Free Trade Areas and Rules of Origin: Economics and Politics

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Abstract

We incorporate intermediate inputs into a small-union general-equilibrium model and develop the welfare economics of preferential trading under the rules of origin. Combining this analysis with the Grossman-Helpman political-economy model, we demonstrate that the rules of origin can improve the political viability of FTAs. Two interesting outcomes are derived. First, an FTA that lowered joint welfare of the union and was voted down in the absence of the rules of origin may become feasible in the presence of these rules. Second, an FTA that increased joint welfare of the union but was voted down in the absence of the rules of origin may become acceptable in the presence of these rules but it may also turn welfare inferior to status quo.

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Table of Contents

1. Introduction

The rules of origin (ROOs) are an integral part of Free Trade Areas (FTAs): union members confer duty-free status on a product only if a pre-specified proportion of its value added originates within the union. Though it is generally recognized that ROOs make FTAs politically more acceptable, we lack a formal analysis supporting this proposition.[1] Since intermediate inputs are rarely incorporated into the formal models of FTAs, the recent political-economy-theoretic literature leaves the role of ROOs entirely out of consideration.[2] This is true of the pioneering contribution by Gene Grossman and Elhanan Helpman (1995) as also of the important paper by Pravin Krishna (1998).[3]

In this paper, we have two broad objectives. First, we incorporate intermediate inputs into the analysis and derive the implications of the ROOs for the political feasibility of FTAs. Second, we systematically discuss the welfare implications of FTAs in the presence of intermediate inputs and ROOs. In addition to being of interest in their own right, these results

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[1] The nascent literature on ROOs includes Kala Krishna and Anne Krueger (1995), Jiandong Ju and Krishna (1998) and Rod Falvey and Geoff Reed (1997, 1998).

[2] Two recent surveys of the traditional and modern theoretical literature on preferential trade areas (PTAs) are Bhagwati and Panagariya (1996) and Panagariya (2000). Among the recent contributions to the literature, mention may be made of Richard Baldwin (1995), Jagdish Bhagwati (1993), Eric Bond and Constantinos Syropoulos (1996), Olivier Cadot, Jaime de Melo and Marcelo Olarreaga (1999), Wilfred Ethier (1998), Paul Krugman (1991), Philip Levy (1997), Panagariya and Findlay (1998), and Sang-Seung Yi (1996).

[3] Grossman and Helpman (1995) allow for ROOs that prevent transshipment of goods imported by a lower tariff member to the higher tariff member. In contrast, our focus is on ROOs based on input usage.

are an integral part of the answer to the first question. To determine how they impact the political viability of FTAs, we must determine how they impact the welfare implications of FTAs.

Our analysis is conducted within a conventional general-equilibrium model that has three final goods and an intermediate input used in the production of one of the final goods. One partner is assumed to import the input and export the final good using the input. The other partner exports the input and imports the final good, thereby, opening the way for the exchange of a tariff preference in the final good for a ROO. This setting is particularly relevant to the recent wave of FTAs between developed and developing countries such as the one between the United States and Mexico.[4] In such arrangements, the developing country member typically exports final goods that use inputs exported by the developed country member. From the U.S.-Mexico example we know that ROOs play a crucial role in making FTAs politically feasible.

A key welfare result we derive is that, in general, the ROOs may lower or raise the joint welfare of the union. On the one hand, a ROO diverts trade in the intermediate input by substituting within-union supply for outside-union supply. On the other, it can undo trade diversion in the final good using the input. Thus, the net effect is ambiguous.[5] When the ROO is weakly binding, a tightening of it improves joint welfare because the loss from the price distortion in the intermediate input market is second-order small. However, as the ROO is tightened further, the loss from the input price distortion can more than offset the benefit in the

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[4] Similar arrangements have been concluded recently by the European Union with countries in North Africa.

[5] This result was anticipated by Panagariya (1999) but not proved formally. Ju and Krishna (1998) also touch on it but their focus being on the accessibility of the outside world to the union's markets in final and intermediate goods, they stop short of deriving the welfare result formally.

final good market. In the special case when the post FTA price of the final good is at its free trade level, the ROO is unambiguously harmful since in this case, there is no trade diversion in the final good to be reversed.

The political-economy analysis of FTAs is developed in three steps. First, using the original Grossman-Helpman (1994) model, we determine the structure of tariffs in the initial equilibrium. The key result here is that the tariff on the input is zero in both partners.[6] Second, we study the viability of an FTA in the absence of the ROOs. Third, we ask whether the FTAs that are rejected in the second step could become acceptable in the presence of ROOs.

In our model, the union members are necessarily asymmetric in that one imports the input while the other imports the final good using it. Neutralizing for other sources of asymmetry and assuming that neither country's supply is large enough to displace the rest of the world from the market of the other, we show that the country importing the final good that uses the input rejects the FTA in the absence of ROOs. The reason is that while the tariff preference offered in the final good by this country causes a loss of tariff revenue, it does not make any corresponding tariff-revenue gain in its partner's market. The latter result follows from the fact that the endogenously determined tariff on the input in the country importing the input is already zero. The only situation in which this country can gain and hence accept the FTA is the one in which the partner's supply of the final good is large enough to entirely displace the rest of the world as a source of supply.

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[6] This result is anticipated but not formally derived in Grossman and Helpman (1994) since intermediate inputs are absent from their model.

The introduction of a binding ROO alters these outcomes. The ROO increases the price of the regionally produced intermediate input and hence effectively provides protection to it. The FTA that was unattractive to the input exporter in the absence of a ROO can now become attractive. Therefore, the ROO can make a previously infeasible FTA feasible. When an FTA becomes feasible after the inclusion of the ROO, two interesting possibilities are shown to arise. (i) An FTA that lowered the joint welfare of the union and was rejected in the absence of the ROO is accepted upon the inclusion of such a rule; and (ii) an FTA that improved joint welfare of the union but was nevertheless rejected in the absence of the ROO is accepted, but the supporting ROO is so distortionary that the FTA lowers the union's joint welfare relative to the status quo.

The paper is organized as follows. In Section 2, a general equilibrium model of trade is developed to analyze the economic and political characteristics of the initial equilibrium, based on a nondiscriminatory tariff. In Section 3, the economic consequences of a FTA and the viability of its endorsement are analyzed in the absence of ROOs. A ROO is then introduced and the resulting price and welfare outcomes are derived in Section 4. In Section 5, the viability and welfare implications of the FTA are reassessed when the latter encompasses the ROO. Some numerical examples are provided to highlight the key results in this section. Section 6 concludes the paper.

2. The Model

Consider a world comprised of three countries, the home country (HC), the foreign country (FC) and the Rest Of the World (ROW), producing and trading four goods, 0, 1, 2 and m. Goods 0, 1 and 2 are final, and m a pure intermediate input used in the production of good 1. Good 0 is the numeraire, which balances trade for the three countries. All final goods are consumed in all three countries. The potential partners HC and FC are small in relation to the ROW. All markets are assumed to be perfectly competitive. The world price of commodity i, (i = 0, 1, 2, m) is denoted P_i^W and is determined in the ROW. Units of goods are chosen such that all world prices can be normalized to 1, i.e., $P_i^W = 1$.[7] Initial tariffs are nondiscriminatory so that the domestic price of each good exceeds its world price by per-unit tariff.[8] All tariff revenue is redistributed to the consumers in a lump-sum fashion.

We describe the variables and functions associated with HC in detail; those associated with FC are defined similarly and distinguished by an asterisk (*). X_i and c_i (i = 0, 1, 2, m) denote the quantities of good i supplied and demanded, L_i (i = 0, 1, 2, m) and $\overline{K}_i$ (i = 1, 2, m) the quantities of labor and specific factor used in good i, $\overline{L}$ the total endowment of labor, and P_i (i = 1, 2, m) the domestic price of non-numeraire good i.

Consumption: We normalize the number of consumers at unity. As in Grossman and Helpman (1994, 1995), assume quasi-linear preferences. The consumer solves

(1) $$\underset{c_i}{\text{Min}} \sum_{i=1}^{2} P_i c_i + c_0 \text{ subject to } \overline{U} = c_0 + \sum_{i=1}^{2} u_i(c_i) ,$$

[7] The production and demand structure in the ROW turn out to be irrelevant for our analysis and is, therefore, not modeled.

