# Regionalism, Trade Liberalization and Imperfect Markets

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**Abstract**

*We use a three country – one good Cournot oligopoly model to investigate feasibility of free trade areas (FTAs) between two of the three countries. Using a linear demand, constant marginal cost and a welfare function which is a sum of consumers' surplus (CS), profits and tariff revenues (TR), we derive optimum tariff before and after an FTA is formed. We show that although tariffs imposed by FTA members are lower than pre FTA tariffs, the optimum tariff imposed by the non-member remains unchanged. We also show that an FTA will be supported by member countries if gain in CS at home and gain in market shares in partners' market exceed loss in market share at home and loss of tariff revenues. Furthermore, we show that although non-member's CS and TR do not change under FTA, its market shares in FTA members' markets increase. Hence its welfare also increases. Finally, we derive a sufficient condition under which a multilateral FTA between all three countries will be feasible.*

Keywords: FTA; Optimum tariff; Welfare; Imperfect Competition

JEL Classifications Codes: F10; F13; F15

# Introduction

It is well known that under GATT and WTO movement towards preferential trade agreements (PTAs) by which regional trade agreements are formed has gained significant momentum. This is what Bhagwati (1992) called "regionalism". In 2000, according to WTO report, PTAs identified 172 trade accords with 68 under negotiation (Bond et all 2004). Among these free trade areas (FTAs) accounted for 148 of these agreements and 67 of those under negotiations[1]. This has generated a considerable interest among trade theorists. Recent literature reflects that (see, among others, Ornelas (2008), Furusawa and Konishi (2007), Bond et al (2004), Panagarya and Duttagupta (2002), Panagarya (2000), Krishna (1998), Levy (1997), Grossman and Helpman (1994,1995) and Bhagwati (1993). The key issues are twofold. First, under what conditions PTAs (in particular, FTAs) will be supported by member countries and second, whether PTAs are compatible with multilateral trade liberalization. Using a median voter model, Levy (1997) has shown that if multilateral liberalization is infeasible then trading blocks do not make it more feasible. Grossman and Helpman (1994) have shown that FTA will be acceptable if lobbying contribution from exporters who stand to gain from FTAs outweigh the political cost of decline in welfare. Panagarya and Duttagupta (2002) conclude that for a given level of protection the FTA that may not be politically viable in the presence of tariff may be accepted in the presence of quota or voluntary export restraint. Richardson (1993) demonstrates, using a three-good model, that formation of FTA may lead to reduction of external tariff. Grossman and Helpman (1995) argue that viability of FTA is enhanced by trade diversion rather than trade creation. Finally, in a recent paper Ornelas (2008) uses a competitive linear model to show that FTA reduces tariff on excluded countries. Lower tariff is shown to increase aggregate economic efficiency and bring multilateral trading system closer to global free trade. Ornelas (2008) has further shown that FTAs and multilateral trade liberalization are not only compatible but multilateral cooperation is more effective in enhancing global welfare when it is accompanied by regionalism such as FTA or PTA.

The papers discussed above use model of perfect competition to conduct their analysis. Krishna (1998), Bond et al (2004) and Freund (2000) investigated these questions using a Cournot oligopoly model. Krishna (1998) finds that the greater the degree of trade diversion the more likely it is that FTA will be accepted. When an FTA is formed, each member benefits in terms of profits of its firms from obtaining preferential access to

[1] FTAs are PTAs with zero tariff.

partner's market but loses from giving a similar access to partner in its own market. In the absence of trade diversion this is a zero sum game. But if members can capture part of outside country's share in union's market without corresponding loss in outside market they can generate positive benefit. Krishna (1998), in a three-country model asks whether an initially feasible multilateral liberalization remains feasible after two of the three countries have formed an FTA. He answers it in the negative. Bond et al (2004) also arrives at similar conclusion. In their model, free trade induces members of FTA to reduce tariff. This improves rest of the world's terms of trade and welfare. But the rest of the world responds by raising tariff. Hence, FTA may undermine global free trade. Freund (2000), using a Cournot oligopoly and repeated game framework, investigates how multilateral liberalization impacts decision to form FTA. Initially each country levies some multilateral tariff on the other two countries. She has shown that in this setting welfare gain from forming PTA is greater than the gain from move to free trade when tariff is low while the reverse in true when it is high. Hence, PTAs are more sustainable when multilateral tariffs are low. Therefore, multilateral trade liberalization may lead to free trade.

