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WHY GOVERNMENTS ENTER TRADE AGREEMENTS

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Abstract

This paper offers an explanation for why a government of a small open economy may want to enter a trade agreement in a dynamic political economy setting. Based on a result that lobbying game equilibrium policies may lead to a sub-optimal industry structure for a government, the paper explores the possibility that a trade agreement can be used by a government to shift resources in the direction desired by the government. In doing so, the paper suggests a possibility that trade liberalization may be explained by industry-structural motivations. Also examined is the optimal levels of tariff/subsidy a government would be willing to agree to in an international trade agreement.

1. Introduction

The question of why countries enter trade agreements, more specifically why the trading system has been liberalized, has been widely studied. Three main streams of literature exist on this question. The classic view which is based on the work of Johnson (1953-54) holds that the reason countries enter trade agreements is to avoid terms-of-trade prisoners' dilemma.[1] Governments are motivated to join the trade agreements by the desire to avoid aggregate welfare losses that arise from retaliatory tariff impositions. A second stream of literature stresses time-inconsistency problems as the reason for trade agreements[2]. In this case, if an optimal trade policy lacks credibility due to time-inconsistency problems and domestic institutions cannot provide a desired commitment, international trade agreements may serve as a commitment device and restore the credibility of the optimal trade policy. A more recent literature stresses political aspects of trade agreements. This literature views the features of international trade agreements as the outcomes of political processes. Recent examples which use politics to explain trade agreements include Grossman and Helpman (1995), Hillman and Moser (1995), Levy (1997).

Over the last few decades the world trading system has witnessed progressive declines in general levels of protection through international trade agreements. At the same time, governments exercise protectionist trade policies. A large country may want to join multilateral trade agreements to avoid the terms of trade externality. For a small country, however, terms-of-trade argument does not apply because a small country cannot influence terms-of-trade. If a government is social-welfare maximizer, trade theory says that the best policy for a small country is free trade. However, free trade is rarely observed. This observation is consistent with political economy models that argue governments subject to political pressure from lobby groups for protection collect political contributions by granting protection rather than moving to freer trading regime. However, this conclusion is contrary

[1] See Bagwell-Staiger (1999) for a recent analysis of this issue.
[2] See for instance, Staiger-Tabellini (1987) and Tornell (1991).

to the observed liberalization process over the last few decades. Maggi and Rodriguez-Clare (1998) develop a model in which a politically motivated government of a small country wants to join trade agreements. They argue that governments enter trade agreements to distance themselves from lobby group pressure. They point out two parameters that influence government's decision to enter the trade agreements: the bargaining power of a lobby group and the government's valuation of contribution relative to social welfare.[3] In their paper, a government may commit to free trade in order to foreclose political pressures and forgoes political contributions. Even though this story may apply to some countries[4], it is hard to think that all the countries who joined trade agreements did so in order to abandon politics. It is also generally accepted that politics play important roles in determining trade policies.[5]

So, on the one hand, political economy suggests desires for a government of a small country to exercise protectionist trading regime. On the other hand, small countries have joined trade agreements and liberated their trade policies. This paper develops a political economy model that reconciles this seemingly contradictory feature of political economy and the observed trade liberalization. Industry structure consideration combined with a policy scheme consistent with obligations under the trade agreements is all that is needed.

Lee (2002) shows that, in a Grossman-Helpman type of lobbying game, resources (capital) may move to steady-state industry structure where government utility may not be at its highest achievable. This possibility of sub-optimal industry structure, absent of other policy device, forms the basic motive for a government to join trade agreements. When

[3] They suggest that a government would enter free trade agreements if their bargaining position is weak compared to that of lobby groups. In other words, a government may want to commit to free trade in order to foreclose political pressures and forgo political contributions if the government cannot be compensated for the costs of a distortion in the allocation of resources caused by protections due to its weak bargaining position.

[4] For example, it has been suggested that the reason for Mexican government to join NAFTA was to avoid domestic political pressures and to use the trade agreement as a commitment device for economic policy reform.

[5] See, for example, Baldwin and Magee (1998) for an empirical study as to how politics influence voting on trade issues.

an economy would evolve to a sub-optimal industry structure, a government would want to shift resources to an industry structure where the government can achieve higher utility. Grossman-Helpman type lobbying game with the policy instruments of tariffs and subsidies, however, may not achieve this outcome because when a government chooses protection levels given contribution schedules, resources may move away from the industry structure that is most preferred by the government. This brings up the question of whether a government can use trade agreements in order to move capital in the direction it wants. If the trade agreements can shift resources in the direction that is utility improving for the government, then the government will be willing to enter the trade agreements. This paper shows that, by adopting a policy scheme which corresponds to obligations required by trade agreements, a government can manipulate steady-state industry structure. This role of the trade agreements can explain motives for the trade agreements and trade liberalization. Political situations that may differ in each country can explain different levels of protection countries agree to in trade negotiations. It is possible that for some governments zero tariff may be the optimal choice and those governments would argue for free trade. For some other governments, some positive tariffs may be optimal.

This paper does not address reciprocal trade agreements[6] such as WTO or how international trade negotiations are conducted. Instead, attention is restricted to incentives of a government of a small country to enter trade agreements and if so, what forms its trade policies may take. The political structure of the paper is lobbying game based on Grossman and Helpman (1994). But, it is modified to allow for the possibility of entering trade agreements.

The paper suggests two main findings. First, in the lobby game setting, there is a role for policy commitment via trade agreements. The suggestion by some political pressures models that a politically motivated government would not move to a freer trading regime can be altered if we consider the dynamics of capital relocation and the optimal industry

[6]Hillman-Moser (1995) considers this issue for a small country.

structure for the government. In a situation where political equilibrium without trade agreements generates trade policies that lead the economy to sub-optimal industry structure from government's perspectives, the trade treaties are shown to provide the government a way to shift resources to the industry structure more preferred by the government. Second, sizes of lobby groups play a critical role in determining the optimal trade policies the government is willing to agree to in international negotiations.

The sequence of events is as follows. In the initial period, levels of protection are determined by a lobbying game as in the sense of Grossman-Helpman. Given the initial conditions, a government has an option of entering trade agreements in the second period. If the government does not enter the trade agreements, Grossman-Helpman type of lobby game continues in the following periods. If the government enters the trade agreements, it can implement levels of protection as long as they comply with the trade agreements. If the government does not enter the trade agreements, the mobile capital relocates depending on the first period rents and the anticipated rents in the next period which is determined by the lobbying game. If the government does enter the trade agreements, then the mobile capital owners make location decision based on the agreed trade protection.