[8] We rule out the export and import subsidies by assumption. Article XVIII of the General Agreement on Tariffs and Trade (GATT) and the Uruguay Round Agreement on Subsidies and Countervailing Duties prohibit export subsidies. Though the GATT does not prohibit import subsides, they are rarely used and, therefore, ruled out in our analysis.

where $\overline{U}$ is an exogenously specified level of utility and the $u_i(.)$ are differentiable, increasing and strictly concave sub-utility functions for the non-numeraire final goods ($u_i' > 0$ and $u_i'' < 0$). The first order conditions generate the demand functions, $c_i = d_i(P_i)$, where $d_i(.)$ is the inverse of $u_i'(.)$. The solution to (1) generates the following expenditure function for the home country:

$$E(1,P_2,P_3;\overline{U}) = \overline{U}+\sum_{i=1}^{2} e_i(P_i) \,, \tag{2}$$

where, $-e_i(P_i) = u_i(d_i(P_i))-P_i d_i(P_i)$ is the consumer's surplus derived from the consumption of the non-numeraire good i. It is readily verified that $c_i = e_i'(P_i)$.

<u>Production</u>: The numeraire good is produced under constant returns to scale (CRS), using labor only. In particular, its production function is written as $X_0 = L_0$ with the competitive wage, w, getting fixed at 1. The production functions for non-numeraire goods are given by:

$$\text{(i) } X_1 = \text{Min }\{V_1, \frac{c_m}{a_m}\} \,,\ V_1 = F_1(L_1,\overline{K}_1)$$

$$\text{(ii) } X_2 = F_2(L_2,\overline{K}_2), \tag{3}$$

$$\text{(iii) } X_m = F_m(L_m,\overline{K}_m).$$

The $F_i(.)$, (i = 1, 2, m) are CRS, increasing and concave in their arguments. The production of good 1 occurs in two stages. First, a composite factor of production, which we call "value added" and denote by V_1, is produced and then a_m units of m are combined with one unit of V_1 to produce one unit of good 1.[9] Given this production structure, the producer in each sector chooses L_i to solve the following optimization problem:

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[9] This production function (also employed by Ramon Lopez and Panagariya (1992) among others) allows for substitutability between primary factors but not between the intermediate input and primary factors. A more general specification makes the handling of ROOs cumbersome. However, even if substitutability were

(4)
$$\pi_1(P_1^v;\overline{K}_1)=\max_{L_1}\ P_1^v F_1(L_1,\overline{K}_1) - L_1,$$
$$\pi_i(P_i;\overline{K}_i)=\max_{L_i}\ P_i F_i(L_i,\overline{K}_i) - L_i,\ i=2,\ m.$$

The $\pi_i(.)$, denote the rent earned by the specific factor $\overline{K}_i$. For good 1, the net value-added price received by producers is $P_1^v = P_1 - a_m P_m$ where P_1 is the final-good price and $a_m P_m$ is per-unit cost of the intermediate input. As usual, the $\pi_i(.)$ are increasing and convex in the price, with $X_i = \pi_i'(.)$, where X_i is the quantity of good i supplied.

The Pattern of Trade under MFN Tariffs: Under nondiscriminatory tariffs, the differences in factor endowments and production technologies across countries are assumed to be such as to generate the pattern of trade shown in Figure 1. An FTA between HC and FC may change this pattern.

From Figure 1, HC imports input m from FC and exports (final) good 1 to it. For concreteness, the reader may wish to identify HC with Mexico and FC with the United States. Each potential union member also imports the good imported from its "potential partner", from ROW. As in Grossman and Helpman (1995), both HC and FC could import other final goods, represented by good 2, from ROW (as shown in Figure 1). However, to sharpen the focus on the role of input specific ROOs, we drop good 2 from our analysis.[10] Using t, with appropriate sub- and super-scripts, to denote per-unit tariff rate, the domestic price of m in HC is $1+t_m$ and that of

allowed, as long as the intermediate and value-added inputs are not perfect substitutes, the general results of the analysis will not change.

[10] For a detailed analysis of ROOs in FTAs where both partners import good 2 from the ROW see Duttagupta (2000).

good 1in FC is $1+t_1^*$. With no intervention in exportable goods, the price of good 1 in HC and of m in FC is 1. The price of the numeraire good 0 is 1 everywhere as it is free from duties whether it is imported or exported.

We have already determined the demand and output of each non-numeraire good in terms of its price. The output and demand for the numeraire good are determined as residuals. We can then determine utility from the income-expenditure equality. Since income consists of wages, profits and tariff revenue, equation (2) yields,

$$U = \bar{L} + [\pi_1(1-a_m(1+t_m)) + \pi_m(1+t_m)] + [-e_1(1)] + [t_m\{a_m\pi_1'(.) - \pi_m'(.)\}] \tag{5}$$

Note that in this equality, $\bar{L}$ represents the wage income while the terms in successive pairs of square brackets represent profits, consumer's surplus and tariff revenue. As expected, utility equals income as measured by wages, profits and tariff revenue plus the consumer's surplus.

<u>Endogenous Tariffs</u>. Tariff rates can now be endogenized. We assume that tariff rates are chosen (in each country) so as to maximize a weighted sum of welfare as measured by U and producers' profits. In HC, this objective function is represented by

$$G = \sum_{i=1}^{n} \pi_i + gU, \; g > 0. \tag{6}$$

Note that since profits also enter U, they receive a weight of 1+g in G whereas the remaining components of U receive a weight of g only.[11]

[11] Analogously, we have G^* for FC.

There are at least two ways to rationalize the choice of tariffs based on the maximization of (6). First, the first-order conditions obtained by maximizing (6) with respect to tariff rates are the same as those obtained under the Grossman and Helpman (1994) lobbying game between the government and the lobbyists, where lobbyists are the owners of sector-specific factors. Second, the solution implied by the maximization of (6) is equivalent to that obtained from a Nash bargaining game between a welfare maximizing government and the owners of sector-specific factors. For the future reference, we note that the acceptance or rejection of an FTA will be based on the evaluation of (6), which also coincides with the pressured or coalition-proof FTA equilibrium of Grossman and Helpman (1995). Thus, the use of (6) is a short cut to the Grossman-Helpman game for the choice of initial tariffs as well as that of FTA.

Restricting tariff to be nonnegative, maximization of (6) with respect to the tariff rates yields,

(7) $$t_1 = 0, t_m = 0.$$

Given HC exports good 1, the lobby for it would like exports to be subsidized. But since we rule out export subsidies by appeal to Article XVIII of GATT, we obtain $t_1 = 0$. In the case of the imported intermediate input, the story is slightly more involved. The lobby for $\overline{K}_m$ wants a positive tariff but that for $\overline{K}_1$ wants the opposite. The lobby for $\overline{K}_1$, thus, actively contests the lobby for $\overline{K}_m$. The lobbying strength over the intermediate input price is then determined from the relative buying or selling power in the intermediate input market. As HC is a net importer of m, the lobbying strength of the owners of $\overline{K}_1$ (proportional to total demand for m) exceeds that of $\overline{K}_m$ (proportional to domestic supply of m). Thus, the interior solution turns out to be an import subsidy, which we rule out by assumption. [12]

Tariff rates in FC are given by,

(8) $$\frac{t_1^*}{1+t_1^*} = \frac{1}{g^*}\frac{\alpha_1^*}{\eta_1^*} > 0,\ t_m^* = 0.$$

Here $\alpha^*{}_1$ is the ratio of domestic output of good 1 to its imports and $\eta^*{}_1$ the absolute value of the price elasticity of import demand for good 1 in FC. For the imported final good (in FC), the standard Grossman and Helpman (1994) result is obtained: the MFN tariff is inversely proportional to the elasticity of import demand and the government's weight on social welfare, and directly proportional to the ratio of domestic production to the imports of that good.

