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Small Is Beautiful

Preferential Trade Agreements and the Impact of Country Size, Market Share, Efficiency, and Trade Policy

Maurice Schiff

The smaller the volume (or share) of imports from the trading partner, the larger the impact of a preferential trade agreement on home country welfare — because the smaller the imports, the smaller the loss in tariff revenue. And the home country is better off as a small member of a large bloc than as a large member of a small bloc.

Summary findings

There has been a resurgence of preferential trade agreements (PTAs) partly because of the deeper European integration known as EC-92, which led to a fear of a Fortress Europe; and partly because of the U.S. decision to form a PTA with Canada. As a result, there has been a domino effect: a proliferation of PTAs, which has led to renewed debate about how PTAs affect both welfare and the multilateral system.

Schiff examines two issues: the welfare impact of preferential trade agreements (PTAs) and the effect of structural and policy changes on PTAs. He asks how the PTA's effect on home-country welfare is affected by higher demand for imports; the efficiency of production of the partner or rest of the world (ROW); the share imported from the partner (ROW); and the initial protection on imports from the partner (ROW).

Among his findings:

• An individual country benefits more from a PTA if it imports less from its partner countries (with imports measured either in volume or as a share of total imports).

This result has important implications for choice of partners.

• A small home country loses from forming a free trade agreement (FTA) with a small partner country but gains from forming one with the rest of the world. In other words, the home country is better off as a *small* member of a *large* bloc than as a large member of a small bloc. This result need not hold if smuggling is a factor.

• Home country welfare after formation of a FTA is higher when imports from the partner country are *smaller*, whether the partner country is large or small. Welfare worsens as imports from the partner country increase.

• In general, a PTA is more beneficial (or less harmful) for a country with lower import demand. A PTA is also more beneficial for a country with a more efficient import-substituting sector, as this will result in a lower demand for imports.

• A small country may gain from forming a PTA when smuggling is a factor.

Small is Beautiful: Preferential Trade Agreements and The Impact

of Country Size, Market Share, Efficiency and Trade Policy.

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I. Introduction

The welfare impact of preferential trade agreements (PTAs) is an issue which has been the subject of an ongoing debate. Early contributions are Viner (1950), Meade (1955) and Lipsey (1960). Much of the early work was stimulated by the integration experiments taking place in Europe (e.g., Meade 1956). The 1990s have seen a resurgence of North-South PTAs in the Americas and between the EU and Mediterranean and Eastern European countries, and of South-South PTAs such as MERCOSUR in South America, the ASEAN Free Trade Agreement or AFTA in South-East Asia, and the Cross-Border Initiative in sub-Saharan Africa.[1]

The resurgence of PTAs is due in part to the deeper European integration known as EC-92 which led to a fear of a "Fortress Europe", and in part to the U.S. decision to form a PTA with Canada. This has resulted in a domino effect, with a proliferation of PTAs (Baldwin, 1995). These events have led to renewed debate on the impact of PTAs on welfare, as well as on the impact of PTAs on the multilateral system (Winters 1996).

The literature on the welfare effect of PTAs has distinguished between the effect on the PTAs' member countries and the effect on the rest of the world (ROW). This paper focuses on the member countries.

PTAs affect both the exports and the imports of member countries. The following claims,

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[1]Recent experience and future prospects involving the EU are examined in Winters (1993).

related to the impact on home country welfare of changes on the export side, are not subject to debate: i) improved access for home country exports to the partner's market raises the welfare gain (or reduces the welfare loss) of a PTA; ii) the benefit of improved market access is larger the larger the home country's post-integration exports to the partner country; and iii) the benefit of improved market access is larger the larger the partner's reduction in trade barriers.

On the other hand, the welfare impact on the home country of changes in imports associated with the formation of PTAs is still subject to debate. Consequently, the focus of the analysis in this paper is on the import side. A PTA results in trade creation and trade diversion. The former raises welfare, while the latter has both a welfare-reducing and a welfare-increasing effect (with a presumption that the net effect of trade diversion is negative). Thus, the welfare impact of a PTA is ambiguous a priori. Moreover, it is perfectly likely that while PTA members as a whole may be better off, individual members may still lose - for example because of possible losses in tariff revenues (which are captured either partly or fully by the other members as an improvement in their terms of trade).

Not only has the welfare impact of PTAs on member countries been a matter of debate, but the effect of changes in structural and policy variables on the welfare impact of PTAs has been subject to debate as well. Some of the questions examined below, and which have not been conclusively answered in the literature, are:

How is the impact of a PTA on home country welfare affected by a higher

a) demand for imports?

b) efficiency of production of the partner (ROW)?

c) share imported from the partner (ROW)?

d) initial protection on imports from the partner (ROW)?

A. 'Natural' Trading Partners

A number of studies argue that if two countries or regions are 'natural' trading partners, they are more likely to gain from a PTA between them. First, Summers (1991) states that "... to the extent that blocs are created between countries that already trade disproportionately, the risk of large amounts of trade diversion is reduced". Second, in a 1995 communication from the EU Commission to the Council entitled "Free Trade Areas: An Appraisal" (henceforth referred to as the "EU Report"), it is stated that PTAs formed with natural trading partners are less likely to have detrimental trade diversion effects. Third, Lipsey (1960) states that "... given a country's volume of international trade, a customs union is more likely to raise welfare the higher is the proportion of trade with the country's union partner and the lower the proportion with the outside world."[2]

Fourth, Park (1995) states that "The smaller the intra-regional shares in total trade ... the more likely the trading blocs would become trade diverting." Fifth, Wonnacott and Lutz (1989) argue that, ceteris paribus, since proximity between PTA members increases trade among them,

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[2]It should be noted that, from the example used in his paper, what Lipsey seems to have in mind - when talking about the proportion of goods traded - is the proportion of different products traded. Lipsey argues (p. 507) that when a customs union is formed, the relative price between imports from the partner and domestic goods is brought into conformity with the real rates of transformation, while the relative price between imports from the partner and from the outside world is moved away from equality with real rates of transformation. Hence, the larger are purchases of domestic commodities and the smaller are purchases from the outside world, the more likely it is that the union will raise welfare. Lipsey concludes that the size of imports from the partner is unimportant.

it reduces the extent of trade diversion and increases the benefits of PTAs, a point also made by Deardorff and Stern (1994). And sixth, drawing on Jaquemin and Sapir (1991) and on Wonnacott and Lutz (1989), Langhammer (1992) also reaches the same conclusion.

The studies mentioned above examine welfare from the viewpoint of the regional bloc as a whole. In Section II, several counter-examples are used to show that their result does not hold in general. Second, it is shown - in Section II for the small-country case and in Section III for the large-country case - that the opposite holds from the viewpoint of an individual member country. In other words, an individual country benefits more from a PTA if it imports less from its partner countries (with imports measured either in volume or as a share of total imports). This result has important implications for individual countries' choice of partner countries when contemplating forming a PTA or joining an existing one.

