Did the Multi-fiber Agreement Make the NAFTA Politically More Acceptable? A Theoretical Analysis.

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Abstract

The central question addressed in this paper is whether the presence of the MFA made the NAFTA politically more acceptable. Assuming that the government maximizes a weighted sum of welfare and producer profits, we derive four key results. First, taking the initial level of trade restriction as exogenously given, it is possible for an FTA to be endorsed by both parties under the MFA-like quota in one country though it is unambiguously rejected under a tariff that provides equal protection. Second, if the initial MFA quota is itself chosen endogenously, as long as all quota rents accrue to exporting countries, the quota is set so as to yield either autarky or free trade. Third, an intermediate outcome can obtain if quota rents are shared between the trading partners as is true, for example, under a tariff quota. Depending on the degree of the government's bias in favor of producers, this outcome may be more or less restrictive than that obtained under a tariff. Finally, assuming parameter values that give rise to the intermediate outcome initially, it remains possible for an FTA to be endorsed under the MFA-type quota when it is turned down by one of the potential partners under a tariff. But it is now also possible for the opposite to happen: an FTA that is endorsed under a tariff may be turned down under the MFA-type quota.

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1.   Introduction

A key issue in the recent literature on preferential trading, surveyed systematically in Panagariya (2000), concerns the conditions under which free-trade areas are likely to be endorsed by potential members.[1]   In an important paper, Grossman and Helpman (1995) address the question in a small-union model in which production activity is characterized by perfect competition. Relying on the political-economy model developed in Grossman and Helpman (1994), they conclude that a bilateral free trade area (FTA) is more likely to be endorsed by both partners when trade between them is approximately balanced and the arrangement is trade diverting. Krishna (1998) uses an imperfect-competition model and arrives at a very similar conclusion. Duttagupta (2000) introduces an intermediate input into the Grossman and Helpman (1995) model and asks whether the rules of origin can make initially infeasible FTAs feasible. She concludes that, under certain conditions, this is indeed possible.

To-date, the issue of the viability of FTAs has been analyzed exclusively in the presence of tariffs. But it may be hypothesized that a key feature that aided the conclusion of the North American Free Trade Agreement (NAFTA) was the presence of the Multi-fiber Agreement (MFA) in apparel, which constituted an important export sector for Mexico. Given the MFA quotas on outside countries, under NAFTA, Mexico could expand its

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[1] Several of the political-economy theoretic questions on preferential trading were initially raised and discussed in Bhagwati (1993). Richardson (1993), Bond and Syropoulos (1996), Panagariya and Findlay (1996), Bagwell and Staiger (1997a, 1997b), Levy (1997), and Cadot, de Melo and Olarreaga (1999) analyze formally some of the theoretical issues raised by Bhagwati. Among recent surveys of the literature on preferential trading are Bhagwati and Panagariya (1996), Bhagwati, Greenaway and Panagariya (1998), Fernandez and Portes (1998), Panagariya (1999) and Winters (1996). Many of the important contributions to the theory of preferential trading, both old and new, have been brought together in a recent volume edited by Bhagwati, Krishna and Panagariya (1999).

exports of apparel to the United States and Canada without the fear of extra-union competition. At the same time, from the U.S. and Canadian viewpoint, the MFA quotas ruled out the possibility of trade diversion. Indeed, they allowed these countries to redirect some of the quota rents accruing to outside countries to their own consumers through improved post-NAFTA terms of trade.

In this paper, following the Grossman-Helpman (1995) approach, we analyze formally the implications of the MFA-type regime in one of the sectors for the viability of FTAs. To our knowledge, the only contribution that considers the role MFA-type restrictions in a political economy model of preferential trade arrangements (PTAs) is the recent, as yet unpublished paper by Cadot, de Melo and Olarreaga (1998). Assuming that all trade restrictions take the form of voluntary export restraints, with quota rents shared between trading partners, these authors study the effect of the formation of an FTA on voluntary export quotas on outside countries. The model these authors employ is a hybrid between the Meade model of preferential trading and the Grossman-Helpman model of political economy.

In contrast to Cadot, de Melo and Olarreaga (1999) and in conformity with Grossman and Helpman (1995), we treat trade restrictions against outside countries as fixed at their initial levels and focus on the decision to form the FTA itself. Our main results may be summarized as follows. First, suppose the initial trade restriction is taken as exogenously given. Then it is possible for an FTA to be endorsed by both parties under the MFA-like quota in one country though it is unambiguously rejected under a tariff that provides equal protection. Second, if the initial MFA quota is itself chosen endogenously, as long as all quota rents accrue to exporting countries, the quota is set so as to yield either autarky or free

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trade. If the government is biased in favor of producers rather than overall welfare beyond a critical level, the outcome is autarky. If the bias is below this critical level, the outcome is free trade. But the intermediate result, in which imports are strictly positive and less than the level achieved under free trade does not obtain. This result is clearly in sharp contrast to the result obtained by Grossman and Helpman (1994) under a tariff when the intermediate outcome is the norm. Third, the intermediate outcome can obtain if quota rents are shared between the trading partners as is true, for example, under a tariff quota. In conformity with the previous result, it remains true that depending on the degree of the government's bias in favor of producers, this outcome may be more or less restrictive than that obtained under a tariff. Finally, assuming parameter values that give rise to the intermediate outcome initially, it remains possible for an FTA to be endorsed under the MFA-type quota when it is turned down by one of the potential partners under a tariff. But it is now also possible for the opposite to happen: an FTA that is endorsed under a tariff may be turned down under the MFA-type quota.