This structure of initial tariffs has an important bearing on the decision to form an FTA in later sections. It establishes the presumption that a country that primarily exports final goods and imports intermediate goods stands to benefit from the FTA since it gains access to the protected markets of its partners whereas its own input market is already free of tariffs. Conversely, a country that primarily exports intermediate inputs does not have an incentive to endorse the FTA in the absence of other sources of gains from the latter. In Section 5, we will bring ROOs as this alternative source. Presently, we consider the politics of FTA in the presence of intermediate inputs without ROOs.

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[12] To avoid any misunderstanding that HC is already a free-trading country, making FTA a fruitless exercise for it, we remind that this is merely because we are not considering good 2. Initial protection in HC can readily be brought to bear on the analysis by making the existence of good 2 explicit. But that will distract from out central focus without additional enlightenment.

3. The Economics and Politics of FTAs in the Absence of ROOs

We will assume throughout that when the FTA is formed, the countries freeze their external tariffs at their initial, MFN level. While trade in goods produced within the union is freed up entirely, no trade deflection is permitted. To determine whether such an FTA is accepted or rejected we evaluate its impacts on welfare and total profits and, hence, on G in (6).

Under an FTA, each member country removes the import duty on its partner but retains it on the rest of the world. Depending on the configurations of demand and supply curves in the two member countries, we need to distinguish three analytically distinct possibilities for each good. To see how these three cases play out in our model, consider final good 1, which is imported by FC and exported by HC. For the time being we ignore the analytical solutions of the tariffs derived on this good in the previous section and denote t_1 and t_1^* to be per-unit MFN tariffs on this good in HC and FC, respectively, and assume $t_1^* \geq t_1 > 0$.

In Figure 2, let I*I* represent the import demand for the good in the country with the higher tariff rate, FC. When the FTA is formed, the tariffs apply to imports from outside only so that HC has the incentive to sell *all* its supply in FC unless doing so lowers the price there below it own domestic price, $1 + t_1$. Based on where the prices in the two countries settle in the new equilibrium, we have three cases.

<u>Case 1: Purely Trade Diverting FTA:</u> As long as HC's *total* supply curve crosses I*I* at point Y or above, as shown by S^1S^1, the price in FC remains $1 + t_1^*$. HC then sells all its production in the market of FC, satisfying its domestic demand by imports from ROW. To the extent that the quantity supplied by HC increases, the union's total imports from outside decline. This is enhanced protection in the Grossman-Helpman terminology or pure trade diversion in the Vinerian terminology. FC loses tariff revenue in the amount MHRQ with consumers' and

producers' surpluses remaining unchanged. Of this loss, area MHJL is net increase in the producers' surplus accruing to HC, and area LJNQ is the additional tariff revenue raised by HC (since it now imports quantity LJ instead of buying the latter from its own suppliers). Thus, trapezium JHRN is a deadweight loss due to trade diversion.

Case 2: Purely Trade Creating FTA: At the other extreme, suppose HC's supply curve intersects I^*I^* at point T (whose height is $1+t_1$) or below as shown by S^2S^2. In this case, the union-wide price settles at $1+t_1$ or less with imports into FC from the outside country eliminated entirely. If S^2S^2 crosses I^*I^* exactly at T as in Figure 2, HC's suppliers sell everything in FC. If S^2S^2 crosses I^*I^* below T, HC's suppliers sell a part of their output in their home market. The price in FC declines to $1+t_1$ as a result of which there is consumers' surplus gain, producers' surplus loss and tariff revenue loss. The lost tariff revenue (equal to area MYSQ) goes partially to boost tariff revenue gain in HC (equal to the area LTZQ) since the latter now buys a quantity equal to LT from outside rather than its own firms, and partially to increase the consumer's plus producers' surplus in FC (equal to area MYTL). The overall effect on the union is a welfare gain equal to area YTZS. This situation is trade creating, and results in "reduced protection" for the unions' producers for that good.

Case 3: Mixed Case: If the supply curve of HC crosses I^*I^* between points Y and T, the price in FC is endogenous with producers from HC selling their entire quantity in FC and consumers in FC buying their entire quantity from them. Since we will focus exclusively on cases 1 and 2 in our analysis below, we leave this case for the reader to work out.

Let us now relate this analysis to the effect of the FTA on the actual prices of the particular goods within our specific model. Recall that in the initial, MFN equilibrium, we have $t_1 = 0$. Therefore, for this good, horizontal lines beginning at $1+t_1$ and 1 coincide with each other. Thus, HC does not collect any tariff revenue on this good either before or after the formation of the FTA. In the purely trade diverting case, case 1, all of the lost revenue in FC becomes the extra producers' surplus for HC. In the purely trade creating case, case 2, the FTA establishes free trade in good 1 in FC, with all of the lost tariff revenue becoming a part of the increased net consumers' surplus in FC.

In general, the three cases we discussed would also obtain for m. However, since there is no tariff on this good in the MFN equilibrium in either HC or FC, within our model, there is no scope for either trade creation or trade diversion. Thus, until a rule of origin is introduced, the welfare calculations will not be affected by the changes in this sector. Indeed, given the strong separability across goods in both demand and supply and the fixity of the input price, profits in this sector are also unchanged. Thus, the changes in m make no contribution to the changes in G. This will, of course, change when a ROO is introduced.

The stage for assessing the feasibility of the FTA is now set. To economize on space, we restrict ourselves to cases 1 and 2 for good 1.

<u>Case 1: FTA is Purely Trade Diverting in Good 1</u>: In good 1, HC benefits and FC is hurt in terms of welfare. Moreover, profits in good 1 rise in HC and are unchanged in FC. Hence, HC accepts the welfare reducing FTA and FC rejects it. This can be easily verified from a rise in the value of G in (6) and a fall in the corresponding value of G^* under FTA relative to that under MFN.

<u>Case 2: FTA is Purely Trade Creating in Good 1</u>: In this case, the price of good 1 drops to the world price in the FC. This leads to a net gain in welfare but decline in profits in sector 1 in FC. The price of good 1 faced by producers and consumers in HC remain unchanged at the world price of 1. Based purely on the changes in sector 1, HC will weakly endorse the welfare

increasing FTA but FC's decision depends on the value of g^*. These results are summarized in Proposition 1.

Proposition 1: (a) An FTA in the absence of a ROO that is purely trade diverting in good 1 (case 1) is necessarily rejected by FC. (b) If the FTA is purely trade creating in good 1 (case 2) HC accepts it but FC may accept or reject it.[13]

4. The Economic Effects of the Rules of Origin

Let us now assume that under the FTA the duty free status to the exports of good 1 from HC to FC is conferred only if they have some minimum content of the intermediate input produced within the union. In practice, there are three main forms that a ROO may take.[14]

(i) Substantial Transformation: The input imported by a member from outside must undergo substantial change in terms of name, character or use to qualify for duty-free access into another member's market.

(ii) Change in the Tariff Heading: The commodity, assembled from parts originating outside the union, must undergo a classification change in the tariff line.

(iii) Value-added Test: A minimum percentage of value added must have within-union origin.

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[13] These results would be modified slightly in the presence of good 2. For instance Proposition 1(a) holds if $t_2 \leq t_2^*$ and so on. See Duttagupta (2000) for details.

[14] For a more extensive list of ROOs, see Falvey and Reed (1997).

The ROOs based on transformation or tariff classification requirements involve discrete changes that are not readily handled by differential calculus unless one works with a model with a continuum of production stages. For this reason, we will work with a ROO that is based on a value-added test. The specific form in which we define the ROO is as follows. Denote by θ the ratio of the intermediate input purchased from within the union to the total quantity of input used by the producers of good 1 in HC. That is to say,

$$(9) \qquad \theta = \frac{c_m + c_m^*}{c_m + c_m^* + c_m^W},$$

where c_m^W is the quantity of the input obtained from the ROW and $c_m + c_m^* + c_m^W = a_m X_1$. The ROO imposes a lower bound, denoted θ_R, on the choice of θ. Producers of good 1 from HC receive the tariff-inclusive price in FC only if they use fraction θ_R of the input from regional sources.[15] Formally, the price they receive in FC is given by,

$$(10) \qquad \begin{aligned} P_1^* &= (1+t_1^*) \text{ if } \theta \geq \theta_R \\ &= 1 \text{ if } \theta < \theta_R . \end{aligned}$$

If the ROO (i.e., θ_R) is set at a sufficiently high level, it creates a premium on the within-union supply of m thereby raising its price above unity. The precise price is then determined

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[15] Alternatively, the ROO can be defined in terms of the final good price or unit cost. The former would place a floor on the within-union value added as a proportion of the price in the importing country, i.e., on $[P_1^* - a_m(1-\theta)]/ P_1^*$. The latter would apply a floor to within-union cost as a fraction of total cost, i.e., on $[P_1^v + \theta\, a_m P_m]/[P_1^v + \theta\, a_m P_m + a_m(1-\theta)]$. As shown in Duttagupta (2000), these criteria are equivalent to each other and to that defined in (9) and (10).

endogenously by the regional demand for and supply of m. An understanding of how this price is determined is important for our subsequent analysis and requires a careful consideration.