In this paper, we use a three country-one good Cournot oligopoly model to analyze the condition under which an FTA between two of the three countries will be supported by the members. We also investigate the effects of FTA on the third country (the non-member). Specifically, we extend Krishna (1998) and Brander-Krugman (1983) model to derive optimum tariff under FTA and show that the optimum tariffs imposed by members are lower than that prevailed before FTA while the optimum tariff imposed by the third (non member) country remains unchanged. These results are consistent with Bagwell and Staiger (1999) and Freund (2000). However, our results differ from Bond et al (2004) in that in Bond et al (2004), although FTA reduces tariff imposed by members, the rest of the world raises tariff. Also, in Krishna (1998), an FTA will be accepted by members only if members gain at the expense of the non member (trade diversion). However, in this paper we show that for an FTA to be feasible, members' profits do not have to increase and non member's profit does not have to decrease. In fact, in our model, it is shown that under FTA, non member's profit and welfare will increase. Finally, we derive condition under which a multilateral FTA will be supported by all three countries.

This paper is organized as follows: in the second section, we present the model and derive the main results. This is followed by a section with concluding remarks.

## 2. Trade Liberalization

### *(2.1) The Model*

We consider a model of trade in which three countries, 1, 2, and 3, trade in one good, Q. This is an extension of the model suggested by Brander-Krugman (1983), and Krishna (1998) where firms from each country producing homogeneous products compete in each other's markets. We also assume the presence of a competitively produced numeraire good traded freely across markets. We let i= 1,2,3 and j=1,2,3 and use the following notations:

$q^i_j$ represents quantity supplied by country *i's* firm in country *j*'s market,

$P_j$ denotes the equilibrium price in country *j*'s market,

$\pi_i$ denotes profit made by country *i*'s firm,

$t_j$ is the specific tariff imposed by country *j* on import, and

$C_i$ denotes a constant marginal cost.

Following Krishna (1998), we assume that aggregate utility in country *j* takes the form, $U_j(K, Q_j) = K + (A_j Q_j - \frac{1}{2} Q_j^2)$, where K denotes the consumption of numeraire good and $Q_j = \sum_i q^i_j$ denotes the total sales of the good in country *j*'s market by firms from all three countries. That is $Q_j = q_j^1 + q_j^2 + q_j^3$. This implies that price in country *j* is a linear function of the total output, $P_j = A_j - Q_j$, where $A_j$ is constant. Each firm treats each country as a separate market.

We employ the most frequently used oligopoly model, Cournot model, where each firm assumes other firms hold output fixed in each country. Therefore, firm from country *i* chooses quantity to supply in country *j* by solving the following problem:

$$\text{Max } \pi_i = \sum \{(A_j - Q_j) - (C_i - t_j)\} q^i_j \quad . \qquad (1)$$

First order conditions yield: for $i$ and $j$ =1, 2, 3,

$$q_j^i = \frac{1}{4}\left\{A_j - 3(C_i + t_j) + \sum_{k \neq i} C_k + t_j\right\} \text{ for } i \neq j \quad (2)$$

$$q_i^i = \frac{1}{4}\left\{A_j - 3C_j + \sum_{k \neq i} C_k + t_i\right\} \quad . \quad (3)$$

From (1), (2), and (3) we get,

$$\pi_i = \sum_j (q_j^i)^2 \quad / \quad (4)$$

From (2) and (3) we derive the following comparative static results:

$$\frac{\partial q_j^i}{\partial t_i} = \frac{1}{2}, \quad \frac{\partial q_j^i}{\partial t_j} = -\frac{1}{2} \text{ , for } i \neq j, \text{ and } \frac{\partial q_j^i}{\partial t_k} = 0 \text{ , for } j \neq k \quad (5)$$

Note that results in (5) are not surprising. An increase (resp. decrease) in tariff will raise (resp. lower) domestic production and reduce (resp. raise) imports. A tariff on imports protects domestic producers by raising importing nations cost of production.

### (2.2) *Optimal Tariff*:

The idea that consuming nation has an incentive to impose tariff on the import of the imperfectly competitive good so as to extract some of the rent earned by the producers has been used extensively in the literature on trade policy. The optimal tariff, a tariff that maximizes welfare, has been discussed and analyzed by Brander-Spencer (1984, 1985), Levy and Nolan (1992), Cheng (1988), Dixit (1988) and Krugman (1989). In this section we derive optimal tariff for country $i$ before and after a free trade agreements between two of the three countries.