The paper is organized as follows. The basic model is presented in Section 2. Next section establishes the concept of equilibrium when a government faces a constraint on protection level of one industry. In Section 4, the value of trade agreements is discussed for two-period case. Conclusion follows.

2. The Model

Consider a small open economy with three industries, an import-competing (m), an export (x) and a numeraire industry(o), and two types of agents, workers and capital owners. Each worker is endowed with l units of labor and each capital owner with k units of capital. The size of the population is normalized to one. The fraction of capital owners is denoted κ. The numeraire good, y_o, is produced with a constant returns to scale technology using

only labor. Labor is assumed to be supplied inelastically and is completely mobile across industries, so that the wage can be set to one.

The import-competing and the export industries produce y_m and y_x, respectively, using both capital and labor. Some of capital is assumed mobile across industries in the long run while there is some other capital that has no mobility (sunk capital). As fractions of population, let α_{js} be the number of owners of sunk capital and α_{jn} the number of mobile capital owners in $j = \{m, x\}$. Firms in the industry m and x are assumed identical with the measure of firms in each industry fixed initially. The total measure of the two industries is normalized to 1. Let s be the fraction of firms in the import-competing industry and $(1-s)$ be that of the export industry. Since all the firms are identical, s and $(1-s)$ also represent the fractions of capital used in the industries. The production function of firms in each industry is assumed given by:

$$y_j = K_j^{\frac{1}{2}} L_j^{\frac{1}{2}} \qquad j = m, x.$$

Therefore, the output in each industry can be expressed as:

$$\begin{aligned} y_m(p_m) &= \delta_m p_m s \\ y_x(p_x) &= \delta_x p_x (1-s) \end{aligned} \tag{1}$$

where p_j denotes the domestic price of good j and $\delta_m = \delta_x = \frac{1}{2}K$.

The world price of the import and export goods are denoted by p_m^w and p_x^w, respectively. Producer surplus in each industry is given by:

$$PS_j \equiv \Pi_j + PS_j^w \tag{2}$$

where PS_j^w is the producer surplus at the world price and Π_j is the additional producer surplus if the domestic price is different from the world price.

Consumers have identical additively separable preferences given by:

$$U = c_o + u_m(c_m) + u_x(c_x) \tag{3}$$

where c_j is the consumption of good j and $u_j(\cdot)$ is assumed differentiable, increasing and concave. The demands are assumed to be linear in prices: $d_m(p_m) = \beta_m - \epsilon_m p_m$ and $d_x(p_x) = \beta_x - \epsilon_x p_x$ where $\beta_j, \epsilon_j > 0$. Consumer surplus is defined as

$$CS(p_m, p_x) = \sum_{j=\{m,x\}} u_j(d_j(p_j)) - p_j d_j(p_j). \tag{4}$$

The sunk capital owners in the two nonnumeraire industries are organized to form lobby groups while the mobile capital owners benefit from the lobbying effort of the sunk capital owners regardless of the industry they are in. Domestic prices are determined by a lobbying game as in Grossman-Helpman(1994). The differences are: (i) the lobbying game is played for T periods and only the sunk capital owners participate in the lobbying game, and (ii) the possibility of entering trade agreements is allowed. Lobby groups offer truthful contribution schedules to an incumbent government. A Nash equilibrium which is supported by truthful contribution schedules is a truthful Nash equilibrium. A solution to a lobbying game is, then, a truthful Nash equilibrium. Assume that lobby groups cannot commit to future contribution schedules.

Utility of the mobile capital owners depends on the lobbying efforts of the lobby groups and the industry in which their capital is located. Per-period gross welfare of each industry is given by:

$$\begin{aligned} W_j(\mathbf{p}) &= W_j^{lob}(\mathbf{p}) + W_j^{mob}(\mathbf{p}) \\ &= \frac{\alpha_{js}}{\alpha_{js}+\alpha_{jn}} PS_j(p_j) + \alpha_{js}[TR(\mathbf{p}) + CS(\mathbf{p})] \\ &\quad + \frac{\alpha_{jn}}{\alpha_{js}+\alpha_{jn}} PS_j(p_j) + \alpha_{jn}[TR(\mathbf{p}) + CS(\mathbf{p})] \end{aligned} \tag{5}$$

where $\mathbf{p} = (p_m, p_x)$ and $W_j^{lob}, W_j^{mob} \quad j = \{m, x\}$ are welfares of sunk capital owners and mobile capital owners, respectively, $\frac{\alpha_{js}}{\alpha_{js}+\alpha_{jn}}$ and $\frac{\alpha_{jn}}{\alpha_{js}+\alpha_{jn}}$ are the shares of industry j's producers' surplus for the sunk and mobile capital owners. $TR(\mathbf{p})$ is trade revenue given by:

$$TR = \sum_{j=\{m,x\}} \left(p_j - p_j^w\right) \left(d_j\left(p_j\right) - y_j\left(p_j\right)\right). \tag{6}$$

The trade revenue is redistributed equally to the population in a lump-sum fashion.

The mobile capital owners maximize their discounted utility over T periods by choosing an industry to be located in. Since utility of mobile capital owners depends on the industry they are in, they move across industries if it is beneficial. Agents are assumed to have perfect information.

The government's objective is taken to be a weighted sum of political contributions and social welfare:

$$G = \sum_{t=1}^{T} \rho^{t-1} [C_m(\mathbf{p}) + C_x(\mathbf{p}) + aW(\mathbf{p})]_t \tag{7}$$

where C_m, C_x denote contributions from the lobby groups of the two industries, W social welfare and a denotes the value of the social welfare relative to the contributions. The social welfare in each period is the sum of producers' surplus, trade revenue and consumers' surplus: $W = PS_m + PS_x + TR + CS$. The government chooses domestic prices (i.e., levels of protection) of the import and export goods in each period. Policy instruments considered in the model are tariffs and subsidies. Additionally, the possibility of trade agreements for the second period is included. Trade agreements are understood as a collection of rules governing the conduct of trade policy.[7] More specifically, the trade agreements specify limits on levels of protection a government can choose. If the government enters the trade agreements, the choice of domestic prices are constrained by the trade agreements.