4.1 Effects of the ROO: Positive Analysis

The price effects of the ROO depend on whether the initial FTA is trade diverting or trade creating in good 1. Hence, we consider both these cases individually.

<u>Case1: Purely Trade Diverting FTA in Good 1</u>: Consider the post-FTA supply of the value-added input, V_1, in HC and relate it to the *regional* market for m. These are depicted in Figures 3(a) and 3(b) respectively. In Figure 3(a), S^VS^V denotes the supply curve of V_1, the value-added input. Under the FTA with no ROO, the price received for V_1 is $1+t_1^*-a_m$. The quantity of V_1 supplied at this price equals OX_F, which is also the quantity of good 1 exported by HC at price $P_1^* = 1+t_1^*$.

Figure 3(b) shows the corresponding market for the intermediate input. $S_{m+m*}S_{m+m*}$ is the total, *union-wide* supply curve of m. At $P_m = 1$, the total supply within the union is OM_F^1. Given a_m and the supply of V_1 in Figure 3(a), we can compute the total demand for the input by HC. Let this demand be represented by OM_T. Let quantity OM_F equal the supply of m in HC plus the *export* supply of FC. The remaining demand for m in HC, M_FM_T, is satisfied by imports from outside the union. The value of θ in this situation is given by the ratio of OM_F to OM_T.

Now suppose that a ROO is introduced. Define $\theta_1 \equiv OM_F^1/OM_T$ so that θ_1 is the ratio of the total within-union supply of the input to its usage by the producers of good 1 in HC in the absence of a ROO. As long as the ROO is set at $\theta_R \le \theta_1$, exporters of good 1 do not feel the bite of the ROO. They satisfy the ROO by drawing extra units of m from input producers in FC and buying less from outside. Correspondingly, FC's producers of good 1 buy less of the input from their own input producers and more from outside. We have,

(11) $$P_m = 1 \text{ for } \theta_R \leq \theta_1$$

If the ROO is increased beyond θ_1, however, the supply of regional m must rise. This, in turn, requires an increase in the price of m. Since the regionally supplied m now carries a premium, P_m is no longer tied to the world price. Effectively, the regionally supplied m is a different input than that imported from outside the union.

Formally, the price of the regionally supplied input is now determined by the interaction of HC's demand for it and the total quantity supplied by the two countries together. That is to say, P_m is obtained by solving the following equation:

(12) $$\theta_R a_m \pi_1'(P_1^v) = \pi_m'(P_m) + \pi_m^{*\prime}(P_m);\ \forall\ \theta_R \text{ such that } \theta_1 \leq \theta_R \leq \theta_2.$$

The left-hand side of (12) represents the demand for the input by the exporters of good 1 in HC and the right-hand side its total within-union supply. The value-added price received for each unit of good 1 sold by the firms in HC to buyers in FC is $P_1^v = 1 + t_1^* - a_m\{\theta_R P_m + (1-\theta_R)\}$. For each unit of the input used by the producers of good 1 in HC, θ_R is purchased regionally at P_m and $1-\theta_R$ from outside the union at a price of 1. Thus, the effective price for each unit of m is $\theta_R P_m + (1-\theta_R)$.

The upper limit on θ_R, denoted θ_2 in equation (12), is chosen so as to ensure that the ROO does not become so restrictive as to lower P_1^v below $1 - a_m$. That is to say, θ_2 is obtained by solving,

(13) $$P_1^v \equiv 1 + t_1^* - a_m\{\theta_R P_m + (1-\theta_R)\} = 1 - a_m.$$

Or, equivalently,

(14) $$\theta_R = \frac{t_1^*}{a_m(P_m - 1)} \equiv \theta_2 .$$

Here P_m is obtained from equation (12). When θ_R exceeds θ_2, producers of good 1 in HC would rather import the input from the world market at the price of 1 and sell their output at home and thus earn $P_1^v = 1 - a_m$, unless the increase in the ROO is met by a corresponding fall in P_m to satisfy equation (14).[16]

Although P_m rises locally as we raise θ_R at $\theta_R = \theta_1$, this is not necessarily so at intermediate values. An examination of the effect of a change in θ_R on P_m using (12) and the first equality in (13) readily demonstrates this fact. Straightforward manipulations yield

$$(15) \qquad \frac{\theta_R}{P_m}\frac{dP_m}{d\theta_R} = \frac{[1 - \frac{a_m \theta_R \varepsilon_1}{P_1^v}(P_m - 1)]}{\varepsilon_m^D + \varepsilon_m^S}$$

where ε_1 is the elasticity of supply of good 1 in HC, ε_m^D the absolute value of the elasticity of demand for within-union m and ε_m^S the elasticity of total supply of m within the union. The first elasticity is defined with respect to P_1^v and the last two with respect to P_m. The denominator of (15) is positive. Therefore, since $P_m = 1$ at $\theta_R = \theta_1$, the right-hand side is unambiguously positive when the ROO is just binding. But once P_m has risen above 1, the numerator of (15) can turn negative. Note that even at the upper extreme value of θ_R, i.e., $\theta_R = \theta_2$, the right-hand side of (15) can be positive.

Intuitively, an increase in θ_R has two effects on the demand for m. At a constant output of good 1, the change increases the demand for m, which is a scale effect. But by reducing P_1^v (see

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[16] It is possible that θ_R reaches the value of 1 before P_1^v reaches $1 - a_m$, i.e., θ_2 solved in (14) is larger than unity. In this case, the upper limit on θ_R is 1 and the producers of good 1 in HC always find it more profitable to export to FC.

the definition of P_1^v above), it also reduces the output of good 1 and, hence, the demand for m, which is a substitution effect. At $P_m = 1$, the latter effect is absent so that the demand for m and hence P_m necessarily rises. At $P_m > 1$, both effects are present. The outcome now depends on the relative strength of the second effect. The larger is ε_1, i.e., the more elastic the export supply curve for good 1, the larger the output response of good 1 to the change in P_1^v and the larger the second effect.[17] Hence, P_m could monotonically increase with the ROO, if the first effect always dominates over the second. Again, P_m could first rise, then reach a maximum and then decline. We summarize these results in the following proposition.

Proposition 2: Assuming the union is purely trade diverting in the final good, P_m *may rise monotonically, have an inverted-U shape, or exhibit multiple peaks as a function of the ROO.*

We now turn to the purely trade creating case.

Case 2: Purely Trade Creating Union in Good 1: Recall that in this case, in the absence of a ROO, producers of good 1 in HC sell in their home market as well as in FC with the FTA price of the good dropping to the world price of 1. In this case, once the ROO becomes binding, an increase in it, which increases the cost of exports through an increase in P_m, can be sustained only by an increase in the consumer price of good 1 in FC. Given the fixed tariff on the imports from outside, such an increase is, indeed, feasible. Producers in HC simply divert their sales from FC towards the home market, which raises the price in the former market.

At a binding ROO, the consumer price of good 1 in FC, P_1^*, exceeds 1 by just enough to yield the exporters in HC the price they receive for value added in their own market, i.e.,

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[17] In the special case when $\varepsilon_1 = 0$, the second effect is absent such that P_m reaches a maximum when $\theta_R = \theta_2$.