B. Other Issues

A second claim which has been made is that, other things equal, it is better for a small home country to form a PTA with a large country rather than with a smaller one. For instance, it has been argued that Chile would do better by forming a PTA with a large region such as NAFTA than with a (smaller) South American country. And Morocco would be better off by forming a PTA with the EU than with Algeria or Tunisia. This issue is examined in Section II.

A third claim is that the higher the post-union tariff on the ROW, the higher the potential for trade diversion and the lower the benefit of the PTA. For instance, Leipziger and Winters (1995) and Schiff (1995) argue that a FTA between Chile and NAFTA will generate larger gains (or smaller losses) for Chile if it lowers its uniform tariff rate from its present level of 11 percent.

This issue is also examined in Sections II and III.

A fourth claim is that, other things equal, it is better for the home country to form a PTA with a region which is more rather than less efficient. The presumption is that the more efficient the partner in the PTA, the larger the potential for trade creation and the smaller the potential for trade diversion. This question is addressed in Section III.

Section II, which draws on Panagariya (1995a, 1995b), examines the welfare impact of a PTA between small countries, between a small and a large country, and how the welfare impact of a PTA is affected by changes in the level of imports. Section III expands and generalizes on previous work by examining the case of large countries. It provides an algebraic solution for the case where the slope of the supply functions (of exports from the partner country and the ROW to the home country) and the initial home country tariffs on the partner country and on the ROW can take any non-negative value.[3] Section III.1 presents the model and the solution for the welfare impact of a PTA on member countries. The effect on the welfare impact of a PTA of changes in various structural parameters and policy variables is derived in Section III.2. Section IV examines how the welfare impact of a PTA between small countries is affected by smuggling and by rules of origin. Section V concludes.

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[3]Cawley and Davenport (1988) examine the impact of removing internal barriers in the EU in a partial equilibrium framework. Their analysis differs in two important ways from the one presented here. First, the internal barriers they examine are sources of real resource costs rather than transfers as in the case of tariffs. Second, they do not examine the effect of changes in structural variables on the impact of PTAs.

II. The Small-Country Case

The issue of the welfare impact of a PTA and how trade shares affect it was examined in Panagariya (1995a) for the case where the partner country's supply curve is upward sloping and the ROW's supply is infinitely elastic. Panagariya (1995b) also examines the opposite case where the partner's supply is infinitely elastic and the ROW's supply curve is upward sloping, while Bhagwati and Panagariya (1995) examine the cases where either one or both of the two sources of imports has an infinitely elastic supply curve.

Assume three countries: the home country, the partner country and the rest of the world (ROW). Assume that markets are perfectly competitive, and that goods imported from the ROW, from the partner country, and domestically produced import substitutes are homogeneous.[4] The analysis is carried out in partial equilibrium. This assumes that there are no distortions in the rest of the economy or that the importable sector which is examined is small and has no impact on the rest of the economy.

Assume the home country and the partner country form a free trade agreement (FTA). The home and partner countries are assumed to be small relative to the ROW. This is especially relevant for PTAs between developing countries in sub-Saharan Africa, the Maghreb, South-East Asia, the Middle East and Central America. The home and partner countries take the price from

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[4]The assumptions of perfect competition and homogeneity hold most closely for agricultural and mineral commodities. However, manufactured goods are generally heterogeneous, and imports from one region are often imperfectly substitutable with imports from other regions and with domestically produced goods. On the welfare effect of a PTA under heterogeneous goods for a small open economy facing infinitely elastic import supplies from both the partner and the ROW, see Rutherford, Rutstrom and Tarr (1994) who apply their analysis to the case of a PTA between Morocco and the EU.

the ROW, P_W, as given. This is shown in Figure 1.

D_H represents the home country's demand for imports, S_P represents the partner's supply of exports facing the home country, and S_{ROW} is the supply from the ROW. Under free trade, imports equal Q_4, and home country welfare W_H = triangle ACE. Assume now that the home country imposes an MFN tariff T. Then, the price of imports from the ROW faced by home country producers and consumers rises to $P_W' = P_W + T$, and S_{ROW} shifts to S'_{ROW}. Similarly, S_P shifts to S'_P. Imports from the partner country equal Q_1, imports from the ROW equal $Q_3 - Q_1$, with total imports of Q_3. W_H^{MFN} = surplus ABF + tariff revenue BDEF, and is lower than W_H under free trade by triangle BCD.

Assume the home country now forms a FTA with the partner country. As the partner country no longer pays the tariff T, its export supply curve shifts to S_P. The ROW still pays the tariff T, so the home country price remains P_W'. Hence, partner country imports increase from Q_1 to Q_2, while the imports from the ROW fall from Q_3-Q_1 to Q_3-Q_2. This results in a worsening in the home country's terms of trade. Welfare is W_H^{FTA} = ABF + BDIG. In other words, the FTA has no impact on the consumer surplus because the price is not affected, but there is a loss of tariff revenue.[5] W_H^{FTA} is lower than W_H^{MFN} by EFGI, the tariff revenue lost on imports from the partner country after forming the FTA. Note that the welfare loss to the home country would occur in the absence of trade diversion as well (e.g., the loss would be EFGI if S_P were vertical at level Q_2).

The home country welfare loss from the FTA is proportional to the level of partner

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[5]In Section III where I examine the large-country case, a FTA does affect the consumer surplus.