[7] To be complete, trade agreements should also specify enforcement mechanism. In this paper, only the aspect of trade agreements which deals with conduct of trade policy is considered.

3. Equilibrium with trade agreements

In the first period, a lobbying game is played and the equilibrium tariff and subsidy are determined. A government has an option of entering trade agreements in the second period. International trade agreements such as GATT (WTO) specify bounds on tariffs and subsidies with an understanding that government policies should not exceed the limits (or ceilings) of the bounds. On the international level, governments negotiate and agree to maximum levels of protection. In the domestic arena, however, the governments may adopt any policy scheme as long as the outcome of the policy scheme does not violate the agreements.

In the first period, a government and lobby groups engage in a lobbying game without any restrictions. In the second period, if a government does not enter trade agreements, it can set trade policies without any restrictions as in the first period. If it does enter trade agreements, the government faces a constraint that policy choices should be within the bounds.

In a dynamic lobbying game setting where some capital is allowed to relocate, the previous chapter points to a possible misalignment of interests between mobile capital owners and an incumbent government, resulting in an undesirable steady-state equilibrium industry structure for the government. An incumbent government who chooses trade policies (tariffs/subsidies) subject to political pressures from lobby groups may find relocation of mobile capital undesirable, but nonetheless unavoidable. In this case, no trade agreements is not a good option for the government. The question is whether, by entering the trade agreements (hence, limiting the choice of possible trade policies), a government can avoid the undesirable outcome outlined above and, if so, how the government may accomplish that.

Consider the following domestic trade policy scheme. A government chooses an industry whose maximum level of protection is to be strictly enforced as agreed in trade agreements and the other determined without any restriction, i.e., an equilibrium policy can be anything as long as it is within the bound for the industry chosen and that of the other industry can

be anything. In other words, a lobbying game equilibrium price of good j faces a constraint

$$p_j \leq \overline{p}_j \tag{8}$$

and equilibrium price of the other good faces no constraint. So, a lobbying game with this policy scheme is restricted in the sense that there is a limit placed on good j's domestic price. Adopting the policy scheme gives a government an option to choose protection levels different from those that will be determined by a lobbying game without the trade agreements.

The price p_j the government may choose has a ceiling of $\overline{p}_j$ which is the maximum domestic price level (hence, maximum level of protection) of industry j allowed by the trade agreements. Assume that the price $\overline{p}_j$ must not be higher than the initial domestic price level which is determined in a lobbying game equilibrium. That is to say that when a government enters trade agreements, it is not allowed to increase protection levels over the previous levels. This may be thought of as a condition for accession. If a tariff rate is chosen, the ceiling would be the limit specified by the trade agreements which government signs. In this lobbying game, unlike the lobbying game where lobby groups announce their contribution schedules and a government chooses protection levels given the contribution schedules without restrictions, the government faces a constraint on tariff (or subsidy) level. Hence, a different equilibrium of the lobbying game is necessary. We need to establish equilibrium prices when government's choice of levels of protection faces a constraint. The equilibrium in this lobbying game is established in the following proposition.

Proposition 3.1. *Suppose at some industry structure s, a truthful unrestricted Nash equilibrium is $\left(\left\{C_j^o\right\}_j, \mathbf{p}^o\right)$. If a government faces a constraint on choice of price of one good, $p_j \leq \overline{p}_j$, and allows the other price p_i to be determined by the lobby game, i.e., $\overline{\mathbf{p}} = \left(\overline{p}_j, p_i\right) \neq \mathbf{p}^o$, then $\left(\left\{\overline{C}_j\right\}_j, \overline{\mathbf{p}}\right)$ can be implemented as an equilibrium with truthful*

contribution schedules $\left\{\overline{C}_j\right\}_j$ *such that*

$$\overline{\mathbf{p}} = \arg\max \left[W_j(\mathbf{p}) - \overline{C}_j(\mathbf{p})\right] + \left[\sum_j \overline{C}_j(\mathbf{p}) + aW\right] \quad \forall\ j \tag{9}$$

and $\frac{\partial G}{\partial p_j} \neq 0$.

Proof. See Appendix 1.

In what follows, the analysis will be done for the case in which a tariff constraint is enforced by an incumbent government. A similar analysis can be done for subsidy. Suppose a government faces a tariff ceiling on the imported good, say $\overline{p}_m$. The proposition above says that in a lobbying game, price of import good can be determined with $\overline{p}_m$ as a binding constraint and the equilibrium price of export good, p_x^e, is determined as a solution to the following:

$$\begin{aligned}
\partial_x \overline{C}_m(\overline{p}_m, p_x^e) + \partial_x \overline{C}_x(\overline{p}_m, p_x^e) + a\partial_x W(\overline{p}_m, p_x^e) &= 0 \\
\partial_x W_x^{lob}(\overline{p}_m, p_x^e) + \partial_x \overline{C}_x(\overline{p}_m, p_x^e) + a\partial_x W(\overline{p}_m, p_x^e) &= 0 \\
\partial_x W_m^{lob}(\overline{p}_m, p_x^e) + \partial_x \overline{C}_m(\overline{p}_m, p_x^e) + a\partial_x W(\overline{p}_m, p_x^e) &= 0
\end{aligned} \tag{10}$$

Solving the first order conditions gives the equilibrium price of the export good as:

$$p_x^e = \frac{p_x^w(\epsilon_x + \delta_x(1-s))}{\epsilon_x + \delta_x(1-s) - A_x\delta_x(1-s)} \tag{11}$$

where $A_x = \frac{\left(\frac{\alpha_{xs}}{\alpha_{xs}+\alpha_{xn}} - \alpha_{ms} - \alpha_{xs}\right)}{(a+\alpha_{ms}+\alpha_{xs})}$. Note that the equilibrium price of the export good, p_x^e, with the constraint is the same as p_x^e without the constraint for the same s. Note that p_x^e decreases in s.[8] When a constraint on tariff is enforced, the path and the magnitude of the equilibrium export price are the same for given s with or without trade agreements.

[8] This holds for the opposite case. If the restriction is on export good, the equilibrium price of imported good is determined by: $p_m^e = \frac{p_m^w(\epsilon_m+\delta_m s)}{\epsilon_m+\delta_m s - A_m\delta_m s}$ which decreases in s.

What may be different is the price of the import good. To distinguish this lobbying game equilibrium from the one without the trade agreements, let's call this equilibrium restricted equilibrium and the equilibrium without the trade agreements unrestricted equilibrium.