$P_1^v = 1 - a_m$. Thus, P_1^* is endogenously determined by the size of the ROO. An increase in θ_R and hence P_m correspondingly results in a fall in the proportion of good 1 exported, which is denoted by γ^e. The fall in γ^e, in turn, leads to an increase in P_1^*. Now at a binding ROO, P_m, P_1^* and γ^e are endogenously determined by the following three equations:

(15) $\gamma^e\theta_R a_m \pi_1'(1-a_m) = \pi_m'(P_m) + \pi^*_m{}'(P_m)$; for $\theta_R \geq \theta_1$

(16) $P_1^* = 1 + a_m\theta_R(P_m - 1)$.

(17) $e_1^{*'}(P_1^*) - \pi_1^{*'}(P_1^* - a_m) = \gamma^e \pi_1'(1 - a_m)$

The left hand side of (15) is the demand for the regional intermediate input based on the proportion of total production used for exports, where as the right hand side is the overall regional supply. The left hand side of (17) is the total import demand for good 1 in FC and right hand side is the total exports of good 1 by HC. Differentiating these equations, the following proposition on the effect of a small tightening of the ROO at $\theta_R = \theta_1$ can be obtained.

Proposition 3: In the purely trade creating case, starting at $\theta_R = \theta_1$, *if we increase* θ_R, γ^e *decreases and* P_m *and* P_1^* *increase such that the value-added price received on exports,* P_1^v*, remains constant at* $1-a_m$.

At an initially strictly binding ROO, further increases in θ_R may be accompanied by a decrease in P_m as in the purely trade diverting case, due to a decline in demand for the intermediate input.

4.2 Effects of the ROO: Welfare

The ROO affects the joint welfare of the union in two ways. Its direct effect is to divert the demand for the intermediate input towards the inefficient regional source by distorting its price. Its indirect effect depends on the post FTA market for the final good that uses this input. In case 1, the increase in the cost of exports caused by the ROO reduces the export supply of good 1 and reverses the initial trade diversion in this market. However, in case 2, there is no trade diversion in this market to be reversed, and the ROO causes a distortion in the consumer price of the good in FC.

Proposition 4: (a) When the initial FTA is trade diverting in good 1 (case 1), and the ROO is increased at the weakly binding level, joint welfare of the partners improves, but as we continue to tighten the ROO, joint welfare can eventually fall. (b) When the initial FTA is trade creating in good 1(case 2), a tightening of a binding ROO weakly worsens the joint welfare of the union.

We can verify these conclusions by evaluating the welfare levels of HC and FC under the ROO and then differentiating the expression for joint welfare with respect to θ_R under the alternative cases.[18] The intuition behind Proposition 4 (a) can be best understood by referring to Figures 3(a) and 3(b). In Figure 3(a) the increase in ROO lowers the level of export production of good 1 from OX_F to OX_R. Thus, the increase in production efficiency in that market is given by area *abcd.* This area is FC's (and the unions') overall gain from substituting production from the less efficient HC to that from the ROW and is proportional to t_1^*, the external tariff on good 1. Figure 3(b) shows the cost of introducing a distortion in the regional market for m. This distortion is proportional to (P_m-1) and the associated cost is equal to area *efg.* The efficiency costs of distortion fall on HC and the union as a whole. When P_m is close to 1, the distortion is negligible and net joint welfare gains are positive. But as the ROO pushes P_1^v sufficiently close to 1 – a_m and the input price sufficiently far from 1, the extra gains from further tightening of the

[18] See Duttagupta (2000) for the detailed algebraic analysis.

ROO in the final-good market in Figure 3(a) can be smaller than the extra losses from the misallocation of resources in the input market in Figure 3(b). Thus, the tightening of the ROO would first raise welfare and then lower it.

Proposition 4(b) follows from the fact that, in the absence of the ROO, the FTA leads to the free-trade outcome. Therefore, at $\theta_R = \theta_1$, the effect of the introduction of a just binding ROO on joint welfare is second-order small and welfare neither rises nor falls. But as we tighten the ROO, welfare declines due to increased distortion in both the final-good and input markets. Note that the cost of the ROO on the exports of good 1 from HC is partially transmitted to the consumers of good 1 in FC through an increase in the price paid by them. This leads to a net loss in consumers' plus producers' surplus in good l, which is proportional to the distortion in the regional price of good m.[19]

5. Political Viability of FTA with ROO

We first consider the impact of ROOs on the viability of FTAs, outlining the analytic argument for how a ROO could make a previously infeasible FTA become feasible and alter the welfare implications of such changes. We then switch to the linear case to provide explicit examples that prove our main results.

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[19] The result in Proposition 4(b) can also be generated from Grossman and Helpman (1995). In their model, if transshipment of goods were allowed, then the FTA would effectively lead to free trade. To the extent ROO disallows transshipment, it also allows for some trade diverting FTAs. This result is close in spirit to Proposition 4(b). However, what does not follow from the Grossman-Helpman model is the possibility that ROOs can be welfare improving, which becomes clear when we consider the linkages between intermediate and final goods as we do here.

5.1 ROOs, FTA Viability and Welfare

The introduction of a binding ROO increases the regional price of m, and hence the returns to the owners of $\overline{K}_m$ and $\overline{K}_m^*$. It is this key effect of the ROO that can make previously infeasible FTAs become feasible. In terms of the objective function being maximized, recall from Section 3 (Proposition 1) that in the absence of a ROO, the FTA leads to a reduction in G^* relative to its level under the MFN tariff. The increase in the returns to $\overline{K}_m^*$, induced by the ROO, may reverse this reduction. In terms of the Grossman-Helpman set-up, the ROO enhances the potential lobbying strengths of input producers. These lobbyists may therefore help switch the government's decision in favor of the FTA in the country that rejected it in the absence of the ROO. More precisely, the outcome in the presence of a ROO can be summarized in the following proposition:

Proposition 5: *(a) An initially infeasible FTA that reduces joint welfare of the union (case 1) can become feasible after the inclusion of a ROO. (b) An initially infeasible FTA that improves the joint welfare of the union (case 2) can become feasible at the inclusion of the ROO, although the ROO supporting it can be so distortionary that joint welfare of the union actually falls with the FTA.*

We first offer the intuitive argument underlying Proposition 4. The definite proof will be shown by recourse to numerical examples below. First consider Proposition 5 (a). Recall from Proposition 1 that the FTA is unambiguously endorsed by HC in the absence of the ROO. When the FTA includes the ROO, the return to $\overline{K}_1$ remains at least as high as that under the MFN tariff. In addition, when the ROO binds, the owners of $\overline{K}_m$ benefit more in the presence of the ROO than in its absence. This implies that the FTA with ROO remains acceptable to HC.

Thus, the fate of the FTA is determined by FC. Recall that in the absence of ROO, FC votes against the FTA due to the tariff revenue loss in the final good market but no compensating gain in the input market. In the presence of the ROO, the tariff revenue loss in sector 1 is less and profits in sector m are strictly higher than under the MFN tariffs. Moreover, the increase in the profits gets a larger weight in G^* than the loss in tariff revenue. These factors help raise G^* and may make it larger than under MFN tariffs.

Now consider the welfare implications of this FTA. From Proposition 4 (a) we know that the initiation of a strictly binding ROO improves joint welfare of the union relative to the situation where there were no ROOs. However, joint welfare of the union under the FTA could still be less compared to that under the initial MFN equilibrium.

Next, consider Proposition 5 (b). Because the owners of $\overline{K}_1$ receive as much as under MFN while the owners of $\overline{K}_m$ benefit with a strictly binding ROO, HC votes in favor of the FTA. Again, the outcome of the FTA depends on the FC. FC's vote may be positive or negative in the absence of the ROO. When it is negative, it may once again switch due to the fact that the ROO increases the price of good 1 as well as m. This redistributes income in favor of producers and, for sufficiently high values of g^*, may turn a previously negative vote into a positive one.[20]

Now consider the welfare outcome of this FTA. From Proposition 4 (b) we know that the initiation of the binding ROO worsens joint welfare of the union. Hence, at a stringent ROO

[20] We note that there are also cases when the ROO can make previously feasible FTAs infeasible. From a practical standpoint, we regard these cases as less interesting and do not explore in detail here. Some further details can be found, however, in Duttagupta (2000).

while the FTA might become politically feasible, it might be harmful for the union in term of welfare.