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Figure 1. FTA Between Small Countries
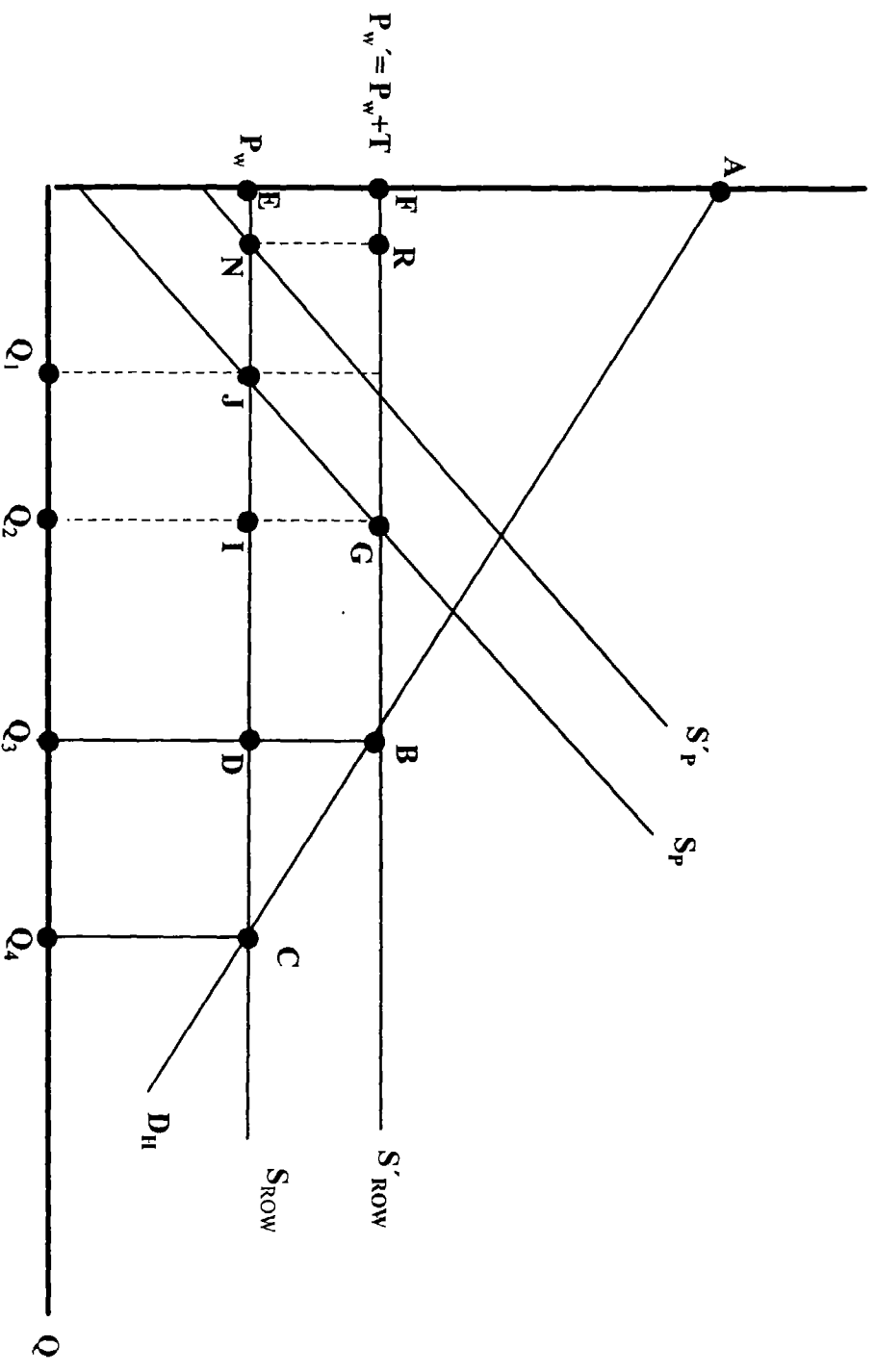
country imports. Consequently, the loss from a FTA with a 'natural' trading partner is larger if imports from the partner are larger. In Section III, I show that this result holds under more general conditions where the slopes of both supply curves and both tariff levels (on imports from the partner country and from the ROW) can take any positive value. Note also that if the MFN tariff were lower than T, the welfare loss from the FTA would be smaller than area EFGI both because of lower imports from the partner and because of the lower tariff rate. As is shown in Section III, this result holds in the general case as well.

The partner gains EFGJ, which is less than the home country loss of EFGI by the triangle GIJ. The reason for the net loss of triangle GIJ for the FTA members as a whole is due to the trade diversion of $(Q_2 - Q_1)$ which was previously imported from the ROW at a cost of P_W but which is now produced at a higher marginal cost.

Section I.A on 'natural' trading partners listed several studies which argued that a regional bloc would be better off if its members traded a larger share among themselves relative to their total trade. However, as shown in Figure 1, the welfare loss GIJ to the members of the FTA is independent of the level of trade between the partners (Q_2) or of the share of trade between the partners relative to their total trade (Q_2/Q_3). Rather, the loss GIJ depends on the the elasticity of the partner's supply curve (S_p) and on the level of the tariff (T). The more elastic S_p and the higher the tariff, the larger the loss. Note that a higher initial tariff implies a larger share traded with the partner (since Q_2 increases and Q_3 falls).[6] In this case, the loss to the FTA increases with

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[6]This result holds also if the share is the one before the formation of the FTA (Q_1/Q_3). Since the home country price rises by the full amount of the MFN tariff T, the (net-of-tariff) producer price for exports by the partner country to the home country remains unchanged as the MFN tariff rises. Thus, the amount Q_1 imported from the partner does not change as the MFN tariff rises.

the share traded with the partner country.

Moreover, if S_P goes through point J in Figure 1 but is more elastic, then imports from the partner (Q_2) as well as the share imported from the partner (Q_2/Q_3) are larger and the loss GIJ is larger as well. Both the higher initial MFN tariff and the more elastic supply of imports from the partner country generates welfare effects for the FTA members which are opposite to those mentioned in the studies cited in Section I.A. Thus, we have shown that the argument made in the literature does not hold in general.

Assume alternatively that the home country forms a FTA with the ROW. Then, following the formation of the FTA, the relevant supply curves are S_{ROW} and S'_P (Figure 1). The home country now gains from forming a FTA, with the gains equal to triangle BCD + the tariff revenue collected on the third country (equal to rectangle FRNE).[7] Note also that as imports from the partner (equal to NC) fall and those of the third country (equal to EN) increase, the welfare gain for the home country increases.

Thus, we have shown that a small home country loses from forming a FTA with a small partner country but gains from forming one with the ROW. In other words, the home country is better off as a small member of a large bloc than as a large member of a small bloc.[8] We have

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On the other hand, total imports Q_3 fall with the MFN tariff; thus, Q_1/Q_3 rises with the MFN tariff.

[7]The latter assumes that the third country, which now receives a net price of P_W - T, cannot sell to the ROW at a higher price than P_W - T. This assumption holds if the ROW had an import tariff larger or equal to T, or if the home country and the ROW form a customs union with a common external tariff equal to T.

[8]The case of a small country joining the entire ROW in a regional bloc, with a small third country left out of the bloc, is probably rare. For instance, Eastern European and Mediterranean

also shown that home country welfare after formation of a FTA is higher when imports from the

partner country are smaller, and that this result holds irrespective of whether the partner country

is small (with an upward sloping supply curve S_p) or whether it is large (with an horizontal supply

curve S_{ROW}). The welfare effect under the various alternatives is shown in Table 1.

Table 1. Effect of Forming a FTA on Home Country Welfare

		Small Member of a Large Bloc	Large Member of a Small Bloc
Level of Imports from	HIGH	- Positive and Small	- Negative and Large
Partner Country	LOW	- Positive and Large	- Negative and Small

As Table 1 shows, the best choice from the home country's viewpoint is to be a small

member of a large bloc and a small importer from the bloc's partner country. The worst outcome

is to be a large member of a small bloc and a large importer from the bloc's partner country. As

is shown in Section IV, this result need not hold in the case of smuggling.