4. Value of trade agreements in two-period game

Proposition 3.1 says that when a government chooses one good whose price is subject to trade agreements and let the other price be determined by a lobbying game, there are truthful contribution schedules that implement the prices as an equilibrium even though the prices are different from the unrestricted equilibrium prices. Now, the question is whether a commitment to the trade agreements can be of any use for a government and if so, what is the optimal bound on tariff the government is willing to agree to. This section demonstrates why a government may want to bind itself to trade agreements by showing that the government can use the trade agreements to shift resources to an industry structure more preferred by the government. Also discussed is the optimal choice of the protection the government may want to bind itself to.

Let's consider a two-period game without adjustment costs. At the initial period, an industry structure is given, say s_1, and domestic prices are determined by the unrestricted lobbying game. Then, the government announces it will enter trade agreements that restrict the levels of protection the government can choose. The mobile capital owners, then, make location decision based on the restriction imposed by the trade agreements and the anticipated price of the export good. Since the price vector in the second period may be different from the price vector that would have been chosen without the trade agreements, the amount and the direction of relocation with the trade agreements can be different. This affects overall government utility. If the overall utility improves with the trade agreements, the government will be willing to enter the trade agreements. If there is no possibility to improve its utility, the government would not want to enter the trade agreements. In other

words, a government will enter the trade agreements if

$$G_1 + \rho G_2\left(\overline{s}_2\right) > G_1 + \rho G_2\left(s_2\right) \tag{12}$$

where $\overline{s}_2$ is the second period industry structure with the trade agreements and s_2 is the industry structure without the trade agreement. Otherwise, the government would not want to enter the trade agreement.

Since the initial period government utility is determined by a given initial industry structure, the total government utility depends on the second period industry structure. Mobile capital owners choose an industry to locate in based on the difference in rents they get (i.e., prices of the two goods). A government can influence the location decision and, hence, the second period industry structure with the choice of the second period prices of the two industries. Therefore, if trade agreements allow the government to choose the levels of protection that will induce the mobile owners to locate where the government wants, then the government will enter the trade agreements.

4.1. Relocation in two-period game

It is useful to find out how the choice of $\overline{p}_m$ influences location decisions of the mobile capital owners, and hence the second period industry structure. For simplicity, assume that world prices are identical. The relocation depends on the difference in return to unit capital given as

$$DGWC = \frac{\Pi_m}{s} - \frac{\Pi_x}{(1-s)} \tag{13}$$

Let's consider a case where $DGWC\left(s_1\right) > 0$. Without trade agreements, the industry structure reaches a second period steady-state industry structure s_2 of the unrestricted lobbying game. At this industry structure, an unrestricted equilibrium price vector (p_{m2}, p_{x2}) is determined. When the prices are set differently from (p_{m2}, p_{x2}), the amount of relocated capital is different from θ $(= s_2 - s_1)$.

In the two period game with no adjustment costs, the industry structure reaches the steady-state level in the second period. At the steady-state level, the domestic prices of the import-competing and the export industry goods are identical. To see this, note that at the steady-state level, $\frac{\Pi_m}{s} - \frac{\Pi_x}{1-s} = 0$. Rewriting, one gets $\frac{1}{2}\delta_m(p_m - p_m^w)(p_m + p_m^w) - \frac{1}{2}\delta_x(p_x - p_x^w)(p_x + p_x^w) = 0$. Since $\delta_m = \delta_x$ and $p_m^w = p_x^w$, we have $p_m^2 - p_x^2 = 0$, i.e., the domestic prices are the same. Hence, whatever $\overline{p}_m$ is imposed by a government, the relocation in the second period ends at the industry structure at which p_{x2} is equal to $\overline{p}_m$. If $\overline{p}_m \neq p_{m2}$, then the second period steady-state industry structure will be different from that of the unrestricted lobbying game.

4.2. Does a government want to enter trade agreements

To determine the value of trade agreements, evaluate the government utility in the neighborhood of the unrestricted equilibrium price vector (p_{m2}, p_{x2}). This is written as:

$$\frac{\partial \phi_2}{\partial s_2}\frac{\partial s_2}{\partial \overline{p}_m} + \frac{\partial \phi_2}{\partial \overline{p}_m} \quad \text{at } \overline{p}_m = p_{m2} \text{ and } p_{x2} \tag{14}$$

where ϕ_2 is the level of indirect objective function of government utility at period 2. Note that $\frac{\partial \phi_2}{\partial \overline{p}_m} = 0$, and $\frac{\partial s_2}{\partial \overline{p}_m} > 0$ because increasing $\overline{p}_m$ from p_{m2} increases s_2 and decreasing $\overline{p}_m$ from p_{m2} decreases s_2. Suppose that at s_2, $\frac{d\phi}{ds} < 0$, i.e., the government utility is decreasing in s at s_2. Then, increasing $\overline{p}_m$ will lead to a decrease in the government utility because an increase in the steady-state level decreases the government utility (i.e., $\frac{\partial \phi_2}{\partial s_2} < 0$). On the other hand, decreasing $\overline{p}_m$ leads to an increase in the government utility because a decrease in the steady-state level increases government utility. If, however, $\frac{d\phi}{ds} > 0$ at s_2, an increase in $\overline{p}_m$ improves the government utility while a decrease in $\overline{p}_m$ reduces the government utility.

In other words, locally around the unrestricted equilibrium steady-state industry structure, a government who anticipates resources will relocate to a point where its utility is still declining in s may want to commit to trade agreements that set a limit on tariffs which are

lower than they would have been without the agreements, so that relocation does not go as far as it would have. It suggests that a government may want equilibrium prices that are different from the unrestricted equilibrium prices.

The analysis above is illustrative rather than definitive in that value of a trade agreement is evaluated at (p_{m2}, p_{x2}), i.e., it is a local phenomenon. We need more definitive analysis. Recall that in the restricted lobbying game, an equilibrium tariff rate should be within a bound while equilibrium subsidy faces no such constraint. Consider Figure 1 that depicts the paths of equilibrium prices in the unrestricted lobbying game.