The paper is organized as follows. In Section 2, we study the viability of an FTA when the initial restriction is set exogenously. Here the outcomes under a tariff and quota are compared at a fixed level of protection, assuming that all quota rents accrue to exporting countries under the MFA-type restriction. In Section 3, we introduce the endogenous determination of the initial restriction and compare the outcome obtained under a tariff with that obtained under a quota. In Section 4, we turn back to the issue of the viability of an FTA under a tariff versus quota regime in one of the sectors when the level of protection is chosen endogenously. The paper is concluded in Section 5.

2.   Equal Protection under Tariffs and MFA

Consider first the effects of an FTA on various agents in the economy when the initial level of protection is fixed exogenously. We consider successively two alternative instruments to achieve this protection: tariff and voluntary export quota. The FTA involves freeing the imports from the partner, holding the specified instrument of protection with respect to the outside country at its original level.

Assume that there are three countries, which we will call Home Country (HC), Foreign Country (FC) and the Rest of the World (RW). HC and FC are the potential members of the FTA to be considered. Variables relating to HC are written without a superscript while those relating to FC and RW are distinguished by an asterisk and W, respectively.

Preferences are quasi linear with the numeraire good yielding a constant marginal utility. Production of the numeraire good requires only labor while that of each non-numeraire good requires labor and a sector-specific factor. These assumptions ensure that all substitution in demand and supply takes place between the non-numeraire goods and the numeraire good. In effect, the changes in non-numeraire goods do not interact with each other and we can carry out the welfare analysis using the partial-equilibrium framework.

Our focus is on a single non-numeraire good that we call apparel. We assume that HC imports this good while FC and RW export it. In the context of NAFTA, we can identify HC with the United States, FC with Mexico and RW with the rest of the world. Figure 1 considers the case when the initial equilibrium is characterized by a tariff. The downward sloping curve, MM, represents the import demand for apparel in HC. By assumption, the rest of the world's supply is perfectly elastic at price P^W. The export-supply

of FC slopes upward and is given by E^*E^*. Initially, HC applies a nondiscriminatory tariff at a per-unit rate measured by the vertical distance NF (=RS = GK = HJ). The tariff makes the export supply from FC, as perceived by agents in HC, to be $E^*_tE^*_t$. Likewise, the price from RW, as faced by buyers in A, becomes $P = P^W + t$. In equilibrium, HC imports OM^* from FC and M^*M^W from RW.

Price

E^*_t

E^*

S^*

F   R   G   H $P (= P^W + t)$

M

N   S   Y   K   J P^W

E^*_t

E^* S^*

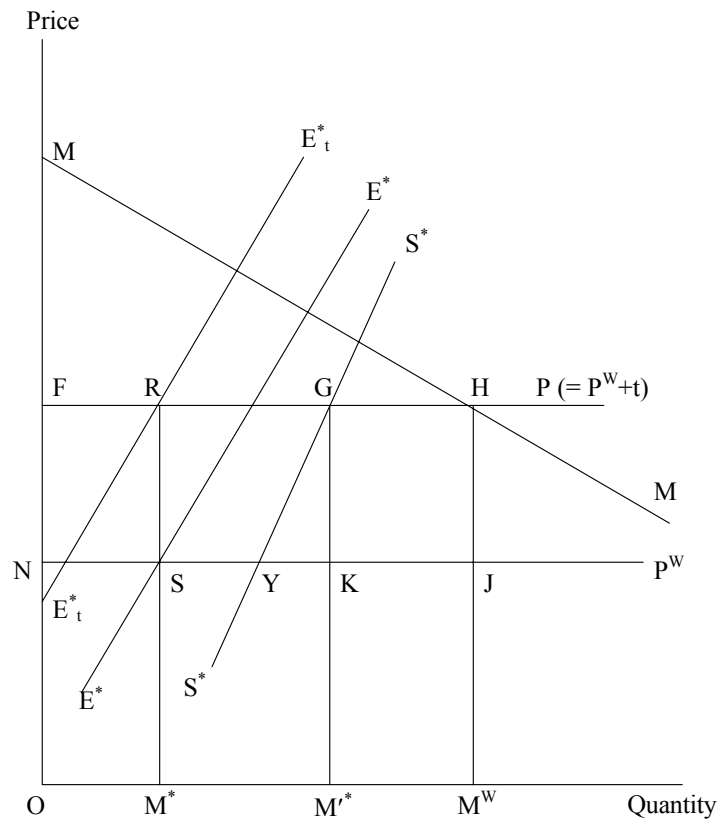O M^* M'^* M^W Quantity

Figure 1: The Tariff Case

Suppose now that as a part of the FTA arrangement, HC eliminates its tariff on FC, leaving the tariff on RW at its original level. Since FC is an exporter of apparel in the initial equilibrium, it is reasonable to assume that it does not impose a tariff on the product. In this case, the price of apparel in FC cannot exceed P^W. Because the price in HC is higher than P^W, all of FC's output is now diverted to HC. That is to say, FC's sales in HC are

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represented by its total supply curve (rather than the export supply curve), as shown by S^*S^*. By assumption, the total output of apparel in FC at price P $(= P^W + t)$ is too small to eliminate RW as a supplier to HC.

The FTA leads to the following changes. The price in HC remains unchanged at P so that its imports from FC rise to OM'^* while those from RW fall to M'^*M^W. The union is wholly trade diverting in apparel with no increase in the *total* quantity of imports into HC. Exporters in FC receive a net increase in their profits as represented by area FGYN. Correspondingly, HC loses area FGKN that it previously collected in tariff revenue. Triangle GKY is the net loss to the union as a whole due to trade diversion. Tariff revenue in FC, producers' surplus in HC and consumers' surpluses in both countries are entirely unaffected.