Given the quasi linear utility function, welfare effects can be measured by standard surplus measures. Letting $W_i$ represent welfare of the country $i$, government choosing optimal tariff solves the following problem:

For $i$ =1, 2, 3,

$$MaxW_i = CS_i + \pi_i + TR_i,$$

where $CS_i$ and $TR_i$ denote consumers' surplus and tariff revenue respectively for country $i$. Note that,

$$CS_i = \frac{(A_i - P_i)}{2} Q_i \tag{6}$$

and

$$TR_i = \sum_j t_i q_i^j \text{, for } i \neq j \tag{7}$$

Differentiating $W_i$ with respect to $t_i$ and using (4), (5), (6) and (7), we get:

For $i$ =1, 2, 3

$$\frac{\partial w_i}{\partial t_i} = \frac{\partial CS_i}{\partial t_i} + \frac{\partial \pi_i}{\partial t_i} + \frac{\partial TR_i}{\partial t_i} = -\tfrac{1}{2} Q_i + q_i^i + \sum_{j \neq i} q_j^i - t_i$$

The optimal tariff is found by setting $\frac{\partial W_i}{\partial t_i} = 0$ and solving $t_i$. This yields,

$$t_i = \tfrac{1}{2} Q_i \tag{8}$$

In the following section we will further assume $C_i = C$ for all $i$. In other words, we assume all nations' costs are similar. Then using (2) and (3) we get, for $i$ =1, 2 and 3,

$$t_i = \frac{3A_i - 3C}{10} \tag{9}$$

It is clear from (9) that the higher (resp. lower) the $A_i$ the higher (resp. lower) is the optimum tariff. Note that in Krishna (1998), tariff was chosen arbitrarily rather than optimally.

We, now, consider an FTA between two countries. Suppose, without loss of generality, country 1 and 2 decide to eliminate tariff on each other's imports while maintaining tariff on Country 3. In view of FTA, we derive new optimal tariff to be imposed by country 1 and country 2 on country 3. We denote optimal tariff under FTA by $t_{iF,}$ for $i$ =1, 2, and 3.

Under FTA, using (4), (5), (6) and (7), for country $i$ =1, 2, we have

$$\frac{\partial CS_i}{\partial t_{iF}} = \frac{1}{4}Q_i \quad , \quad \frac{\partial \pi_i}{\partial t_{iF}} = \frac{1}{2}q_i^i, \quad \text{and} \quad \frac{\partial TR_i}{\partial t_{iF}} = q_i^3 - \frac{3}{4}t_{iF}.$$

Therefore, under FTA, $$\frac{\partial W_i}{\partial t_{iF}} = -\frac{1}{4}Q_i + \frac{1}{2}q_i^i + q_i^3 - \frac{3}{4}t_{iF}.$$

Note that

$$q_i^j = \frac{1}{4}(A_i - C + t_{iF}), \text{ for } i \text{ and } j=1,2, \text{ and} \qquad (10)$$

$$q_i^3 = \frac{1}{4}(A_j - C - 3t_{iF}), \quad i=1 \text{ and } 2. \qquad \ldots \quad (11)$$

Setting $\frac{\partial W_i}{\partial t_{iF}} = 0$ and solving for $t_{iF}$, we get

$$t_{iF} = \frac{3(A_i - C)}{21} \quad \text{for } i = 1, 2 \qquad . \quad (12)$$

Note for country 3, the optimum tariff does not change. Hence,

$$t_3 = t_{3F} \qquad (13)$$

From (9) and (12) it is clear that

$$t_i > t_{iF} \quad \text{for } i = 1, 2 \qquad (14)$$

It is interesting to note, from (13) and (14), that although optimal tariff imposed by country 3 does not change under FTA between country 1 and country 2, FTA leads to a lowering of optimal tariff imposed by country 1 and country 2 on country 3's imports. However, closer inspection reveals that the result is not surprising. This is consistent with "tariff complemantarity effect" suggested by Bagwell and Staiger (1999) where FTA members always find it attractive to impose a lower tariff on nonmembers.