An initial industry structure is given at $s_1^{(1)}$. Suppose a government agrees to a bound on tariff: $p_m \leq (a)$. The mobile capital owners in the import-competing industry, knowing that the maximum p_m is (a) and the equilibrium subsidy (hence, price) follows the path shown in Figure 1, will move to the export industry until $\overline{s}$ is reached. Relocation does not stop short of $\overline{s}$ because the equilibrium p_x is still higher than the maximum p_m. Relocation does not continue further than $\overline{s}$ because the equilibrium p_x would be less than (a) and lobbying game will drive up the price of the import-competing good to (a).[9] At $\overline{s}$, a restricted lobbying game equilibrium is (a) and p_x which is equal to (a). Hence, $\overline{s}$ is the second period steady-state industry structure and (a) is the binding constraint. If the ceiling on the tariff bound is higher, then the second period steady-state is bigger than $\overline{s}$, and vice versa. Note that given the initial industry structure $s_1^{(1)}$, the second period steady-state can not be more than the unrestricted equilibrium steady-state s^s. Even when the ceiling on tariff is higher than (b), the mobile capital does not move past s^s. It it does, equilibrium p_x is higher than p_m that import-competing industry lobby is willing to lobby for. The tariff bound a government agrees and enforces is a binding constraint[10] and determines the second period steady-state. Hence, whatever the tariff ceiling $\overline{p}_m$ is agreed and imposed by the government,

[9] In the unrestricted lobbying game the import-competing industry lobby is willing to lobby a government for a protection higher than $\overline{p}_m$. Hence, the lobby group lobbies the government and drives p_m up to the maximum level allowed by the constraint.

[10] That is as long as the ceiling is no more than (b).

the relocation ends at the industry structure where $p_{x2} = \overline{p}_m$ and it cannot be bigger than s^s.

If a constraint on tariff is enforced, the feasible second period steady-state industry structure is: $s \leq s^s$. When the initial industry structure is bigger than s^s such as $s_1^{(2)}$ in Figure 1, since the tariff ceiling cannot exceed the initial level, the feasible steady-state is: $s \leq s^{(2)}$. By the same argument, if the constraint on subsidy is enforced, the feasible second period steady-state is: $s \geq s^s$.

Also note that if $\overline{p}_m = (b)$, then the restricted and the unrestricted lobbying game yield the same result, and the government's utility will be the same. If $\overline{p}_m \neq (b)$, a government ends up with different steady-state structure from the unrestricted one and may obtain different utility. A government enters trade agreements if, by adopting the policy scheme and manipulating the second period steady-state, it can improve its utility. In order to see if international trade agreements can serve that purpose, define $\phi(s) \equiv G(p_m^e(s), p_x^e(s), s)$ to be the indirect objective function in the unrestricted lobbying game and $\overline{\phi}(s) \equiv G(\overline{p}_m = p_x(s), p_x(s), s)$. So, $\overline{\phi}(s)$ gives the government utility at all the feasible steady-state industry structures[11] since the steady-state industry structure is where the domestic prices are the same. The chapter 1 shows that $\phi(s)$ is convex in s. Hence, by finding the difference, $\overline{\phi}(s) - \phi(s)$, one can figure out the shape of $\overline{\phi}(s)$.

The restricted contribution schedules can be written as:[12]

$$\begin{aligned} \overline{C}_m &= W_x^{lob}\left(\mathbf{p}^{-m}\right) + aW\left(\mathbf{p}^{-m}\right) - \left[\overline{W}_x^{lob}(\overline{p}_m, p_x) + a\overline{W}(\overline{p}_m, p_x)\right] \\ \overline{C}_x &= W_m^{lob}\left(\mathbf{p}^{-x}\right) + aW\left(\mathbf{p}^{-x}\right) - \left[\overline{W}_m^{lob}(\overline{p}_m, p_x) + a\overline{W}(\overline{p}_m, p_x)\right] \end{aligned} \tag{15}$$

[11] Since the feasible steady-state is different depending on which bound a government enforces, one has to consider $\overline{\phi}(s) - \phi(s)$ over a relevant range for a particular policy scheme. For the example, the relevant range of s is: $s \leq s^s$.

If a constraint on subsidy is enforced, $\overline{\phi}(s)$ is defined as $G(p_m(s), p_m(s) = \overline{p}_x, s)$ over $s \geq s^s$.

[12] The equations say that lobby j contributes the difference between what the other lobby and the government can achieve if the lobby j does not participate in the political process and what the other lobby and the government can achieve if lobby j participates. See Grossman and Helpman (1994) for more details.

where $\mathbf{p}^{-j}$ is the price vector when lobby j does not participate in the lobbying game. The difference between $\overline{\phi}$ and ϕ is given by the following[13]

$$\begin{aligned}
\overline{\phi}(s) - \phi(s) &= \left(\overline{C}_m + \overline{C}_x + a\overline{W}\right) - \left(C_m + C_x + aW\right) \\
&= \left(\overline{W}_m^{lob} - W_m^{lob}\right) + \left(\overline{W}_x^{lob} - W_x^{lob}\right) + a\left(\overline{W} - W\right) \\
&= -\left(a + \alpha_{ms} + \alpha_{xs}\right)\left(\overline{TR} + \overline{CS} - TR - CS\right) \\
&\quad - \left(\frac{\alpha_{ms}}{\alpha_{ms} + \alpha_{mn}} + a\right)\left(\overline{PS}_m - PS_m\right)
\end{aligned} \tag{16}$$

where $\overline{TR}$, $\overline{CS}$ and $\overline{PS}_m$ are the trade revenue, consumer surplus and producer surplus in the restricted equilibrium, respectively. The following proposition establishes the possibility that trade agreements can be beneficial for a government.

Proposition 4.1. *A government can increase its utility by complying with trade agreements that set the limit to levels of protection and adopting the policy scheme in equation (8) on tariff rates (or subsidies).*

Proof. See Appendix 2.

The proposition says that there exists some set of $\overline{p}_m$ (or $\overline{p}_x$) which increases the government utility as long as $\overline{p}_m \neq p_m(s^s)$ (or $\overline{p}_x \neq p_x(s^s)$). Next question is what are the optimal ceilings ($\overline{p}_m$ or $\overline{p}_x$) that maximize the government utility. It is the maximum protection a government would be willing to agree to and bind to in international trade negotiations.

