} = rV^M. \tag{B4}$$

Combining these two equations, we obtain the following law of motion for ΔV:

$$\Delta\dot{V} = r\Delta V + 1 - [\tilde{p}(x) - \tilde{c}(x)] - \frac{[I_+(-\Delta V)]^2}{2} + \frac{[I_+(\Delta V)]^2}{2}. \tag{B5}$$

From equation (10) we then get the following law of motion for x:

$$\dot{x} = \begin{cases} x\Delta V & \text{if } \Delta V < 0 \\ 0 & \text{if } \Delta V = 0 \\ (K - x)\Delta V & \text{if } \Delta V > 0. \end{cases} \tag{B6}$$

A trajectory in $(x, \Delta V)$ space is an equilibrium if it satisfies the system of differential equations (B5) and (B6) subject to the conditions that (a) $x(0) = x_0$ and (b) ΔV remains bounded as $t \to \infty$.

The assumption $(1 - p^*)/a > (1 - \sigma)K/2$ for all σ implies $p^0(x) > \tilde{p}(x)$, or $1 > \tilde{p}(x) - \tilde{c}(x)$ for all x and all σ. A simple phase diagram analysis shows that the only equilibrium path entails exit from the M sector ($\dot{x} < 0$) until $x = 0$. Such a path then entails $\Delta V < 0$, with $V^N = 1/r$. Therefore, along the equilibrium path, only the owners of capital currently in the M sector invest resources to reallocate their capital, choosing $\gamma_M = -\Delta V$. The equilibrium law of motion for x and V^M is then determined by the following system of differential equations:

$$\dot{x} = \left(V^M - \frac{1}{r} \right) \cdot x \tag{B7}$$

and

$$\dot{V}^M = rV^M - [\tilde{p}(x) - \tilde{c}(x)] - \frac{[V^M + (1/r)]^2}{2}. \tag{B8}$$

Next we derive the rate of exit under commitment to free trade. Let V_c^M denote the value of a unit of capital in the M sector under commitment to free trade. Then the no-arbitrage condition in this case implies

$$\dot{V}_c^M = rV_c^M - p^* - \frac{[V_c^M - (1/r)]^2}{2}. \tag{B9}$$

We now show that $V^M > V_c^M$ along the equilibrium path, unless $\sigma = 1$, in which case $V^M = V_c^M$. Let us rewrite equations (B8) and (B9) as

$$\dot{V}^M = h(V^M) - [\tilde{p}(x) - \tilde{c}(x)] - \frac{1}{2r^2} \tag{B10}$$

and

$$\dot{V}_c^M = h(V_c^M) - p^* - \frac{1}{2r^2}, \tag{B11}$$

where $h(y) = [r + (1/r)]y - (y^2/2)$. First notice that, from (B10) and (B11), V^M and V_c^M must assume the same value at the steady state (since $\tilde{p}(0) - \tilde{c}(0) = p^*$). Since V^M and V_c^M are both lower than $1/r$ for $x > 0$, $h(\cdot)$ is increasing in the relevant range. Next, suppose by contradiction that $V^M < V_c^M$ along the equilibrium path. Since $\tilde{p}(x) - \tilde{c}(x) > p^*$ for all $x > 0$ if $\sigma < 1$, from (B10) and (B11) we have $\dot{V}^M < \dot{V}_c^M$ for all $x > 0$. But the conditions $V^M < V_c^M$ and $\dot{V}^M < \dot{V}_c^M$ contradict the fact that in equilibrium V^M and V_c^M converge to the same value as $t \to \infty$. If $\sigma = 1$, we have $\tilde{p}(x) - \tilde{c}(x) = p^*$ for all x, which immediately implies $V^M = V_c^M$.

Equation (B7) then implies that the rate of exit is slower in the political equilibrium than under commitment to free trade, and since (it can be shown that) the rate of exit under free trade maximizes welfare, the equilibrium rate of exit is suboptimally low. Next, notice that (i) if $\sigma = 0$, the government is worse off than under commitment to free trade since it derives no rents and welfare is lower; and (ii) if $\sigma = 1$, there is no distortion in the speed of adjustment, and since the government derives rents from the political process, it chooses not to commit to free trade. By a continuity argument, then, the government prefers commitment to free trade only if σ is below some critical level, whereas the opposite occurs for σ close enough to one.

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