Suppose now that the decision to form the FTA is itself endogenous. Specifically, assume that the government chooses its policy so as to maximize the following objective function:

(1a) $$R = \sum_{i=1}^{n} \pi_i + gU,$$

where π_i denotes profit in the non-numeraire sector i in HC, U overall welfare in it, and n the total number of non-numeraire goods. In words, R represents a weighted sum of industry profits and welfare. In turn, welfare is defined as

(1b) $$U = \sum_{i=1}^{n} CS_i + \sum_{i=1}^{n} \pi_i + \sum_{i=1}^{n} TR_i$$

where CS_i and TR_i denote consumers' surplus and tariff revenue in sector i in HC, respectively. Since profits enter into welfare with equal weight as consumers' surplus and

tariffs and g is positive, (1a) and (1b) imply that producer profits have a higher overall weight in the objective function than the latter.

The objective function in (1a) and (1b) is consistent with a Nash bargaining solution in which a welfare maximizing government bargains over policies with the owners of specific factors. It is also consistent with the Grossman-Helpman (1994, 1995) political-economy process provided each lobby is assumed to be tiny relative to the economic size of the country and attention is focused solely on the coalition proof equilibriums.

We can write the objective function in FC, R^*, analogously by attaching an asterisk to each variable in equations (1a) and (1b). As already hinted, we focus exclusively on how the decision to form the FTA is impacted by the changes in apparel industry alone. Therefore, unless otherwise stated, we will assume that the outcome of the FTA in other sectors is to neither increase nor reduce the value of R and R^*. Alternatively, we can assume that apparel is the only non-numeraire sector.

We have already seen that in FC, the FTA leads to an increase in the profits of exporters and, hence, also welfare. The value of R^* rises unambiguously and, based purely on the changes in the apparel sector, FC votes in favor of the FTA. In HC, tariff revenue declines without any change in the consumers' or producers' surplus. This unambiguously reduces the value of R and HC votes against the FTA. The FTA fails to materialize.

For completeness, we note that at the other extreme, if FC's supply of apparel is so large that it eliminates the rest of the world, RW, as a source of imports into HC and pushes the price in HC to P^W, the union is wholly trade creating. In this case, profits and welfare in FC are unchanged so that it is indifferent between the status quo and FTA. In HC, welfare

rises but profits fall. Therefore, for sufficiently small values of g, this country still rejects the FTA. Only if the value of g is large, HC accept the union.

In the following, we focus on the wholly trade diverting case shown in Figure 1. There are two reasons for this focus. First, in reality, we do not expect the FTA to eliminate entirely the imports of apparel from the outside country. As such, this is the more realistic case. Second, this case is also clear-cut: since FC necessarily votes against it, the FTA is infeasible in this case.

Suppose then that the initial equilibrium is supported by MFA-like voluntary export restraints rather than tariff. Thus, in Figure 2, assume that FC is subject to a MFA quota of FR (=NS) and country C to RH (=SJ). As in Figure 1, these quotas result in the price P in HC with e being the implicit quota rent. Unlike tariff revenues, quota rents accrue to exporting countries: FC collects FRSN and RW bags RHJS.

Consider next the formation of the FTA between HC and FC. The quota on the rest of the world is fixed at RH (=SJ) while that on FC is removed. With the imports from rest of the world fixed at RH, the import demand curve facing union partner FC is obtained by subtracting horizontally the quantity RH everywhere from MM. This yields mm as the demand curve facing FC in HC. Once again, since the price in FC cannot rise above P^W, all of FC's supply is diverted to HC. The new equilibrium price in HC settles at point U. Imports into HC from FC expand to OM'^* and, since imports from RW do not change, total imports expand by $M^*M'^*$. Given the fixed quota on the outside country, there is no trade diversion. Nevertheless, the outside country suffers a loss due to the decline in the price in country HC and the consequent partial loss of the quota rent.
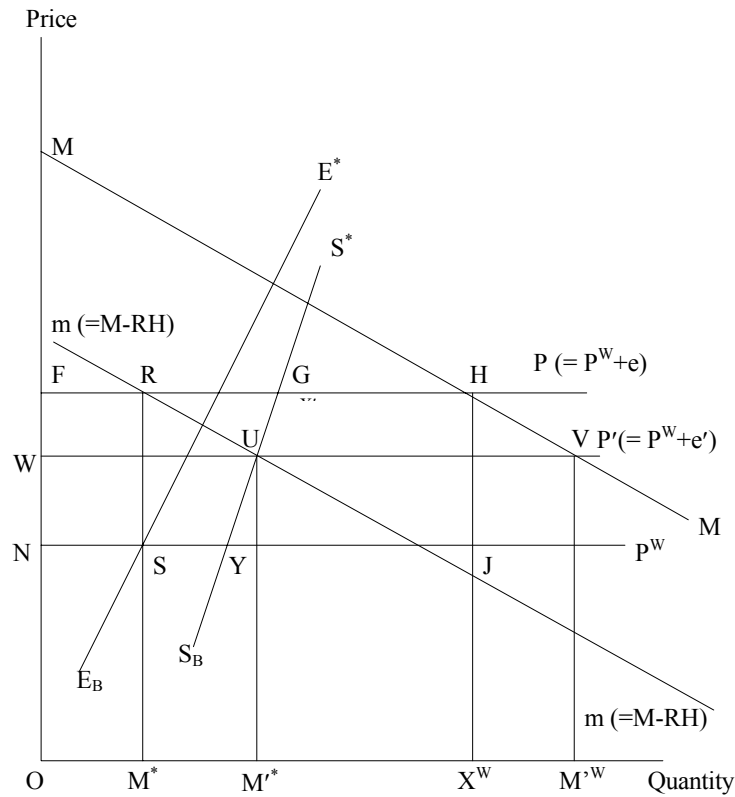
Figure 2: The MFA Case