We now consider specific numerical examples to substantiate our argument in Proposition 5.

5.2 ROO, FTA Viability and Welfare: Numerical Examples

Denote the demand function for final good 1 in HC by $D_1 = D - cP_1$ and the supply functions for goods 1 and m by $X_1 = \alpha_1 P_1^v$ and $M = \alpha_m P_m$ respectively where c > 0 and $\alpha_k > 0$ for k = 1, m. Assume also that both governments assign identical weights to social welfare, g. Then, at the MFN equilibrium, the tariffs for good 1 in FC and input m in HC (following the derivations in Section 2) are given by:

$$(18) \qquad t_1^* = \frac{(1-a_m)\alpha_1^*}{g(\alpha_1^*+c)-\alpha_1^*}. \; t_m = 0.$$

Consider first the welfare implications of the FTA in the absence of the ROO.

Case 1: Purely Trade Diverting Case: This purely trade diverting case requires that the total, within union supply in the FTA equilibrium without ROO be smaller than the total demand of the FC. This condition implies:

$$(19) \qquad D^* - (1+t_1^*)c > (\alpha_1+\alpha_1^*)\,(1+t_1^*-a_m)\,.$$

From Proposition 1(a), FC rejects this FTA in the absence of the ROO. We also know that being purely trade diverting, the proposed FTA lowers the joint welfare of the union.

To investigate the fate of the FTA under the ROO, note that the endogenous price of the regional intermediate input in the present case is given by,

$$(20) \qquad P_m = \frac{a_m\theta_R\,(1+t_1^*-a_m)+a_m^2\theta_R^2}{\beta_m+a_m^2\theta_R^2}, \text{ where } \beta_m = \frac{\alpha_m+\alpha_m^*}{\alpha_1}\,.$$

For the above price of regional m, the difference between the value of G^* under the FTA with ROO and MFN tariffs can be shown to be equal to

$$\text{(21)} \qquad G^*_{ROO}\text{-}G^*_{MFN} = -\,g\underbrace{\{t_1^*\alpha_1(1+t_1^*\text{-}a_m - a_m\theta_R(P_m - 1))}_{\text{Tariff revenue loss from good 1}} + (1+g)\underbrace{\frac{\alpha_m^*}{2}\{(P_m)^2 - 1\}}_{\text{Increase in rents of m}}.$$

The price in (21) and, hence, the right-hand side expression in (22) are non-linear in θ_R. To obtain numerical solutions, we simulate P_m for a range of strictly binding values of θ_R. The parameters satisfy the conditions required to maintain the initial MFN pattern of trade and to maintain equation (19) required to validate case 1. The slope parameter α_1^* is varied to obtain a range of equilibrium MFN tariffs t_1^* ranging from 20% to 40%. The simulation results are given in Figure 4(a) for two particular values of t_1^* ($t_1^* = 0.24$ and 0.32) and $g = 1$. The upper left Panel of Figure 4(a) shows the movements of P_m with ROO. For both tariff rates, $t_1^* = 0.24$ and $t_1^* = 0.32$, P_m achieves a maximum at a ROO between 0.90 and 0.95. Meanwhile the lower left panel indicates that the value-added export price P_1^V falls monotonically with increases in the ROO. On the lower right hand panel, G^*_{ROO}-G^*_{MFN} increases with increase in ROO. The FTA is weakly endorsed by FC when G^*_{ROO}-G^*_{MFN} is zero. This happens at $\theta_R = 0.92$ when $t_1^* = 0.24$ and at $\theta_R = 0.96$ when $t_1^* = 0.32$. However, at these ROOs, the change in the union's joint welfare, shown in the upper right panel, is negative; the FTA continues to be welfare reducing after the inclusion of the ROO. These simulations validate proposition 5 (a) for the trade diverting FTA.

Case 2: Purely Trade Creating Case: This purely trade creating case requires that the total, within union supply in the FTA equilibrium without ROO be equal to the total demand of the FC. For the assumed demand and supply curves, this condition implies:

$$\text{(22)} \qquad D^* - c = \alpha_1^*(1 - a_m) + \gamma^e\alpha_1(1 - a_m),$$

where γ^e is as defined in Section 4. This FTA is welfare improving for FC and has no effect on the welfare of HC. Being purely trade creating in the absence of a ROO, the FTA necessarily improves joint welfare.

In HC, the FTA leaves the value of G unchanged so that it weakly accepts the FTA. However, in FC, the reduction in the price of good 1 can lower the value of G^* by lowering the return on $\overline{K}_1^*$. In terms of the Grossman-Helpman set-up, counter lobbies from $\overline{K}_1^*$ can force the equilibrium outcome to be a pressured MFN stance.

Consider now the FTA in the presence of a ROO. Initially, a binding ROO increases the input price, which in turn, raises the price of good 1 faced by consumers in FC. We maintain all parameter values at the same values as under case 1 except α_1, which is assigned a higher value to ensure higher export capacity of good 1 in conformity with equation (24). It is verified that for the assumed values of the parameters, the value of G^* under the FTA without ROO is less than that under MFN tariffs.

The three equations determining P_m, P_1^* and γ^e are given by:

(23) $$P_m = \frac{\alpha_1}{\alpha_m + \alpha_m^*}\theta_R \gamma^e a_m (1 - a_m),$$

(24) $$P_1^* = 1 + a_m \theta_R (P_m - 1), \text{ and}$$

(25) $$\gamma^e = \frac{(D^* - cP_1^*) - \alpha_1^*(P_1^* - a_m)}{\alpha_1 (1 - a_m)}.$$

The results of the simulation are given in Figure 4(b). Note that $G^*_{ROO} - G^*_{MFN}$ is strictly positive for all ROOs, implying that the FTA is unambiguously endorsed by FC. Also notice, that the price of good 1 in FC, P_1^*, increases monotonically with the increase in the stringency of the ROO. If the ROO is such that $\theta_R \leq 0.35$, then joint welfare improves with the FTA. However, for $\theta_R > 0.35$, the ROO is so distortionary that joint welfare of the union actually falls with the FTA.[21] These simulations validate proposition 5 (b) for the trade creating FTA.

6. Conclusion

This paper offers an analysis of the relationship among traded intermediate inputs, rules of origin, welfare and political feasibility of FTAs. Our main results may be summarized as follows. First, contrary to the general impression in the policy literature, a ROO may improve or worsen the joint welfare of the union.

Second, the price distortion created by the ROO has a direct bearing on the political economy of the FTA endorsement. By increasing rents for the interest group that owns the intermediate input, the ROO strengthens their potential influence on the government. Therefore there are situations when a member who unambiguously votes against the FTA in the absence of ROO would switch its vote in its presence.

Finally and most importantly, the paper addresses the social desirability of an FTA that becomes feasible after the inclusion of a ROO. We offer two results that have potentially important policy implications. One, an initially infeasible but welfare-reducing FTA becomes feasible after the inclusion of the ROO. And two, an infeasible but joint welfare improving FTA becomes feasible upon ROO inclusion. However, the ROO can be so distortionary that after including its inclusion, the FTA becomes joint welfare diminishing.

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[21] This is an important caveat to bear in mind for FTAs like the North American Free Trade Agreement (NAFTA) where the value-added ROOs in most sectors are typically between 0.50 and 0.625.

Our paper provides insight into the politics behind the widespread use of product specific ROOs in the FTAs. For instance, the successful lobbying for strict ROO by the auto parts manufacturers in the United States under NAFTA did increase the trade in auto parts between Mexico and the United States. Similarly, the yarn forward rule directing trade in textiles in the NAFTA (which virtually amounts to a 100% value-added ROO) has played a crucial role in the phenomenal expansion of the U.S-Mexican trade in textiles.[22] As this analysis has shown, ROOs that protect domestic import competing industries *as well as* intermediate exporting industries improve the chances of FTA endorsement for the country exporting inputs and importing final goods. However, the FTA that is supported by stringent ROOs may not be desirable as Anne Krueger has often argued.