### (2.3) *Feasibility of FTA*

We, now, examine the feasibility of an FTA between country 1 and country 2. In particular we will specify conditions under which an FTA will be supported by country 1 and country 2. In other words, we will specify conditions under which, for $i$=1, 2, $W_{iF}$, welfare under FTA, exceeds $W_i$, welfare before FTA. In Krishna (1998), profit plays a critical and decisive role in determining the trade policy. Producers will lobby for and support policy if the proposed policy results in an increase in profit. However, in this paper consumers and government also have a say in determining policy. We consider a more general version of welfare that includes consumers' surplus, profit and tariff revenue.

We let $CS_{iF}$, $\pi_{iF}$ *and* $TR_{iF}$, for $i$ =1, 2 denote consumers' surplus, profit and tariff revenue, respectively, under FTA. Then the difference between welfare level after and before FTA is,

$$W_{iF} - W_i = (CS_{iF} - CS_i) + (\pi_{iF} - \pi_i) + (TR_{iF} - TR_i) \quad \ldots. \quad (15)$$

A sufficient condition for FTA being supported by countries 1 and 2 is that all three parties, (consumers, producers and government) support the proposed policy. In the following, we will examine each component one at a time.

First we compare $CS_{iF}$ with $CS_i$. We let, for $i$ = 1, 2 and $j$ = 1, 2, 3, $q_{iF}^{j}$ denote sale of Country $j$*'s* good in country $i$'s market after FTA. Using (10) and (11) and (12) we get,

$$CS_{iF} = \tfrac{1}{2}(q_{iF}^{1} + q_{iF}^{2} + q_{iF}^{3})^2$$

$$= \frac{1}{2}\left[\frac{1}{4}(A_i - C + \frac{3(A_i - C)}{21}) + \frac{1}{4}(A_i - C + \frac{3(A_i - C)}{21}) + \frac{1}{4}(A_i - C - 2\frac{3(A_i - C)}{10})\right]^2 \quad (16)$$

Also using (2), (3), and (9), for $i$=1, 2,

$$CS_i = \tfrac{1}{2}(q_i^{1} + q_i^{2} + q_i^{3})^2$$

$$= \frac{1}{2}\left[\frac{1}{4}(A_i - C + 2\frac{3(A_i - C)}{10}) + \frac{1}{4}(A_i - C - 2\frac{3(A_i - C)}{10}) + \frac{1}{4}(A_i - C - 2\frac{3(A_i - C)}{10})\right]^2 \quad .. (.17)$$

Therefore, we get,

$$CS_{iF} - CS_i = \frac{828}{11025}(A_i - C)^2 \quad (18)$$

It is clear that $(CS_{iF} - CS_i) > 0$. Due to FTA, tariff on imports from partner countries is removed and, by (14), tariff on imports from country 3 is reduced. This leads to an increase in imports from the partner country and country 3. Also, this implies a decrease in sale for the domestic producers. However, since RHS of (18) is positive it implies that increase in imports will outweigh the decrease in sale by domestic producers.

Next we compare $\pi_{iF}$ with $\pi_i$. Note for $i = 1, 2$, $j = 1, 2$ and $i \neq j$, we get using (4), (10) and (11),

$$\pi_{iF} = (q_{iF}^i)^2 + (q_{iF}^i)^2 + (q_{iF}^i)^2$$

$$= \left[\frac{1}{4}(A_i - C + 2\frac{3(A_i - C)}{21})\right]^2 + \left[\frac{1}{4}(A_j - C + \frac{3(A_j - C)}{21})\right]^2 + \left[\frac{1}{4}(A_3 - C - 2\frac{3(A_3 - C)}{10})\right]^2 \quad (19)$$

and

$$\pi_i = \left[\frac{1}{4}(A_i - C + 2\frac{3(A_i - C)}{10})\right]^2 + \left[\frac{1}{4}(A_j - C - 2\frac{3(A_j - C)}{10})\right]^2 + \left[\frac{1}{4}(A_3 - C - 2\frac{3(A_3 - C)}{10})\right]^2 \quad ** (20)$$

After some tedious algebra, we get,

$$\pi_{iF} - \pi_i = \frac{351}{4900}(A_j - C)^2 - \frac{384}{4900}(A_i - C)^2, \; i, j=1,2 \quad (21)$$

Therefore, a necessary condition for $(\pi_{iF} - \pi_i) > 0$ is

$A_j > A_i$ for $i,j = 1, 2$ and $i \neq j$ (22)

The condition (22) is similar to Krishna (1998). Note that $q_i^i > q_{iF}^i$, $q_j^i < q_{iF}^i$, for $i \neq j$ and $q_3^i = q_{3F}^i$, for $i, j=1,2$. This implies that under FTA partners lose market share at home while gaining market shares in partners' market. Their market shares in country 3 remain the same. Thus if gain in sales abroad is sufficiently large to outweigh the loss of sale at home, then profit will be larger under FTA. However, for this to happen, partner's market must be large relative to home market. It can be shown that under this model, both home and partner country profits cannot be higher under FTA than before.