The effect of the FTA on the welfare of FC is ambiguous. Because the domestic price there remains unchanged at P^W, the consumers' surplus is unaffected. The quota rent disappears and is replaced by additional profits to exporters of apparel. The extra profit is WUYN. In principle, this may be more or less than the lost quota rent, FRSN, explaining the ambiguity of the effect of the FTA on welfare. As drawn in Figure 2, WUYN exceeds FRSN so that welfare rises. Because the underlying political process leads to profits being weighted more than the quota rent, the value of R^* rises as well. Thus, in the case depicted in Figure 2, FC still votes in favor of the FTA.

In HC, the price of apparel falls as a result of the FTA. This means that consumers' surplus rises while producers' profits fall. But since the increase in the consumers' surplus

exceeds the fall in profits, for sufficiently large values of g, R rises and HC also votes in favor of the FTA. Thus, an FTA that would have been infeasible under a tariff can become feasible under MFA. This is not inevitable but it is possible.

3. Endogenous Quota

In the previous section, we assumed that the initial level of protection is exogenously given. We now introduce endogenous determination of the quota, assuming that the government maximizes a weighted sum of welfare and combined profits of the firms. A key simplifying assumption we make is that the foreign governments and suppliers, who are subject to the quota, play no role in the quota determination. In practice, the MFA quotas are "negotiated" between the importing and exporting country governments. Incorporating this feature substantially complicates the analysis and also introduces an asymmetry between the tariff and quota determination.

We first assume, as in the previous section, that all quota rents accrue to foreigners. It turns out that in this case, the outcome is either autarky or free trade but never in-between. To admit an interior solution, we then consider rent sharing such that a proportion of the rent accrues to the country levying the quota.[2]

3.1 All Rents Accrue to Foreigners

We will see that in this case, if the political process is driven mainly by welfare considerations (i.e., g is large), the outcome is free trade and if the process is driven by producer profits, it is autarky. To make the point algebraically first, suppose we have free

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[2] This is the case considered by Cadot, de Melo and Olarreaga (1998). While these authors recognize that the second-order condition associated with the maximization of R need not be satisfied in general, they do not recognize the implications of its breakdown in the manner we do in this section.

trade in apparel initially and we reduce its imports by a small amount through a voluntary export quota. This change is qualitatively equivalent to a small exogenous increase in the domestic price that does not generate any revenue. Therefore, we can calculate the qualitative effect of the quota on the value of R by differentiating (1a) with respect to the price of apparel after setting tariff revenue equal to zero. Thus, we have

$$\frac{\partial R}{\partial P} = (1+g)\frac{\partial \pi}{\partial P} + g\frac{\partial(CS)}{\partial P}$$

(2)

$$= (1+g)S(P) - gD(P)$$

where we use S(P) and D(P) to represent the supply and demand functions of apparel, respectively. The acceptance of the introduction of a voluntary export quota requires that, at the border price, the above partial derivative be positive. Equivalently, we must have

$$(3a) \qquad g < \frac{S(P)}{D(P)-S(P)} = \frac{1}{\dfrac{D(P)}{S(P)}-1}$$

Assuming g to be sufficiently small, this inequality is satisfied at the border price. The introduction of a small restriction on imports raises the value of R and the underlying political process supports the quota.

While the introduction of the quota, thus, increases R, it does not maximize the latter. For as we tighten the quota, the quantity demanded falls and quantity supplied rises so that the above inequality is reinforced. In effect, the value of R rises monotonically as we raise P through a progressively tighter quota. The natural outcome is that the political process that aims to maximize R pushes the equilibrium all the way to autarky.

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Alternatively, suppose the value of the right-hand side of (2) is negative at the free trade equilibrium. In this case, inequality (3a) is reversed at the border price. That is to say, evaluated at the border price,

$$(3b) \quad g > \frac{S(P)}{D(P) - S(P)} = \frac{1}{\frac{D(P)}{S(P)} - 1}$$

In this case, the introduction of the quota reduces the value of R so that locally there is no incentive to introduce the quota. To explore the remainder of the range, suppose we tighten the quota progressively. As we do so, the right-hand side of (3b) grows larger. If it, nevertheless, remains smaller than g all the way up to the autarky point, we know that R declines monotonically as we move from free trade to autarky. Therefore, free trade dominates all equilibriums with import restrictions. On the other hand, if the tightening of the quota turns the above inequality into equality before the autarky equilibrium is reached and then reverses it, R first declines as a function of P and then rises as we tighten the quota. In this case, R may be maximized at either free trade or autarky with a minimum somewhere in the interior.

As is readily verified by differentiating the expression on the right-hand side of equation (2), the second partial of R with respect to P is positive. Therefore, the price at which (3b) turns into equality (i.e., $\partial R / \partial P = 0$), the value of R reaches a minimum. For sufficiently small values of g this may happen below the free-trade price.