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countries have signed agreements with the EU, but some outside countries - including the U.S.
and Japan - are not small. Assume then that the home country faces imports from two large
countries with horizontal supply curves - say, ROW_1 and ROW_2 - as well as imports from one
small country with an upward-sloping supply curve. Assume imports from ROW_1 are cheaper
than those from ROW_2. Then, the home country will not import from ROW under the MFN
tariff, and our results hold as long the home country forms a FTA with ROW_1. The analysis is
based on the assumption that the FTA is with ROW_1. However, note that if the home country
forms a FTA with ROW_2, then whether it is better to form a FTA with ROW_2 or with the small
country is ambiguous a priori because the impact on the home country's welfare of forming a FTA
with ROW_2 is itself ambiguous (it depends on the cost difference on imports from ROW_1
and ROW_2, on the level of the MFN tariff, and on the level and elasticity of demand).

In Section III below, I show - among others - that the result, that the impact of a PTA on home country welfare worsens as imports from the partner country increase, holds in the large country-case as well.

III. **The Large-Country Case**

1. The Model

Before the formation of the PTA, the home country levies a tariff T_1 on country 1 (the partner country) and tariff T_2 on country 2 (the ROW). It is typically assumed - as was done in the previous section - that $T_1 = T_2 = T$, the MFN tariff, before the formation of the PTA. However, the results derived below hold also in the more general case where T_1 differs from T_2 before the formation of the PTA. Hence, equality between T_1 and T_2 is not imposed.

Welfare W is defined as the sum of consumer surplus and tariff revenue, or

$$W = \int_{P}^{P(o)} D(u) \, du + (T_1 S_1 + T_2 S_2)$$

where S_i = imports from country i, D(P) is the demand for imports, P(0) is the demand price when imports are equal to zero, and u is a variable of integration. Then

$$dW = -D(P).dP + [(T_1.dS_1 + T_2.dS_2) + (S_1.dT_1 + S_2.dT_2)],$$

where the first term is the change in consumer surplus and the second term (in square

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brackets) is the change in tariff revenue. The relationship between the demand price P and the

supply or border price P_i is

(1) $P = P_i + T_i;$ $i = 1, 2,$

where T_i is the specific tariff on imports from country i. Equilibrium is given by

(2) $D(P) = S_1 + S_2 \equiv Q.$

From equation (1), $dP = dP_i + dT_i$. Using equation (2), dW can be rewritten as

$$dW = - (S_1.dP_1 + S_2.dP_2) + (T_1dS_1 + T_2dS_2).$$

The first term is the terms of trade effect. An increase in the border price P_i by an amount

dP_i results in a loss equal to $S_i.dP_i$. The second term is the trade volume effect. The difference

between the marginal value P (to the consumer) of an additional unit of imports from country i

and the cost P_i of the unit imported is T_i. Any increase in imports S_i by an amount dS_i generates

a welfare gain equal to $T_i.dS_i$.

Thus, the change in welfare can be expressed either as the sum of the changes in consumer

surplus and tariff revenue, or equivalently as the sum of the terms of trade effect and the trade

volume effect. In the analysis below, we examine welfare effects in terms of the effects on

consumer surplus and on tariff revenue.

In order to keep the problem tractable, all functions are assumed to be linear. This enables us to derive first-order approximations to the actual effects of various simulations under more general functional forms. Thus, the linearity assumption should not affect the simulation results in the case of small changes, such as the effect of a PTA in the case of an infinitesimal reduction in the tariff rate on the partner's imports, though it may limit the generality of the results in the case of large changes, such as a FTA where the tariff on the partner is set to zero.

The demand for imports by the home country is

$$(3)\ D = a - bP,\ a > 0, b > 0.$$

The excess-supply curve of country i is

$$(4)\ S_i = c_i + d_i P_i,\ d_i > 0,\ c_i < 0;\ i = 1, 2.$$

The intercept on the horizontal axis c_i is assumed to be negative because S_i is an excess-supply function and I assume that at price zero, demand is larger than supply so that the partner country and the ROW would be net importers (At $P_i = 0$, $S_i = c_i < 0$).

Prices P, P_1 and P_2 are given by

$$(5)\ P = [d_1 T_1 + d_2 T_2 + a - (c_1 + c_2)]/(d_1 + d_2 + b),$$

$$(6)\ P_i = [d_j T_j - (d_j + b) T_i + a - (c_1 + c_2)]/(d_1 + d_2 + b);\ i = 1, 2; j = 3 - i.$$

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Quantities Q, S_1 and S_2 are given by

$$(7)\ Q = [a(d_1 + d_2) + b(c_1 + c_2) - b(d_1T_1 + d_2T_2)]/(d_1 + d_2 + b),$$

$$(8)\ S_i = [c_i(d_j + b) + d_i(a - c_j) + d_1d_2T_j - d_i(d_j + b)T_i]/(d_1 + d_2 + b);\ i = 1, 2;\ j = 3\text{-}i.$$

Welfare W is

$$(9)\ W = (a/b - P).Q/2 + T_1S_1 + T_2S_2,$$

$$= Q^2/2b + T_1S_1 + T_2S_2,$$

where a/b is the value of P when $D = 0$. The solution for W is

$$(10)\ W = (1/2b).\{[a(d_1 + d_2) + b(c_1 + c_2) - b(d_1T_1 + d_2T_2)]/(d_1 + d_2 + b)\}^2$$

$$+ \{[c_1(d_2 + b) + d_1(a - c_2)].T_1 + [c_2(d_1 + b) + d_2(a - c_1)].T_2 + 2d_1d_2T_1T_2$$

$$- d_1(d_2 + b).T_1^2 - d_2(d_1 + b).T_2^2\}/(d_1 + d_2 + b),$$

where the first term (i.e., the first line) is the consumer surplus and the second term (i.e., the second and third lines) is the tariff revenue.

The home country forms a PTA by reducing its tariff T_1 on imports from country 1, the partner country. A PTA does not necessarily imply that T_1 is set to zero, but only that it be

reduced to a level below the tariff T_2 imposed on imports from the ROW.[9] The impact of a

change in T_1 on home country welfare W is given below for the more general case where T_1 and

T_2 can take any value. That impact is

(11') $\delta W/\delta T_1 = - d_1.Q/(d_1 + d_2 + b)$

$+ [c_1(d_2 + b) + d_1(a - c_2) + 2d_1d_2T_2 - 2d_1(d_2 + b)T_1]/(d_1 + d_2 + b)$.