In conclusion, we note that we have treated the size of the ROO as exogenous. This can itself be subject to industry specific lobbying as evident from the experiences of the automotive parts, electronics, and textiles sectors under NAFTA. This feature can be incorporated into the analysis of the paper along the lines of the exclusion of sensitive sectors in Grossman and Helpman (1995). In view of the space constraints, we leave this extension to a future paper.

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[22] See Joseph A. LaNasa (1993) for an analysis of the restrictive nature of ROOs under the NAFTA.

References

Andriamananjara Soamiley. 1999. “On the Size and Number of Regional Integration Arrangements: A Political Economy Model,” University of Maryland, mimeo.

Bagwell, Kyle and Robert W. Staiger. 1997a. “Multilateral Tariff Cooperation During the Formation of Free Trade Areas,” International. Economic Review, 38:2, May, pp. 291-319.

Bagwell, Kyle and Robert Staiger. 1997b. “Multilateral Tariff Cooperation During the Formation of Customs Unions,” Journal of International Economics 42:1-2, pp. 91-123.

Baldwin, Richard. 1995. “A Domino Theory of Regionalism” in Expanding Membership of the European Union. Richard Baldwin, P. Haaparnata, and J. Kiander, eds. Cambridge, U.K: Cambridge University Press, pp. 25-53.

Bernheim, FC. Douglas and Michael D. Whinston. 1986. “Menu Auctions, Resource allocation, and Economic Influence.” Quarterly Journal of Economics, 101(1), pp 1-31.

Bhagwati, Jagdish. 1993. “Regionalism and Multilateralism: An Overview,” in *New Dimensions in Regional Integration.* Jaime de Melo and Arvind Panagariya, eds. pp. 22-51

Bhagwati, Jagdish, Pravin Krishna and Arvind Panagariya, eds. 1999. *Trading Blocs: Alternative Approaches to Analyzing Preferential Trade Agreements*, Cambridge, MA: MIT Press.

Bhagwati, Jagdish and Arvind Panagariya. 1996. “The Theory of Preferential Trade Agreements: Historical Evolution and Current Trends.” American Economics Review 86:2, pp. 82-87.

Bond, Eric W. and Constantinos Syropoulos. 1996. “The Size of Trading Blocs, Market Power and World Welfare Effects,” Journal of International Economics. 40:3-4, pp. 411-437.

Cadot, Olivier, Jaime de Melo and Marcelo Olarreaga, 1999. "Regional Integration and Lobbying for Tariffs Against Non-Members," *Int. Econ. Rev.* 40(3), 635-57.

Deardorff, Alan and Robert Stern. 1994. "Multilateral Trade Negotiations and Preferential Trading Arrangements," in *Analytical and Negotiating Issues in the Global Trading System.* Alan

Deardorff and Robert Stern, eds. Ann Arbor, MI: University of Michigan Press, pp. 53-85.

Duttagupta, Rupa. 2000. "Intermediate Inputs and Rules of Origin: Implications for Welfare and Viability of Free Trade Agreements", University of Maryland, Ph.D. Thesis.

Ethier, Wilfred, J. 1998. "Regionalism in a Multilateral World", Journal of Political Economy 106:6, pp. 1214-45.

Falvey, Rod and Geoff Reed. 1997. "Rules of Origin as Commercial Policy Instruments," University of Nottingham.

Falvey, Rod and Geoff Reed. 1998. "Economic Effects of Rules of Origin," *Weltwirtschaftliches Archiv 134, No. 2*.

Grossman, Gene and Elhanan Helpman. 1994. "Protection for Sale," American Economic Review, September, Vol. 84, pp 833-850.

Grossman, Gene and Elhanan Helpman. 1995. "The Politics of Free Trade Agreements," American Economic Review, September, Vol. 85, pp 667-690.

Ju, Jiandong and Kala Krishna. 1998. "Firm Behavior and Market Access in a Free Trade Area with Rules of Origin," NBER Working Paper No. 6857.

Krishna, Pravin. 1998. "Regionalism and Multilateralism: A Political Economy Approach", Quarterly Journal of Economics, 113 No. 1, pp 227-251.

Krishna, Kala and Anne O. Krueger. 1995. "Implementing Free Trade Areas: Rules of Origin and Hidden Protection," in *New Directions in Trade theory,* A. Deardorff, J. Levinsohn and R. Stern, ed., University of Michigan Press.

Krueger, Anne O. 1995. "Free Trade Agreements Versus Customs Unions," NBER Working Paper No. 5084.

Krueger, Anne O. 1999. "Free Trade Agreements as Protectionist devices: Rules of Origin," in *Trade Theory and Econometrics : Essays in Honour of John S. Chipman*. James R. Melvin, James C. Moore and Raymond Riezman, eds. New York: Routledge.

Krugman, Paul. 1991. "Is Bilateralism Bad?" in E. Helpman and A. Razin (eds.), *International Trade and Trade Policy*, Cambridge, Mass.: MIT Press, pp. 9-23.

LaNasa, Joseph. 1993. “Rules of Origin under the North American Free Trade Agreement: A Substantial Transformation into Objectively Transparent Protectionism”, Harvard International Law Journal, Vol. 34, No.2.

Levy, Philip. 1997. “A Political-Economic Analysis of Free Trade Agreements,” American Economic Review 87(4), pp 506-519

Lopez, Ramon. and Arvind Panagariya. 1992. “On the Theory of Piecemeal Tariff Reform: the Case of Pure Imported Intermediate Inputs,” American Economic Review, June, Vol. 82, pp 615-625.

Olson, Mancur. 1965. “The logic of Collective Action”, Cambridge, MA: Harvard University Press.

Panagariya, Arvind. 1999. “The Regionalism Debate: An Overview,” *World Economy* 22, 477-511.

Panagariya, Arvind. 1999. “Preferential Trading and Welfare: The Small-Union Case Revisited”, University of Maryland, mimeo.

Panagariya, Arvind. 2000. “Preferential Trade Liberalization: The Traditional Theory and new Developments”, *Journal of Economic Literature* XXXVIII, 287-331.

Srinivasan, T.N. 1993. “Regionalism versus Multilateralism: Analytical Notes. Comment,” in *New Dimensions in Regional Integration*, Jaime de Melo and Arvind Panagariya eds. Cambridge, Great Britain: Cambridge University Press, pp. 84-89.

Viner, Jacob. 1950. *The Customs Union Issue*. New York: Carnegie Endowment for International Peace.

Yi, Sang-Seung. 1996. “Endogenous Formation of Customs Unions under Imperfect Competition: Open Regionalism is Good,” Journal of International Economics. 41:1-2, pp. 153-77.