Figure 3 illustrates these points. DD and SS, respectively, represent the total demand and supply of apparel in HC. Under free trade, the product can be imported at P^W from the rest of the world. Starting from this equilibrium, consider the introduction of a quota that raises the domestic price by a small amount, say, FN, to P. In turn, this change

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raises producers' surplus by FGLN and lowers the consumers' surplus by FHRN. Since all rents accrue to foreigners by assumption, no quota revenue is generated. The net effect on welfare is unambiguously negative while that on profits unambiguously positive.
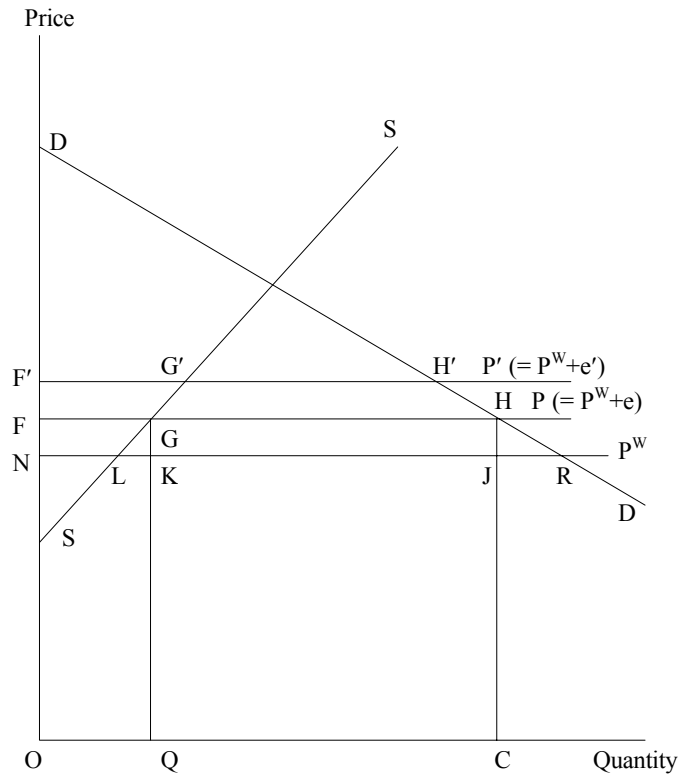

Figure 3: Endogenous Quota

Whether or not this change is approved depends on the relative weight given to welfare in the objective function, g. The change will be accepted for small values of the parameter but rejected for large values of it. Denoting by $\Delta\pi$ and ΔCS the changes in producers' and consumers' surplus, respectively, the change is approved provided

(4) $\Delta R \equiv \Delta\pi + g(\Delta\pi + \Delta CS) > 0$

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Or, since $\Delta\pi + \Delta CS$ is negative for a reduction in imports, the quota is accepted if and only if[3]

$$(4') \qquad g < \frac{\Delta\pi}{-(\Delta CS + \Delta\pi)} = \frac{1}{(-\frac{\Delta CS}{\Delta\pi}) - 1}$$

Assume for now that (4') is satisfied. This means the move from free trade to quota GH increases the value of R. The move does not maximize R, however. To see this, suppose we tighten the quota further such that the price rises by the same amount as before. That is to say, the new price P' is such that FF' = FN. It is then easy to see that the additional increase in profits is more and decrease in consumers' surplus less than was the case when the price increased from P^W to P. This makes the denominator of the right-hand side in (4') smaller and the entire fraction larger. Given the inequality was satisfied for the previous price increase, it is satisfied for this price increase as well. The logical implication is that as we tighten the import quota in steps that raise the price by equal amounts, inequality (4') remains valid throughout. Therefore, R is maximized when the import quota is pushed to zero, leading to autarky.

Similarly, we can show that if inequality (4') is violated at the border price, tightening the quota lowers R until the inequality turns into equality and is reversed. If this does not happen until the autarky equilibrium is reached, free trade necessarily maximizes R. If it happens before the autarky point, R falls initially and then rises. The maximum is reached at either free trade or autarky.

It is useful to compare the voluntary export quota to the endogenously determined tariff derived by Grossman and Helpman (1994). This tariff maximizes R with respect to P,

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[3] Observe that (4') is equivalent to (3a) for finite changes in imports.

taking into account the fact that tariff revenue forms a part of welfare in (1b). The *ad valorem* tariff that accomplishes this task is readily shown to be τ where

$$(5) \qquad \frac{\tau}{1+\tau} = -\frac{S(P)}{gP[D'(P)-S'(P)]} = \frac{1}{g}\frac{S(P)}{M(P)}\left(-\frac{M(P)}{PM'(P)}\right) \equiv \frac{1}{g}\frac{\alpha(P)}{\eta(P)}$$

In writing the last two equalities, we have defined $M(P) \equiv D(P) - S(P)$, $\alpha(P) \equiv S(P)/M(P)$ and $\eta(P) \equiv -P.M'(P)/M(P)$. The last expression is the absolute value of elasticity of demand for imports in HC.

The tariff implied by (5) is positive. And as long as g has some minimum value, it is also non-prohibitive. Thus, the outcome under the voluntary export quota, which is either autarky or free trade, is dramatically different than under the tariff. Even though this latter outcome is unrealistic, one qualitative implication of the present analysis is interesting and remains valid when we modify the analysis so as to admit an interior solution for the quota problem: for small values of g, the endogenously determined voluntary export quota is more restrictive than the endogenously determined tariff while for large values of the parameter, the opposite holds. When the government is more susceptible to being lobbied by producers (g is low), the outcome is more restrictive under a quota than under tariff. When the government is less susceptible to lobbying (g is high), the outcome is the opposite.