The first term is the effect of an increase in T_1 on the consumer surplus $(a/b - P).Q/2$ and

is negative. Thus, forming a PTA (i.e., a decrease in T_1) results in an increase in the consumer

surplus. Note that the increase in consumer surplus tends to zero as d_2 tends to infinity, i.e., as

the ROW's supply curve becomes infinitely elastic. The reason is that a change in T_1 has no

impact on the domestic price P in that case (see equation (5) and Section II).

The second term is the effect of an increase in T_1 on tariff revenue $T_1S_1 + T_2S_2$. Its sign

is ambiguous and depends on all parameter values and on initial tariff levels. Thus, the sign of

$\delta W/\delta T_1$ is ambiguous a priori. This is no surprise since we know since Viner (1950) that the

formation of a PTA entails a situation of second best, with trade creation and trade diversion

effects. Substituting for Q from equation (7), equation (11') can be rewritten as

(11) $\delta W/\delta T_1 = \{ad_1b + c_1b^2 + c_1d_2^2 - c_2d_1^2 + d_1d_2(c_1 - c_2) + 2b(c_1d_2 - c_2d_1) +$

$d_1d_2T_2(2d_1 + 2d_2 + 3b) - 2d_1T_1[d_1d_2 + (d_2 + b)^2]\}/(d_1 + d_2 + b)^2$.

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[9]Note that the formation of a PTA rather than a FTA is GATT-consistent in the case of developing countries.

Note that one can solve for the optimum tariffs T_1^* and T_2^*. These can be derived by solving for $\delta W/\delta T_2$ and by setting $\delta W/\delta T_1 = \delta W/\delta T_2 = 0$. We have two (linear) equations in T_1 and T_2, and we can solve for the optimal values T_1^* and T_2^*.

As noted above, the welfare impact $\delta W/\delta T_1$ has two components. These are the impact on the consumer surplus $\delta W_{CS}/\delta T_1$ and the impact on revenue $\delta W_R/\delta T_1$, with $\delta W_{CS}/\delta T_1 + \delta W_R/\delta T_1 = \delta W/\delta T_1$. The impact on the consumer surplus $\delta W_{CS}/\delta T_1$ is given by

$$(12) \quad \delta W_{CS}/\delta T_1 = - d_1.Q/(d_1 + d_2 + b)$$

$$= - d_1.[a(d_1 + d_2) + b(c_1 + c_2) - b(d_1 T_1 + d_2 T_2)]/(d_1 + d_2 + b)^2 < 0.$$

2. Market Size, Market Share, Efficiency and Trade Policy

The welfare impact $\delta W/\delta T_1$ measures the impact of an increase in T_1. A PTA implies a reduction in the tariff T_1. Thus, define $X = - \delta W/\delta T_1$, where X measures the welfare impact of a small reduction in the tariff on the partner country's imports. Similarly, define $X_{CS} = - \delta W_{CS}/\delta T_1$ and $X_R = - \delta W_R/\delta T_1$, with $X = X_{CS} + X_R$.

A. Higher Demand for Imports

Is a PTA more beneficial when home country demand for imports is small or when it is large? A higher level of import demand may be due to a larger population, to a higher per capita income (and imports being a normal good), or to a reduction in production efficiency in the home country. Of course, if imports increase, exports must increase as well, and if the increase in exports is partly to the partner country, then the improved market access associated with the PTA

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will generate a larger welfare gain. But what about the import side?

The shift in demand is modeled by an increase in the intercept "a" of the import demand function. The effect of an increase in "a" is

(13) $\delta X/\delta a = - d_1 b/(d_1 + d_2 + b)^2 < 0.$

Equation (13) says that the welfare impact of a PTA falls as the demand for imports increases. The reason is that as total import demand rises, the amount S_1 imported from the partner country rises as well. And since S_1 is the tax base on which the tariff is being reduced under the formation of the PTA, the increase in S_1 results in a larger loss in tariff revenue. Note that what matters is the effect on the level of S_1 after the PTA is formed. With larger total imports, S_1 is larger both before and after the PTA is formed since the slope d_1 of S_1 is unchanged. This negative effect on revenue dominates the positive effect which a larger level of imports has on X_{CS}.

Equation (13) also implies that $\delta X/\delta a$ is independent of the level of T_1. Integrating $\delta X/\delta a$ over values of T_1 between T_1's initial value and $T_1 = 0$, we obtain the effect of an increase in import demand on the welfare impact of a FTA. That effect is equal to $- T_1.[d_1 b/(d_1 + d_2 + b)^2]$ $< 0.$ Thus, the welfare impact of a FTA falls as the demand for imports increases.

Equation (13) shows that the result $\delta X/\delta a < 0$ holds irrespective of whether the increase in imports originates mostly in the partner country or mostly in the ROW. This can be seen from equations (7), (8) and (13). Total imports increase by $(d_1 + d_2)/(d_1 + d_2 + b)$, imports from the partner increase by $d_1/(d_1 + d_2 + b)$, and imports from the ROW increase by $d_2/(d_1 + d_2 + b)$.

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The relative increase in imports depends on d_1/d_2. As can be seen from equation (13), the result $\delta X/\delta a < 0$ holds for any value of d_1/d_2 (assuming $d_1 > 0$ and d_1, $d_2 < \infty$).

However, the fall in the welfare impact X of the PTA (due to the increase in total import demand) is larger, the larger the share of the increase in total imports which originates in the partner country because when the share $d_1/(d_1 + d_2)$ is larger, so is the increase in the base S_1 on which the tariff T_1 is reduced.[10] Thus, for a given d_1, the reduction in X due to an increase in import demand decreases as the slope d_2 of the ROW's supply curve increases. From equation (13), $\delta(\delta X/\delta a)/\delta d_2 = 2d_1b/(d_1 + d_2 + b)^3 > 0$. And $\delta X/\delta a$ tends to zero as d_2 tends to infinity. Thus, if the ROW's supply curve is infinitely elastic, an increase in import demand has no effect on the price and thus has no effect on imports from the partner (and the ROW supplies the entire increase in import demand). In that case, the welfare impact of a PTA remains unchanged when import demand increases.

In general, a PTA is more beneficial (or less harmful) for a country with lower import demand. A PTA is also more beneficial for a country with a more efficient import-substituting sector, as this will result in a lower demand for imports.

Finally, assume that transport costs to the partner country and to the ROW decrease in equal amounts. This can be modeled by an increase in import demand, where the demand price is net of transport costs. As seen from equation (13), the reduction in transport costs will have

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[10]This result can be derived from equation (13) by taking the derivative of $\delta X/\delta a$ with respect to d_1/d_2 or with respect to $d_1/(d_1 + d_2)$. Both derivatives are negative.