Figures

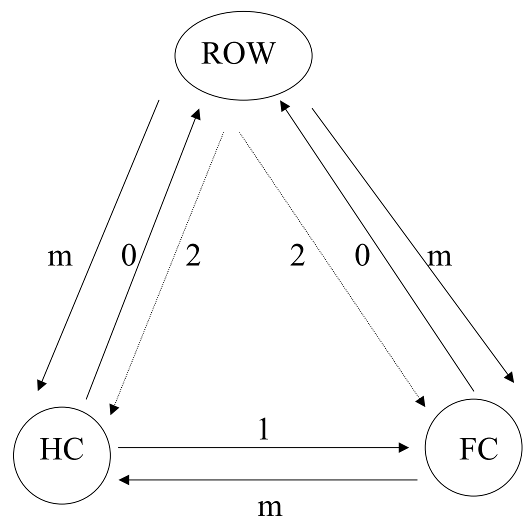

Figure 1: Direction of Trade Under MFN Tariffs

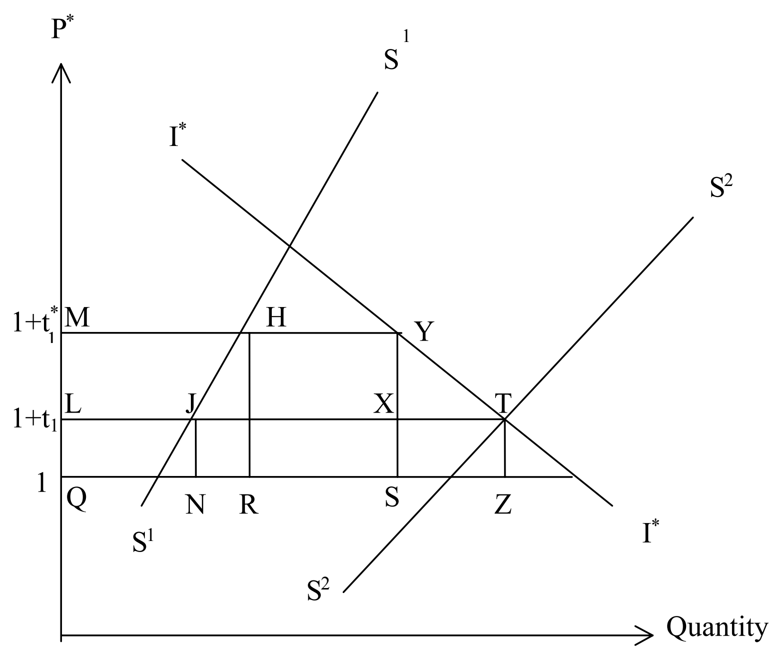

Figure 2: Post FTA market of an import good in FC

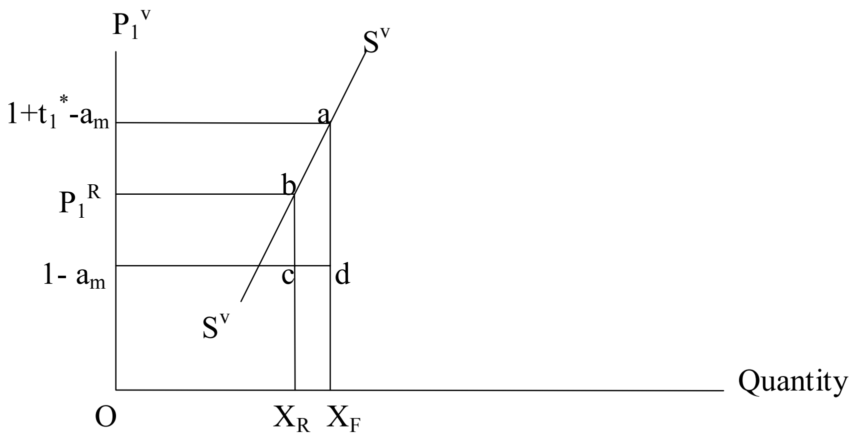

Figure 3a: Value Added in Sector 1

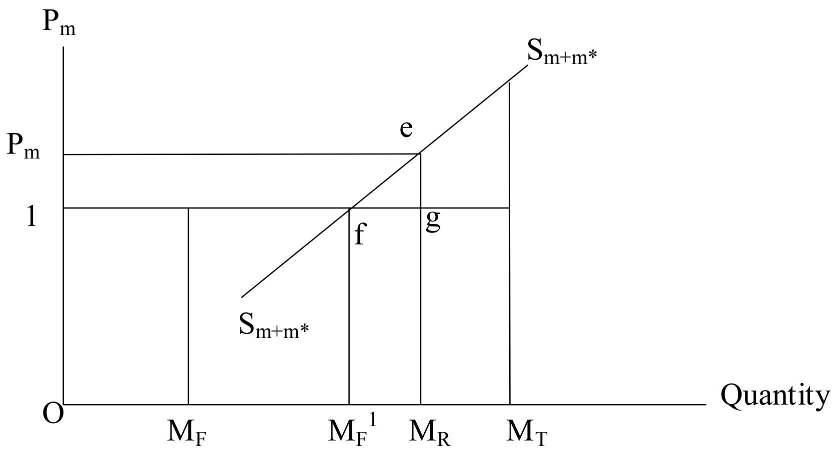

Figure 3b: The Regional Market for m

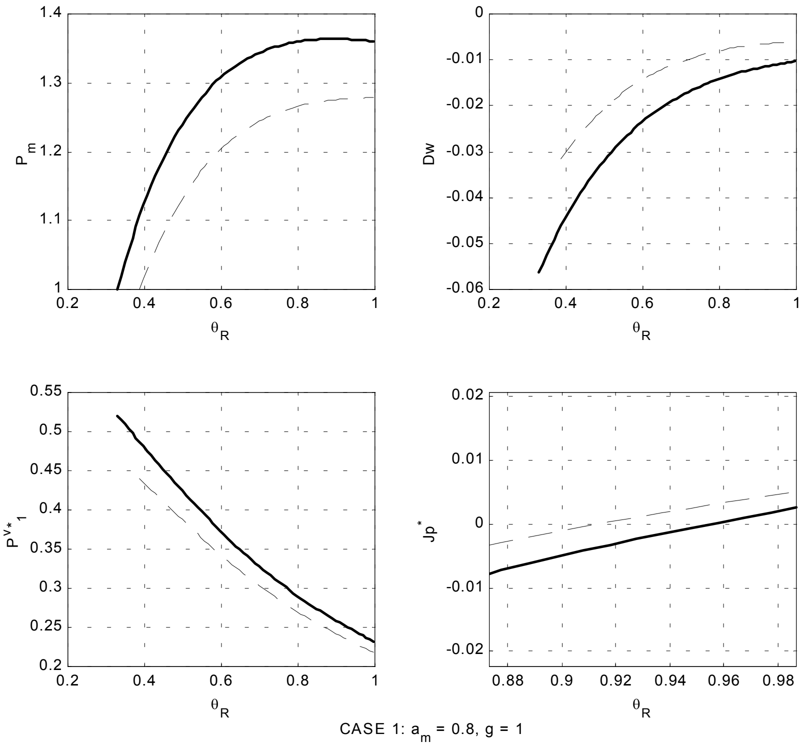

Figure 4(a) $\alpha_m = 0.05,\ \alpha_m^* = 0.1,\ \alpha_1 = 1.1,\ D^* = 1,\ c = 0.2$; ___ $t_1^* = 0.32$, --- $t_1^* = 0.24$

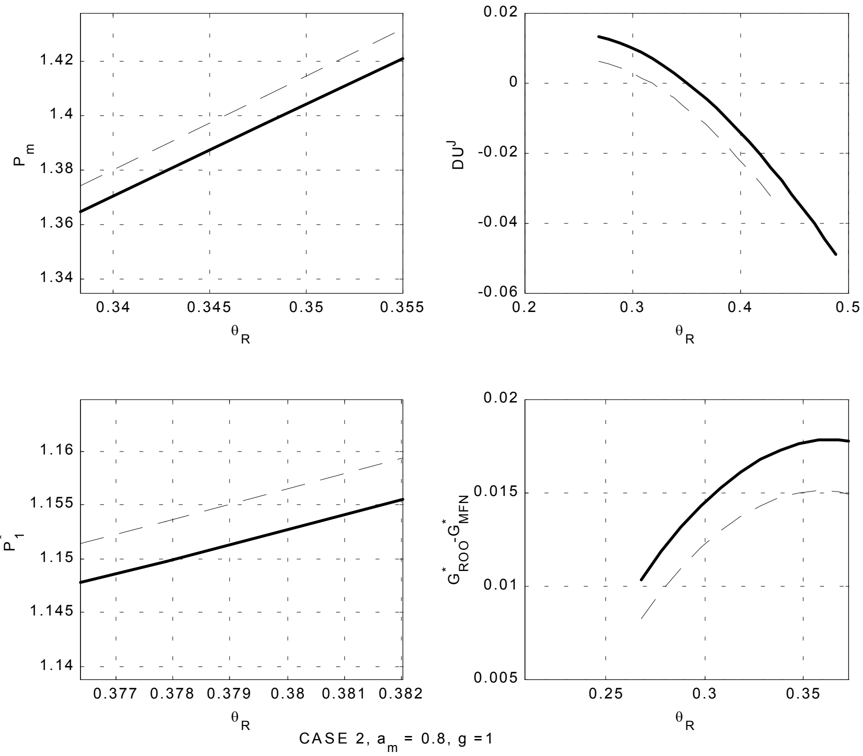

Figure 4(b) $\alpha_m = 0.05$, $\alpha_m^* = 0.1$, $\alpha_1 = 3.5$, $D^* = 1$, $c = 0.2$, ___ $t_1{}^* = 0.24$, --- $t_1{}^* = 0.32$