These results have an interesting connection to the older literature on the equivalence of tariffs and quotas pioneered by Bhagwati (1965) and Bhagwati and Srinivasan (1980). When quotas are chosen exogenously, a given level of protection can be achieved by a tariff, import quota or voluntary export quota. The main difference is that under the voluntary export quota, the quota rent accrues to the foreign country. When the

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level of protection is chosen endogenously, quite apart from the rent issue, the level of protection is different under the two instruments.

Interestingly, if we were to solve the problem of endogenous tariffs while allowing for revenue seeking that uses real resources along the lines of Bhagwati and Srinivasan (1980), we will resurrect the equivalence between tariffs and voluntary export quotas. With 100 percent revenue seeking, the endogenous tariff will also yield either free trade or autarky as the optimal solution.

3.2   Rent Sharing

Let us now assume that a proportion b of quota rent accrues to HC where b is strictly between 0 and 1. In this case, the tariff revenue term in (1b) is replaced by $b(P-P^W)[D(p)-S(P)]$. Taking this term into account, we can readily compute the first- and second-order conditions of maximization of R with respect to P. We have

$$\text{(6a)} \qquad \frac{\partial R}{\partial P} = S(P) + g[(b-1)M(P) + b(P - P^W)M'(P)] = 0$$

$$\text{(6b)} \qquad \frac{\partial^2 R}{\partial P^2} = S'(P) + g[(2b-1)M'(P) + b(P - P^W)M''(P)]$$
$$= [1 - g(2b-1)]S'(P) + g[(2b-1)D'(P) + b(P - P^W)M''(P)]$$

From the second equality in (6b), if we assume the demand and supply functions to be linear $[M''(P) = 0]$, a necessary condition for the second-order condition to be satisfied is $b > \frac{1}{2}$. Thus, in the linear case, HC must be able to retain more than half of the quota rent for the solution to be in the interior; the tendency for the quota solution to be either autarky or free trade remains strong. The sufficiency condition for the second-order condition to be satisfied is naturally stronger requiring $g(2b-1) > 1$ or, equivalently, $b > (1/2)+1/(2g)$. In the

full rent-sharing case (b = 1), which is equivalent to the tariff case, this sufficiency condition reduces to g > 1.

Simple manipulations and substitutions allow us to obtain from (6a)

(7) $\qquad \dfrac{e}{1+e} = \dfrac{\alpha(P)}{gb\eta(P)} - \dfrac{1-b}{b}\dfrac{1}{\eta(P)}$

where e is the *ad valorem* rate of quota rent and, as defined before, α and η are ratio of domestic output to imports and the elasticity of demand for imports, respectively. As expected, for b = 1, this rate of quota rent coincides with the tariff rate in (5).

It is instructive to derive the effect of a change in b on the rate of quota rent, e. Since P^W is fixed, e moves in the same direction as P. Totally differentiating the first-order condition (6a) and simplifying, we can obtain

(8) $\qquad \dfrac{dP}{db} = -\dfrac{M(P)}{bR''}(g - \alpha)$

where R″ denotes the second partial of R(P) as in (6b) and is negative by the second-order condition. According to (8), a small reduction in b raises or lowers P and, hence, e, as g is larger or smaller than α. Starting at b = 1, where e = τ, if we lower b the rate of quota rent rises for values of g smaller than α and falls for values of g larger than α. That is to say, the quota leads to a more or less restrictive outcome than the tariff, as g is smaller or larger than α.

The intuition behind this result can be given as follows. Starting from an initial equilibrium, suppose we reduce b. It can be shown that this change makes R′(P) positive or negative at the initial P according as α-g is positive or negative. For small values of g, the expression is positive so that restoration of the first-order condition requires reducing R′(P).

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By the second-order condition, this fact implies an increase in P and, hence, a tightening of the quota. For large values of g, α-g is negative so that the reduction in b requires raising $R'(P)$ and hence lowering P.

4. The FTA Once Again

Given that the initial level of protection in apparel (tariff or MFA) is itself chosen so as to maximize the value of R, by definition, HC will not accept the FTA based solely on the changes in this sector. Under the tariff, HC could have chosen the same level of protection as that under the FTA without losing any tariff revenue. The fact that a different level of protection is chosen implies that the value of R is higher than potentially achievable under an FTA that liberalizes the apparel sector to FC. The same argument applies under the MFA, though there may or may not be a loss of the tariff revenue in this case.

To address the question whether the MFA made NAFTA more feasible than would have been the case under a tariff, we must now explicitly recognize the existence of at least another non-numeraire sector in which HC is an exporter and FC an importer, say, automobiles. This opens the possibility that HC could trade the losses from preferential liberalization of the MFA sector for gains from preferential access in the automobiles that will accrue in terms of producers' surplus gain. Likewise, FC can trade the benefits of preferential access in apparel in HC's market for the losses from preferential access it offers the latter in the automobiles sector accruing in terms of tariff revenue loss.

To facilitate the following discussion, let us define explicitly two regimes: the "MFA regime" and "tariff regime." Under the MFA regime, we assume that in the initial, pre-FTA equilibrium, apparel is subject to the MFA restriction in HC. The MFA quota is chosen endogenously as discussed in the previous section and split between FC and the

outside country to equate the supply prices of the two sources. Under the tariff regime, apparel is subject to a tariff restriction in HC. Once again, the tariff is chosen endogenously a la Grossman and Helpman (1994). Under *both* regimes, automobiles in FC are subject to an endogenously chosen tariff. With export subsidies ruled out, automobiles in HC and apparel in FC are traded freely under both regimes.