4.3. Optimal choice of $\overline{p}_m$

We can get some ideas of what the optimal $\overline{p}_m$ (or $\overline{p}_x$) for government would be by noting that ϕ is convex in s and that $(\overline{\phi} - \phi)$ increases in s for $s > s^s$ (for the case when a

[13] It is assumed that if a lobby does not participate in the lobbying game, the government implements the unrestricted equilibrium, i.e., the price each industry gets is the same in both the restricted and the restricted equilibrium if a lobby does not participate.

constraint on subsidy is enforced), decreases in s for $s < s^s$ (for the case when a constraint on tariff is enforced) with a minimum of zero at s^s.[14] In other words, as s moves away from s^s, the difference $(\overline{\phi} - \phi)$ increases. The optimal tariff ceiling is the one which will shift mobile capital to the optimal steady-state industry structure in the second period. Note that even though only a tariff rate is imposed, the second period optimal subsidy level is simultaneously determined with the second period tariff by $\overline{p}_m = p_{x2}$.

If the optimal steady-state industry structure is the one where all mobile capital is located in export industry, the optimal tariff ceiling is the one which induces all the mobile capital to relocate to the export industry.

Consider Figure 2 that depicts $\overline{\phi}$, ϕ, initial s such that $DGWC(s_1) > 0$, and the paths of the unrestricted equilibrium prices.

Suppose a government enforces a constraint on tariff rate. It is easy to see that the best $\overline{p}_m$ is (f). With $\overline{p}_m = (f)$, mobile capital moves to s_{op} where government's utility is the highest. The price (f) corresponds to the lowest possible equilibrium p_x. Since this price depends on, among other things, lobby memberships of the import-competing and export industries, the lobby memberships are an important factor in determining the optimal tariff ceiling the government is willing to agree to. Hence, depending on political parameters, some governments would be willing to agree to low tariff ceilings (even zero) while others would only be willing to agree to high tariff ceilings. The lowest equilibrium p_x decides the lowest optimal tariff ceiling the government would be willing to agree to. If the lobby memberships are such that the equilibrium subsidy can be as low as zero, then choosing zero tariff as a ceiling in the second period is the best policy for the government. If, on the other hand, zero subsidy is not feasible due to lobby memberships, then the lowest tariff level corresponding to the lowest feasible equilibrium subsidy will be chosen as the ceiling. Since large lobby memberships tend to lead to positive levels of protection, a country which has relatively high lobby memberships would not want to commit to free trade. A country

[14] See the proof of proposition 4.1 in appendix.

with relatively small lobby memberships would be more likely to be willing to commit to free trade.

Next, consider how the equilibrium trade policies change from period 1 to period 2. In Figure 2, the initial equilibrium prices are (g) for export industry and (h) for import-competing industry. The optimal tariff ceiling is (f) and it is also equilibrium p_x at the second period steady-state. It is easy to see that trade policies are liberalized with trade agreements. In short, committing to the trade agreements allows a government to credibly adopt the policy scheme in a way that improves its utility by shifting mobile capital to a more desirable industry structure and at the same time to liberalize its trade policies.

4.4. Implementation

So far, the analysis is focused on finding the optimal ceiling. Now, let's consider how the policy scheme can be implemented and which constraint a government will want to enforce. Governments may use the policy scheme either on tariff or on subsidy. Which scheme governments may want to use depends on where the highest utility can be achieved.

Depending on lobby memberships, the shape of the government indirect objective function indicates that the highest utility can be achieved at an industry structure where all mobile capital is located either in the import-competing industry or in the export industry. In the restricted lobbying game, where the second period steady state ends up depends on which constraint (tariff or subsidy) a government enforces and the ceiling of the constraint. Hence, a government's choice of industry whose constraint on protection is to be enforced depends on where the highest utility may be achieved.

If a government wants to shift all mobile capital to the export industry, then the government would use the scheme on tariff. The government negotiates a constraint on tariff which is equal to the optimal tariff rate and implements this ceiling as a binding constraint. Subsidy rate is determined as an equilibrium outcome of lobbying game. Since $\frac{dp_x}{ds} > 0$, mobile capital will relocate to the export industry until the equilibrium subsidy in the re-

stricted lobbying game is equal to the tariff ceiling, i.e., the government can shift capital to the optimal industry structure and comply with trade agreements as in Figure 2.

If, on the other hand, the optimal industry structure is a steady-state industry structure where all mobile capital is located in the import-competing industry, a government would use the policy scheme on subsidy. The government can implement a ceiling on subsidy equal to the lowest equilibrium tariff. Since $\frac{dp_m}{ds} < 0$, mobile capital will relocate to the import-competing industry until the equilibrium tariff in the restricted lobbying game is equal to the subsidy ceiling. The resulting steady-state industry structure is exactly the optimal industry structure for the government.

5. Conclusion

This paper has argued that commitment to trade agreements can be of use to a politically motivated government by providing the government a way to shift resources to an industry structure which is better for the government than the one which will be resulted from lobbying game equilibrium without the trade agreements. The paper shows that a government that is subject to domestic pressures via political contributions may opt to liberalize its trade policies. The underlying motive is that in the unrestricted political lobbying game, equilibrium policies may lead the economy to a sub-optimal industry structure for the government. In such cases, the government can achieve more preferred industry structure by committing to trade agreements. The incentive for the government to enter trade agreements is different from the arguments that the governments enter trade agreements to distance themselves from domestic political pressures as suggested by Maggi and Rodriguez-Clare (1998). The government does not join trade agreements to distance itself from lobby groups per se or abandon politics. Rather, this model suggests that an incumbent government enters trade agreements in order to move away from a bad political equilibrium (unrestricted equilibrium) to a better political equilibrium (restricted equilibrium). By choosing a policy scheme appropriately and using political competition between lobby groups, the government can

influence the industry structure and still receive political contributions from lobby groups.

The paper has also shown when a government may be willing to agree to free trade agreements and when it is likely to argue for some positive levels of protection in international trade negotiations. The key parameters are the lobby memberships of import-competing and export industries. If a country has relative high lobby memberships, the government of the country would not want to commit to free trade because the free trade may not be politically feasible. On the other hand, it is possible that a nation with relatively small lobby memberships would be willing to agree to free trade.

In the paper, only two-period case is analyzed. In the case of no adjustment costs as assumed in the paper, there are no incentives for the mobile capital owners to relocate after the second period since domestic prices of the two goods are the same. The levels of protection and the industry structure do not change for the following periods. There are some possible extensions of the model. This paper shows that there are unilateral incentives for a small country's government to join trade agreements. Trade negotiations and reciprocity are not considered. In order to better understand trade liberalization process through GATT/WTO characterized by reciprocity, we need to look for reciprocal motives for multilateral trade agreements. The underlying motives for governments to shift resources to a preferred industry structure would remain. With that in mind, we may be able to consider the role of reciprocity. For example, if a government wants to have a big export industry and lowers its tariff rates, market access to a foreign market would be necessary. Reciprocity would come into play as a way to gain an access to a foreign market[15].