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a negative effect on the welfare impact of a PTA because lower transport costs will result in larger imports from the partner country.

B. Increase in the Efficiency of the Partner (ROW)

A gain in the partner's efficiency will result in lower production costs and in an outward shift of the partner's supply curve S_1. Assume that the reduction in the marginal cost is independent of output, i.e., that the marginal cost falls by a constant. This can be represented by an increase in c_1. The shift in c_1 may also be due to an export subsidy or to a reduction in unit transport costs on imports from the partner country. The effect of an increase in c_1 on X is

(14) $\delta X / \delta c_1 = -(b^2 + d_2^2 + d_1 d_2 + 2bd_2)/(d_1 + d_2 + b)^2 < 0.$

Thus, an increase in partner efficiency associated with an increase in c_1 results in a smaller value of X, i.e., in a smaller welfare impact of a PTA on the home country.

The effect of an increase in c_1 on the welfare impact of a FTA is also negative. It is obtained by integrating $\delta X / \delta c_1$ over values of T_1 between T_1 's initial value and $T = 0$. That effect is equal to $-T_1.[(b^2 + d_2^2 + d_1 d_2 + 2bd_2)/(d_1 + d_2 + b)^2] < 0.$

This is a somewhat surprising result since the conventional wisdom is that a regional agreement with a more efficient partner should be more beneficial for the home country since it would be expected to generate more trade creation and less trade diversion. The result here is due to the effect on the tax base. An increase in c_1 results in a higher tax base S_1 (equation (8)) on which the tariff T_1 is reduced under the PTA. This negative effect on X_R dominates the positive

effect of an increase in c_1 on X_{CS}.

The effect on X of increased efficiency in the ROW caused by an increase in c_2 is

(15) $\delta X/\delta c_2 = d_1(d_1 + d_2 + 2b)/(d_1 + d_2 + b)^2 > 0.$

Thus, an increase in efficiency in the ROW due to an outward shift in S_2 raises the welfare impact of a PTA with the (partner) country whose relative efficiency has fallen. Again, this is due to the effect on the tax base S_1 which falls as c_2 increases (equation (8)). An outward shift in S_2 also raises the welfare impact of a FTA. That effect is equal to $T_1 \cdot [d_1(d_1 + d_2 + 2b)/(d_1 + d_2 + b)^2] > 0$.

Assume the U.S. and the EU are identical. El Salvador and Mexico face higher transport costs in their trade with the EU, and Morocco and Tunisia face higher transport costs in their trade with the U.S. Thus, El Salvador and Mexico (Morocco and Tunisia) trade more with the U.S. (EU).[11] Then, from the viewpoint of exports, El Salvador and Mexico (Morocco and Tunisia) are better off forming a PTA with the U.S. (EU). However, the opposite is true from the viewpoint of imports: El Salvador and Mexico (Morocco and Tunisia) are better off forming a PTA with the EU (U.S.).

The choice of partners depends on which of the two effects dominates, the one related to the import side or the one related to the export side. If the effect on the import side dominates

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[11]I assume an internal solution, i.e., I assume that the U.S. and the EU supply curves of exports to Mexico and to Morocco are not both infinitely elastic. If they were, then Mexico would import only from the U.S. and Morocco would import only from the EU.

(either because the initial barriers imposed by the U.S. and the EU are already low, or because the PTA will not lead to a significant reduction in trade barriers), then El Salvador and Mexico (Morocco and Tunisia) would be better off forming a PTA with the EU (U.S.). Effects on the import side may in fact dominate since U.S. trade barriers are already low, and because Morocco and Tunisia did not obtain much in terms of increased access for its exports in its agreement with the EU.[12]

C. Increase in the Share Imported from the Partner (ROW)

Assume c_1 increases. In order to isolate the effect of changes in regional shares imported from the effect of changes in the total level of imports, shares must be changed in such a way as to keep total initial imports Q constant. This can be obtained by reducing either the ROW's supply shifter c_2 or the import demand shifter "a". The reduction in c_2 can be caused by a reduction in efficiency in the ROW, while the reduction in "a" can be caused either by a reduction in income or by an increase in efficiency of production in the home country.

Starting with c_2, in order to keep initial imports constant, c_2 has to be reduced by the same amount as c_1 is increased (see equation(7)). Thus, in this case, the effect on X of an increase in the share imported from the partner is obtained by subtracting $\delta X/\delta c_2$ in equation (15) from $\delta X/\delta c_1$ in equation (14). The result is

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[12]Obviously, other factors may play a decisive role in determining who to integrate with. For instance, Morocco has obtained larger transfers from the EU following the signing of the FTA. In the case of Mexico, it expected to raise the credibility of its policy reforms and it may have obtained additional help from the U.S. during the December 1994 crisis as a member of NAFTA than would have occurred otherwise.

(16) $\delta X/\delta c_1 - \delta X/\delta c_2 = -1$.

Thus, the welfare impact of a PTA falls as the share imported from the partner increases. That the effect on the welfare impact is exactly equal to - 1 can be explained as follows. A PTA is implemented here by a one unit reduction in T_1. The only effect of an outward shift of S_1 by one unit accompanied by an inward shift of S_2 by one unit is to lose one additional unit of tariff revenue when the PTA is formed. All that has occurred is that the base S_1, on which the tariff is being reduced, is one unit larger. The impact of the PTA on the consumer surplus is not affected in this case.

The effect of an increase in the share imported from the partner on the welfare impact of a FTA is $-T_1 < 0$ (which is obtained by integrating $\delta X/\delta c_1 - \delta X/\delta c_2 = -1$ over values of T_1 between T_1's initial value and $T_1 = 0$). Thus, the welfare impact of a FTA also falls as the share imported from the partner increases.

Total initial imports can also be kept constant when c_1 increases by reducing the demand shifter "a". From equation (7), the change in "a" required to keep Q constant is $\delta a/\delta c_1 = -b/(d_1 + d_2)$. From equations (13) and (14), $\delta X/\delta c_1 - [b/(d_1 + d_2)].\delta X/\delta a = [b^2 d_1 - (d_1 + d_2)(b^2 + d_2^2 + d_1 d_2 + 2bd_2)]/(d_1 + d_2 + b)^2(d_1 + d_2) < 0$. Thus, in this case as well, an increase in the share imported from the partner reduces the welfare impact of a PTA. And it reduces the welfare impact of a FTA as well.