Our main result in this section is that for some parameter values, an FTA may be feasible under the MFA regime but not the tariff regime. It turns out, however, that for alternative parameter values, it is also possible for an FTA to be feasible under the tariff regime but infeasible under the MFA regime. Thus, if the initial level of the policy is chosen endogenously, the impact of the MFA on the feasibility of NAFTA cannot be predicted unambiguously.

Interestingly, the essential logic behind this ambiguity can be explained without introducing the automobiles sector explicitly. Thus, continue to focus exclusively on the trade diverting case in which, under the tariff regime, the loss to HC in apparel is captured entirely by the loss of tariff revenue. Using subscript t to identify the variables under the tariff regime, denote the absolute decline in the value of R_t, resulting from this revenue loss, by z_t. Under the MFA regime, no duty is collected on the imports from the partner and the domestic price of apparel falls following the FTA. Therefore, the consumers' surplus rises and producers' surplus and tariff revenue fall. As argued in the first paragraph of this section, the net effect of these changes is necessarily to lower the value of the government's objective function. Using subscript m to denote the variables under the MFA regime, let z_m represent the absolute value of the reduction in R_m. The HC government votes in favor of the FTA under regime i (i = m, t) if the gain in the producers' surplus from FTA in

automobiles is at least as large as $z_i/(1+g)$. This follows from the fact that the gain in the producers' surplus of $z_i/(1+g)$ translates into a gain of z_i in R_i, which is just enough to compensate for the losses incurred in apparel.

Next, consider FC. Continuing to focus on the purely trade diverting case, under the tariff regime, FC necessarily benefits from the FTA in the apparel sector. Denote the increase in the value of R_t^* due to this gain by y_t^*. Under the MFA regime, the FTA may or may not raise the value of R_m^*. But we choose to limit ourselves to the case in which R_m^* does increase, denoting the magnitude of the increase by y_m^*. In addition, we assume completely inelastic supply of automobiles by HC. This assumption rules out deadweight loss in production due to trade diversion and ensures that the loss of tariff revenue by FC in the automobiles sector is identical to HC's gain in producers' surplus following the formation of an FTA. Focusing solely on the case in which HC endorses the FTA, FC votes in favor of the FTA under regime i if $y_i^*-(z_i.g^*)/(1+g) \geq 0$ (i = m, t). Remembering that g^* is the relative weight the FC government places on welfare, $(z_i.g^*)/(1+g)$ is its valuation of the tariff revenue loss in the automobile sector.

For an FTA to be feasible under the MFA regime when it is not feasible under the tariff regime, three conditions are sufficient. First, HC's gain in producers' surplus from the FTA in the automobile sector must be at least as large as $z_m/(1+g)$. Given that producers' surplus receives a weight of $1+g$ in R_m, this condition ensures that the HC government does not experience a decline in the value of its objective function and endorses the FTA under the MFA regime. Second, the gain to the FC government in the apparel sector under the MFA regime must be at least as large as the loss to it in the automobiles sector necessary to induce HC to vote favorably on the FTA; that is to say, $y_m^* \geq (z_m.g^*)/(1+g)$. This ensures

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that FC endorses the FTA under the MFA regime. Finally, the loss to the HC government from an FTA in apparel sector is smaller under the MFA regime than under the tariff regime; that is to say, $z_m < z_t$. If this last condition is satisfied, an FTA that is weakly endorsed by HC under the MFA regime will not be endorsed by it under the tariff regime. For, in this case, the HC government will not be able to recover the larger losses in apparel under the tariff regime.

The opposite possibility in which an FTA that is feasible under the tariff regime becomes infeasible under the MFA regime can be identified similarly. In this case, we assume $z_m > z_t$. Then, if HC endorses the FTA only weakly under the tariff regime, it will not endorse the latter under the MFA regime.

To show that the cases we have identified are not vacuous, we now proceed to offer numerical examples. For this purpose, we rely on the following, linear demand and supply functions in the two countries:

$$(9) \; d = \frac{4-p}{2}, s = \frac{p}{2}; \; d^* = \frac{2-p^*}{16}, s^* = \frac{p^*}{8}.$$

These functions are consistent with FC (e.g., Mexico) being smaller than HC (e.g., USA) in the sense that both demand and supply in HC under free trade ($p = p^* = 1$) are larger than those in FC. The relationship between domestic price and the MFA quota can be represented by $M = d - s = 2 - p$, where M is the level of the MFA quota determined endogenously by solving the following maximization problem: [4]

$$(10) \; \underset{M}{\text{Max}} \; R = g[\underbrace{\frac{1}{4}(2+M)^2}_{\text{consumer surplus}} + \underbrace{\bar{L}}_{\text{wages}} + \underbrace{b(1-M)M}_{\text{MFA rents}}] + (1+g)\underbrace{\frac{1}{4}(2-M)^2}_{\text{producers surplus}}.$$

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As before, b represents the share of the MFA rent captured by HC. The equilibrium quota implied by the solution to the above problem is given by M_m, where,

$$(11)\ M_m = \frac{gb-1}{2gb-g-1/2}.$$

Under tariff, the optimum quantity imported, M_t, can be obtained by setting b =1 in (11):

$$(12)\ M_t = \frac{g-1}{g-1/2}.$$

FTA involves the removal of the MFA quota on FC, which causes the price in HC to decline. The fall in the price applies to both trading partners. We compute the changes in the values of governments' objective functions in the two countries for a variety of values of g and b. The problem is simplified by assuming that g takes the same value in HC and FC. As we saw in Section 3.2, the equilibrium domestic price under MFA decreases or increases with an increase in b as g < α or g > α, where α is ratio of domestic production to total imports at equilibrium. For the specification in (9), this condition reduces to g < 1.5 or g > 1.5. Parameters g and b are restricted to satisfy the second order condition (SOC) of the maximization problem and to also ensure that the FTA does not eliminate the rest of the world, RW, as a source of imports into HC. For the values of b we consider, the SOC is satisfied provided $1.15 \le g \le 8.86$.