Another extension of the model might be the gradualism of a trade agreement. In the model, a trade agreement occur once and there is no more incentive to engage in another one. Given that it took a several GATT rounds to reduce tariff rates, one might wish to develop a model that shows gradual time path to freer trading regime. One possibility is inclusion of adjustment costs in the government utility function. In such a case, time path of

[15]See Hillman-Moser (1995) for market accessibility as a reason for reciprocal trade agreements.

government policies may differ from the one described in the paper because a large amount of relocation leads to large adjustment costs

6.

Appendix

1. Proof of Proposition 3.1

The necessity and sufficiency proof in Bernheim-Whinston implies the condition (9) is the necessary and sufficient condition for the lobby groups. ■

2. Proof of proposition 4.1

1. At $s = s^s$, i.e., $p_m = p_x = \overline{p}_m$, $\overline{\phi}(s) - \phi(s) = 0$ where p_m is the price in the unrestricted equilibrium and $\overline{p}_m$ is the price in the restricted equilibrium. This holds true when a constraint on subsidy is enforced.

2. The derivative of $\overline{\phi}(s) - \phi(s)$ evaluated at s^s is zero.

$$\begin{aligned}
\frac{d\left(\overline{\phi}-\phi\right)}{ds} &= \frac{dp_m}{ds}[(a+\mu)\left\{-\delta_m p_m s-\left(p_m-p_m^w\right)\left(\epsilon_m+\delta_m s\right)\right\} \\
&\quad +\left(\frac{\alpha_{ms}}{\alpha_{ms}+\alpha_{mn}}+a\right)\delta_m p_m s]-(a+\mu)\left(p_m-p_m^w\right)\delta_m p_m \\
&\quad -(a+\mu)\left(p_m-p_m^w\right)\delta_m p_m+\frac{1}{2}a\delta_m p_m^2 \\
&\quad +\frac{d\overline{p}_m}{ds}[(a+\mu)\left\{\delta_m \overline{p}_m s+\left(\overline{p}_m-p_m^w\right)\left(\epsilon_m+\delta_m s\right)\right\} \\
&\quad -\left(\frac{\alpha_{ms}}{\alpha_{ms}+\alpha_{mn}}+a\right)\delta_m \overline{p}_m] \\
&\quad +(a+\mu)\left(\overline{p}_m-p_m^w\right)\delta_m \overline{p}_m-\frac{1}{2}a\delta_m \overline{p}_m^2 \\
&= \frac{dp_m}{ds}[\left(\frac{\alpha_{ms}}{\alpha_{ms}+\alpha_{mn}}-\mu\right)\delta_m p_m s+(a+\mu)\left(p_m-p_m^w\right)
\end{aligned}$$

$$
\begin{aligned}
&(-\epsilon_m - \delta_m s)] - (a+\mu)\left(p_m - p_m^w\right)\delta_m p_m \\
&-\frac{d\overline{p}_m}{ds}[\left(\frac{\alpha_{ms}}{\alpha_{ms}+\alpha_{mn}} - \mu\right)\delta_m \overline{p}_m s + (a+\mu)\left(\overline{p}_m - p_m^w\right) \\
&(-\epsilon_m - \delta_m s)] + (a+\mu)\left(\overline{p}_m - p_m^w\right)\delta_m \overline{p}_m
\end{aligned}
$$

Using $p_m = p_x = \overline{p}_m$ gives

$$
\begin{aligned}
\frac{d\left(\overline{\phi} - \phi\right)}{ds} &= -\left(\frac{d\overline{p}_m}{ds} - \frac{dp_m}{ds}\right)[\left(\frac{\alpha_{ms}}{\kappa s} - \mu\right)\delta_m p_m s \\
&\quad + (a+\mu)\left(p_m - p_m^w\right)\left(-\epsilon_m - \delta_m s\right)]
\end{aligned}
$$

The expression in the square bracket in the right-hand side is zero because it is the first order condition in the unrestricted equilibrium. Therefore, slopes of $\overline{\phi}$ and ϕ are the same at s^s. This holds true when a constraint on subsidy is enforced.

3. Consider slope of $\overline{\phi} - \phi$ when $s \gtrless s^s$.

   (a) Suppose $s < s^s$, i.e., $\overline{p}_m < p_m$. This is for a case in which a government enforce a constraint on tariff. Since p_m has to satisfy the first order condition, $\frac{d\left(\overline{\phi}-\phi\right)}{ds}$ can be written as

$$
\begin{aligned}
\frac{d\left(\overline{\phi} - \phi\right)}{ds} &= -\frac{d\overline{p}_m}{ds}[\left(\frac{\alpha_{ms}}{\alpha_{ms}+\alpha_{mn}} - \mu\right)\delta_m \overline{p}_m s + (a+\mu)\left(\overline{p}_m - p_m^w\right) \\
&\quad (-\epsilon_m - \delta_m s)] \\
&\quad + (a+\mu)\left[\left(\overline{p}_m - p_m^w\right)\delta_m \overline{p}_m - \left(p_m - p_m^w\right)\delta_m p_m\right] \\
&\quad -\frac{1}{2}a\delta_m\left(\overline{p}_m^2 - p_m^2\right) \\
&= -\frac{d\overline{p}_m}{ds}[\left(\frac{\alpha_{ms}}{\alpha_{ms}+\alpha_{mn}} - \mu\right)\delta_m \overline{p}_m s + (a+\mu)\left(\overline{p}_m - p_m^w\right) \\
&\quad (-\epsilon_m - \delta_m s)] \\
&\quad +\delta_m\left(\overline{p}_m - p_m\right)[\frac{1}{2}(a+\mu)\left(\overline{p}_m - p_m^w\right) + \frac{1}{2}(a+\mu) \\
&\quad \left(p_m - p_m^w\right) + \frac{1}{2}\mu\overline{p}_m + \frac{1}{2}\mu p_m]
\end{aligned}
$$