D. Changes in Initial Level of Protection

I now examine how the welfare impact of a PTA is affected by a change in the initial value

of T_1, T_2 or both. The effect of a change in T_1 is

(17) $\delta X/\delta T_1 = 2d_1[d_1d_2 + (d_2 + b)^2]/(d_1 + d_2 + b)^2 > 0.$

Equation (17) says that, independently of the level of tariff T_2 on the ROW, the higher the initial import tariff T_1 on the partner's imports, the larger the welfare impact of a small reduction in T_1. The reason is as follows. The larger the tariff T , the smaller the imports S from the partner country (see equation (8)). And since S_1 is the tax base on which the tariff T_1 is reduced under the PTA, the smaller that tax base, the smaller the loss from tariff reduction. Even though $\delta X_{CS}/\delta T_1 < 0$ (obtained from equation (12)), the positive effect $\delta X_R/\delta T_1$ dominates the negative effect $\delta X_{CS}/\delta T_1$. [13]

Equation (17) does not imply that a complete elimination of the tariff T_1 with the partner country - i.e. a free trade agreement (FTA) - is more beneficial (or less harmful) when the initial tariff T_1 is higher. The reason is that even though $\delta X/\delta T_1 > 0$, X - the welfare impact of the PTA - may itself be negative. If $X > 0$ at the initial level of T_1 and T_2, then a slightly higher initial value of T_1 will result in a larger welfare impact of a FTA. However, if $X < 0$ at the initial level of T_1 and T_2, then a slightly higher initial value of T_1 will result in a smaller welfare impact of a FTA. [14]

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[13]The reason $\delta X_{CS}/\delta T_1$ is negative is that a higher T_1 results in lower imports Q (see equation (7)). A small reduction in T_1 results in a lower price P. And the resulting increase in the consumer surplus is smaller when the price reduction applies to a smaller base Q.

[14]Note that if at some point along the reduction in T_1, imports from the ROW fall to zero, then any further reduction in T_1 is equivalent to unilateral trade liberalization and is beneficial. In this

The fact that $\delta X/\delta T_1 > 0$ implies that the welfare impact X of a marginal reduction in T_1

keeps falling as T_1 falls. Consequently, if $X < 0$ at the initial level of T_1 and T_2, then $X < 0$ at

lower levels of T_1, and a FTA must necessarily lower welfare (since the sum or integral of

increasingly negative values of X is negative). On the other hand, if $X > 0$ at the initial level of

T_1, and since X falls as T_1 falls, X may reach zero at a positive tariff $T_1^0 > 0$ (with $X < 0$ for

$T_1 < T_1^0$). In that case, given T_2, T_1^0 is the optimum tariff, and the impact of a FTA on welfare

is ambiguous.

The effect of a change in T_2 is

(18) $\delta X/\delta T_2 = -d_1 d_2 (2d_1 + 2d_2 + 3b)/(d_1 + d_2 + b)^2 < 0.$

Equation (18) says that, for a given tariff T_1 on the partner country's imports, the higher

the initial import tariff on the ROW, the smaller the welfare impact of a small reduction in the

tariff T_1. The reason is that the tax base, S , increases with T (see equation (8)). Moreover,

$\delta X_{CS}/\delta T_2 < 0$ as well. By integrating $\delta X/\delta T_2$ over all values of T_1 between T_1's initial value and

$T_1 = 0$, we find that a higher T_2 lowers the welfare impact of a FTA, with the effect equal to -

$T_1 \cdot [d_1 d_2 (2d_1 + 2d_2 + 3b)/(d_1 + d_2 + b)^2] < 0.$ In fact, by lowering the tariff on the ROW

sufficiently, it is possible to turn welfare-reducing PTAs into welfare-improving PTAs for the

home country, and similarly for FTAs. This point has been made by Leipziger and Winters

(1995) and by Schiff (1995) who argue that a FTA between Chile and NAFTA would generate

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paper, I assume that the home country continues to import from the ROW after it establishes a
FTA with the partner country.

larger gains for Chile if it simultaneously lowered its tariff rate on the ROW from its present level of 11 percent.

IV. Additional Issues

A. Rules of Origin

One important issue regarding FTAs are rules of origin. Assume, as in Section II, a FTA between two small countries who take the world price as given. Starting from an MFN tariff T, we found that the home country lost from forming a FTA because of a loss in tariff revenue on imports from the partner country equal to EFGI (see Figure 1). However, if the tariff T_p imposed by the partner on the ROW is lower than T, then if the partner country can sell imports from the ROW in the home country market, the home country loses control of its trade policy vis-a-vis the ROW and its effective tariff with respect to the ROW becomes the lower tariff T_p of the partner country. The result is the same as that of a unilateral reduction in the home country tariff from T to T_p, but with one important difference: the tariff revenues are collected by the partner country rather than by the home country. To prevent such trade 'deflection' and limit the imports from the partner country to those goods actually produced in the partner country, rules of origin are generally established as part of FTAs.

Assume that trade deflection is in fact efficiently dealt with. An additional problem is that the partner country may sell not just its excess supply Q_2 (see Figure 1) to the home country, but may decide to sell its entire output (or a large part of it; see below) to the home country and obtain its consumption from the ROW (see Bhagwati and Panagariya 1995). In that case, the partner country will sell more than Q_2 to the home country, and rules of origin are not necessarily

effective even though no trade deflection takes place.

What is the impact of a FTA on welfare in this case? There are three possible outcomes. First, if the output of the partner country is less than Q_3 at price $P_W + T$ (see Figure 1), so that the home country still imports from the ROW, then the home country welfare loss from the FTA is larger than area EFGI because of the increased imports from the partner country on which no tariff is paid. Second, if output from the partner is larger than Q_3 at price $P_W + T$, the home country will no longer import from the ROW, and the price will fall below $P_W + T$ (though not below $P_W + T_P$, the replacement cost in the partner country). In that case, it is unclear whether the welfare loss from the FTA is larger or smaller than area EFGI (see Figure 1). The reason is that the tariff revenues on imports from the ROW are lost but efficiency gains are obtained from the lower price. Third, if output from the partner at price $P_W + T_P$ is larger than the demand in the home country at that price, then the price will be $P_W + T_P$, the partner country will sell only part of its output to the home country, and it is again unclear whether the welfare loss is larger or smaller than area EFGI.

Thus, if the home country continues to import from the ROW after forming the FTA, the home country will lose from forming the FTA and the loss will be larger than area EFGI. On the other hand, if the home country stops importing from the ROW after forming the FTA, the loss may be larger or smaller than EFGI. In fact, the home country may even gain if T_P is sufficiently small. The reason is that with partner output at price $P_W + T_P$ larger than home country demand at that price, the effect of forming a FTA is close to that of unilateral liberalization.