Table 1 shows the range of b for which HC and FC both endorse the FTA under the MFA with HC's endorsement being weak in the sense that it is just compensated in the automobile sector for its losses in the apparel sector. The range of b is derived for three values of g, 1.25, 1.5, 1.75. For g = 1.25, the equilibrium *ad valorem* rate of quota rent

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[4] Consumers' surplus and producers' surplus are expressed in terms of the MFA quota quantity, M, using the relationship, p = 2 − M.

under MFA is higher than the equilibrium *ad valorem* rate of tariff. For g = 1.75, the rate of quota rent under MFA is smaller while for g = 1.5, it is the same as the tariff rate. For g = 1.25, the SOC requires b > 0.81 (see Table 1a). For $b \geq 0.84$, the losses to HC from FTA under MFA are smaller than under tariff. This means that if HC just votes the FTA under MFA, it will reject it under tariff. For b = 0.82 or 0.83, the losses to HC under MFA are the same as under tariff and FTA is endorsed by it under both regimes. For all of these parameter values, i.e., g = 1.25 and b > 0.81, FC always endorses the FTA. Thus, we have a range, 0.84 < b < 1, for which FTA is infeasible under the tariff regime but feasible under the MFA regime.

For g = 1.50 and g = 1.75, the result that the FTA that is infeasible under the tariff regime but feasible under initial MFA holds for all values of *b* that satisfy the SOC (see Tables 1b and 1c). Again, FC supports the FTA under both initial MFA and tariff. However, the endorsement of the agreement, which requires the ratification of both countries, is rejected with an initial tariff and is accepted with an initial MFA.

We may recapitulate here the intuition behind the above results. Under the MFA regime, while HC suffers losses in producers' surplus in apparel, it also gains in consumers' surplus. Moreover, the MFA quota revenue loss is only on a fraction of the total quota rent. For almost all parameter values of *g* and b that satisfy the SOC in the above problem, these cumulative losses to HC under MFA are smaller than the tariff revenue losses under an initial tariff system.

However, for some parameter specifications, as given in Table 2, the above conclusion turns around. Under MFA, the FTA is rejected by HC (although not by the FC) for sufficiently low values of g. Recall that for a small g and a small b, the domestic price of

apparel is much higher under MFA than under tariff.[5]   Therefore, under FTA, as the domestic price falls, the subsequent producers' surplus loss is very large, such that the overall decline in R in apparel under MFA exceeds that under tariff.

5.   Concluding Remarks

In this paper, we have studied the implications of the MFA-like restrictions for the political viability of free trade areas. We show that if we take the initial level of protection as exogenously fixed, the presence of MFA, rather than tariff, does make an FTA more viable.   If the initial level of protection is itself chosen endogenously, depending on parameter values, FTAs may or may not be more likely under MFA than under tariff.

Our paper also sheds new light on the old subject of tariffs versus quotas pioneered by Bhagwati (1965) and Bhagwati and Srinivasan (1980). We show that when quota rents do not accrue in their entirety to the importing country, in general, the endogenously chosen level of protection will be different under a tariff than under the quota. In the extreme case of all rents accruing to the exporter, the quota will be accompanied by either complete free trade or complete autarky. When rents accrue to the exporting country only partially, an intermediate outcome is possible but it is different, in general, from that under a tariff. The greater the bias of the government in favor of producers, the more likely the quota will lead to a more protectionist outcome than tariff. The equivalence can be restored, however, by introducing revenue seeking in the tariff problem following Bhagwati and Srinivasan (1980). Revenue seeking that uses real resources leads to a loss similar to the loss of rent in

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[5] In Section 3.2 we showed that the MFA quota increases and the associated prices decreases with increases in the rent sharing factor, b, if g is small ($g < 1.5$ in the present problem). Hence, when b is small then the MFA quota is very restrictive implying a high domestic price.

the quota problem and introduces a tendency towards either free trade or autarky as the likely outcome.

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Table 1a: $g = 1.25$, SOC satisfied for $b \geq 0.82$.

Losses from apparel to HC from tariff $= 0.17$

Range for b	Losses to HC from MFA
0.82-0.83	0.17
0.84-1.00	(0.13-0.16)< 0.17

Table 1b: $g = 1.5$, SOC satisfied for $b \geq 0.67$.

Losses from apparel to HC from tariff $= 0.14$

Range for b	Losses to HC from MFA
0.67-1.00	(0.07-0.11)< 0.14

Table 1c: $g = 1.75$, SOC satisfied for $b \geq 0.73$.

Losses from apparel to HC from tariff $= 0.12$

Range for b	Losses to HC from MFA
0.73-1.00	(0.01-0.09)< 0.12

Table 2: Parameter specifications for which losses to HC from FTA are higher under initial

MFA than under initial tariff.

g	B	a_m	a_t
1.26	0.81	0.18	0.17
1.31	0.78	0.17	0.16
1.32	0.77	0.17	0.16
1.34	0.76	0.17	0.16
1.35	0.75	0.17	0.16
1.37	0.74	0.17	0.16
1.38	0.74	0.16	0.15
1.39	0.73	0.16	0.15
1.40	0.72	0.17	0.15
1.41	0.72	0.16	0.15
1.42	0.71	0.17	0.15
1.44	0.70	0.16	0.15
1.46	0.69	0.15	0.14