Since $p_x = \overline{p}_m$ by construction, it must be $\frac{d\overline{p}_m}{ds} = \frac{dp_x}{ds} > 0$. Since $\overline{p}_m < p_m$, $\delta_m(\overline{p}_m - p_m)\left[\frac{1}{2}(a+\mu)(\overline{p}_m - p_m^w) + \frac{1}{2}(a+\mu)(p_m - p_m^w) + \frac{1}{2}\mu\overline{p}_m + \frac{1}{2}\mu p_m\right] < 0$. Next, suppose $TT \equiv \left(\frac{\alpha_{ms}}{\alpha_{ms}+\alpha_{mn}} - \mu\right)\delta_m\overline{p}_m s + (a+\mu)(\overline{p}_m - p_m^w)(-\epsilon_m - \delta_m s) < 0$. Rewriting for $\overline{p}_m$, one gets

$$\overline{p}_m > \frac{p_m^w(\epsilon_m + \delta_m s)}{\epsilon_m + (1 - A_m)\delta_m s} = p_m$$

where $A_m = \frac{\left(\frac{\alpha_{ms}}{\alpha_{ms}+\alpha_{mn}} - \mu\right)}{(a+\mu)}$. Since $\overline{p}_m < p_m$ for $s < s^s$, TT should be bigger than zero. Hence, for $s < s^s$, $\frac{d\left(\overline{\phi}-\phi\right)}{ds} < 0$.

(b) Similarly, for $s < s^s$, i.e., when a government enforce a constraint on tariff, $\frac{d\left(\overline{\phi}-\phi\right)}{ds} < 0$.

Therefore, $\overline{\phi} - \phi$ is zero at $s = s^s$, increases in s for $s > s^s$ and decreases in s for $s < s^s$, i.e., $\overline{\phi} - \phi = 0$ and positive for all other s. Hence, a government can do better by committing to trade agreements that limit the choice of tariff levels. ■

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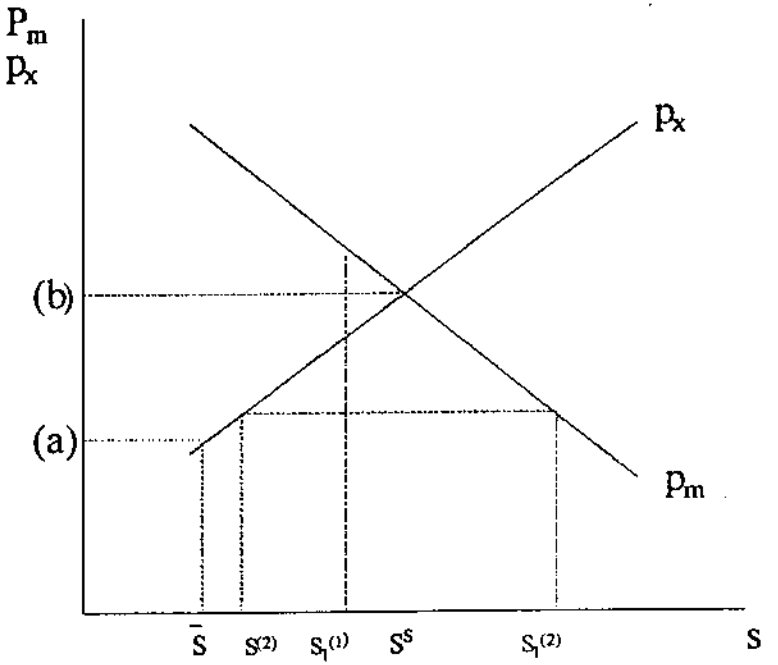

Figure 1: Second period steady-state industry structure

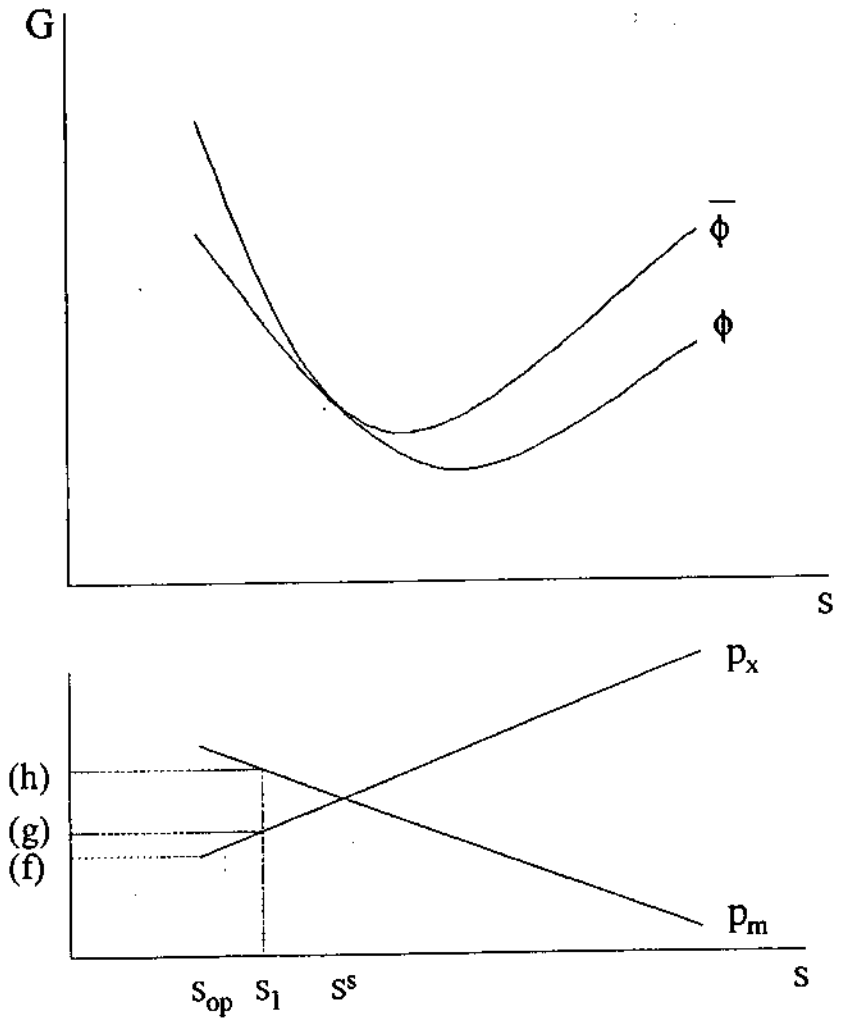

Figure 2: Illustration of value of trade agreements: a small country