B. Smuggling

Assume, as in Section II, a FTA between two small countries who take the world price as given. The analysis in Section II and in Section IV.B is based on the assumption that the tariff is actually paid on imports from the partner country under the MFN tariff. However, smuggling accounts for an important share of trade in a number of developing countries. If under the MFN tariff all home country imports from the partner country are smuggled into the home country, no tariff revenues are obtained by the home country on these imports, and thus none are lost under the FTA. The partner country may not only smuggle its own output into the home country but may also buy imports from the ROW in order to smuggle them into the home country. No smuggling will take place if the partner country applies a tariff T_P on imports from the ROW larger or equal to the home country tariff T.[15]

Assume that the tariff T_P applied by the partner country on imports from the ROW is lower than T. Then, before the FTA is formed, individuals in the partner country will pay $P_w + T_P$ for imports from the ROW which they will smuggle and sell in the home country. What is the impact of forming a FTA on welfare in this case? I examine four possible cases: smuggling is either costly or costless, and rules of origin are either enforced or not enforced.

I) First, assume that smuggling is costless. In that case, there will be no direct imports by the home country from the ROW, the home country collects no tariff revenue at all, and the

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[15]If the price in the partner country in autarky is between P_w and $P_w + T$, the partner will not trade with the ROW. However, since its autarky price is lower than the price in the home country, it would probably be profitable to smuggle some of its output into the home country. However, in the case of small neighboring developing countries, it is likely that they will have similar factor endowments and that they will be net importers of the same goods from the ROW.

domestic home country price is $P_w + T_p$.

a) Assume that rules of origin are not enforced. Then, the FTA has no impact.

b) Alternatively, assume that rules of origin are fully enforced (say, because formation of the FTA leads to cooperation on enforcing trade rules among the members of the FTA). Then, the partner country can sell some or all of its own output to the home country. If output from the partner at price $P_W + T_p$ is larger than the import demand in the home country at that price, then the price will be $P_W + T_p$ as before the formation of the FTA, and the FTA has no impact on welfare. If output from the partner is not sufficient to satisfy home country import demand at price $P_W + T_p$, then the home country price will be higher than $P_W + T_p$ but not higher than $P_W + T$. If the price is below $P_W + T$, the home country continues not to import from the ROW and the higher price implies a loss for the home country (and a gain for the partner country). If output from the partner country at $P_W + T$ is less than Q_3 - the home country import demand at that price (see Figure 1) - then the home country will import from the ROW the difference between its import demand (Q_3) and the partner country's supply at price $P_W + T$. Then, the impact of the FTA on home country welfare is ambiguous because the home country loses from the higher price but gains from the tariff revenue collected on imports from the ROW.

II) Smuggling may entail real resource costs. Assume that there is an upward-sloping supply of smuggling services. Since the partner country's importers buy from the ROW at $P_W + T_p$, the _marginal_ cost of smuggling cannot be higher than $T -_p T$ in equilibrium (since home country importers can always buy from the ROW at $P_W + T$). Consider two alternatives: a) the marginal cost of smuggling at Q_3 (see Figure 1) is higher than $T - T_p$, or b) it is lower than $T - T_p$.

a) Assume that the marginal cost of smuggling at Q_3 is higher than $T - T_p$. Then, the amount smuggled from the partner will be lower than Q_3 and the rest will be imported from the ROW, with the price in the home country equal to $P_W + T$. Once the FTA is formed, and assuming rules of origin are fully enforced, smuggling no longer takes place.

If the total output of the partner is less than Q_3 at price $P_W + T$, then the home country will continue to import from the ROW. The price remains $P_W + T$. The impact of the FTA on home country welfare depends on the effect of the FTA on the volume of imports from the ROW. If the amount smuggled from the partner country before the formation of the FTA is larger (smaller) than the amount imported from the partner country after formation of the FTA, imports from the ROW increase (fall) and the FTA results in an increase (fall) in welfare (since tariff revenues are collected on imports from the ROW).

If total output of the partner is larger than Q_3 at price $P_W + T$, then the price in the home country falls below $P_W + T$ after formation of the FTA and the home country no longer imports from the ROW. The impact of the FTA on home country welfare is ambiguous because revenues on imports from the ROW vanish (a welfare loss), while the fall in price results in a welfare gain.

b) Alternatively, assume that smuggling is costly but that the cost of smuggling at Q_3 is less than $T - T_p$. Then, all imports are from the partner before formation of the FTA. The price is lower than $P_W + T$, the home country does not import from the ROW and it collects no revenue. The impact of the FTA on home country welfare is ambiguous in this case as well. If partner country supply is so large that the price in the home country falls, the home country gains. If partner country supply is smaller and the home country price rises but remains lower than $P_W + T$, the home country loses. And if partner country supply is less than Q_3 at price $P_W + T$, so

that the price rises to P_w + T and the difference between Q and partner country supply is imported from the ROW, then the impact of the FTA on home country welfare is ambiguous because the higher price results in a welfare loss but the revenues collected on imports from the ROW are a welfare gain.

Thus, if smuggling is costless, a FTA will have no impact on home country welfare if rules of origin are not enforced and will either have no impact on home country welfare, will result in a loss, or will have an ambiguous impact, if rules of origin are enforced. If smuggling is costly and rules of origin are enforced, the impact of the FTA on home country welfare is ambiguous. It can be shown that the impact on welfare is ambiguous as well if smuggling is costly and rules of origin are not enforced.

V. Conclusion

The analysis presented here has shown that

a) as far as the import side is concerned, "small is beautiful": the impact of a PTA on home country welfare is larger the smaller the volume of imports from the partner and the smaller the share of imports from the partner. This result is due to the fact that the smaller the imports from the partner, the smaller the loss in tariff revenue associated with a PTA. This effect dominates the negative effect (of smaller imports from the partner) on the impact of the PTA on the consumer surplus. These results hold irrespective of whether the member countries are small or large on the world market;

b) a PTA between small countries with exogenously given terms of trade results in a welfare loss for the PTA members as a whole;

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c) once the FTA is formed, and even if rules of origin are fully enforced, if the partner country's MFN tariff is lower than that of the home country, the partner may sell all or part of its output to the home country. Then, the FTA

i) results in a larger welfare loss if the home country still imports from the ROW, or

ii) has an ambiguous effect on home country welfare if the home country no longer imports from the ROW;

d) in the case of smuggling, and if the partner country's MFN tariff is lower than that of the home country, then

i) if smuggling is costless and rules of origin are not enforced, the home country price remains equal to that in the partner country and the FTA has no impact on home country welfare,

ii) if smuggling is costless and rules of origin are enforced, then if partner country output is so large that the home country price remains equal to that in the partner country, the FTA has no impact on home country welfare; if partner country output is smaller and the home country price rises but remains lower than the MFN-tariff inclusive price on imports from the ROW (with zero home country imports from the ROW), the FTA results in a welfare loss for the home country; and if partner country output is smaller still and the home country imports from the ROW, then the impact of the FTA on home country is ambiguous; and

iii) if smuggling is costly, the impact of a FTA is ambiguous, whether rules of origin are enforced or not.

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