We now, compare $TR_{iF}$ with $TR_i$. Note that $TR_{iF} = t_{iF}(q_i^3)$ and $TR_i = t_i(q_i^j + q_i^3)$, for $i = 1, 2,\ j = 1, 2$ and $i \neq j$.

Using (9), (10), (11) and (12) we get,

$$TR_{iF} = \frac{3(A_i - C)}{21}\left(\frac{1}{4}(A_i - C - 3\frac{3(A_i - C)}{21})\right) = \frac{9(A_i - C)^2}{441} \tag{23}$$

and

$$TR_i = \frac{3(A_i - C)}{10}\left[\frac{1}{4}\left(A_i - C - 2\frac{3(A_i - C)}{10} + A_i - C - 2\frac{3(A_i - C)}{10}\right)\right] = \frac{6(A_i - C)^2}{100} \tag{24}$$

Therefore, $TR_{iF} - TR_i = -\frac{873}{22050}(A_i - C)^2 < 0$ (25)

Note that under FTA, optimal tariff imposed by countries 1 and 2 on country 3's imports is lower and thus country 3's exports to countries 1 and 2 increases. However, it is not enough to overcome the loss of tariff revenue from its partner country. Therefore, tariff revenue under FTA is lower.

Combining (15), (18), (21) and (25) we get,

$$W_{iF} - W_i = \frac{828}{11025}(A_i - C)^2 + \frac{351}{4900}(A_j - C)^2 - \frac{384}{4900}(A_i - C)^2 - \frac{873}{22050}(A_i - C)^2,$$

for $i, j$=1,2 and $i \neq j$.

Simplifying we get,

$$(W_{iF} - W_i) \rangle 0 \text{ if } \frac{(A_j - C)^2}{(A_i - C)^2} > \frac{210}{351} \tag{26}$$

Similarly,

$$W_{jF} - W_j > 0 \text{ if } \frac{(A_j - C)^2}{(A_i - C)^2} < \frac{351}{210} \tag{27}$$

Combining these two inequalities (26) and (27) both nations will approve FTA if

$$\frac{210}{351} < \frac{(A_j - C)^2}{(A_i - C)^2} < \frac{351}{210}, \text{ for } i, j=1,2 \text{ and } i \neq j. \tag{28}$$

Note that in Krishna (1996) profit was decisive in determining the feasibility of FTA. Therefore, it was necessary for both members to gain at the expense of non-member (trade diversion). The larger the trade diversion, the more likely it is that members will support an FTA. However, we do not require the nonmembers to lose market share to make an FTA feasible. This is because of the presence of a more general welfare function and tariff rates being determined optimally in our paper.

Let's consider the effect of an FTA between country 1 and country 2 on the welfare of country 3, the non-member. We let $W_3, CS_3, \pi_3,$ and $TR_3$ denote welfare, consumer's surplus, profit and tariff revenue earned by country 3 respectively before FTA and $W_{3F}, CS_{3F}, \pi_{3F},$ and $TR_{3F}$ represent the same after FTA.

Hence,

$W_{3F} - W_3 = (CS_{3F} - CS_3) + (\pi_{3F} - \pi_3) + (TR_{3F} - TR_3).$

Note that using (16) and (17) we get, for *i*=1,2,3,

$CS_{3F} = \frac{1}{2}\sum_i (q_{3F}^i)^2$ and $CS_3 = \frac{1}{2}\sum (q_3^i)^2.$

Since $t_3 = t_{3F}$, by (13) $q_{3F}^i = q_3^i$, for *i*=1,2.

Also, since $t_3 = t_{3F}$, by (3) $q_3^3 = q_{3F}^3$. Thus,

$$CS_{3F} = CS_3. \tag{29}$$

Also, since $t_{3F} = t_3$ by (13) and $q_{3F}^i = q_3^i$ for *i*=1 and 2. Hence,

$$TR_{3F} = TR_3 \tag{30}$$

In view of (29) and (30), we get,

$W_{3F} - W_3 = (\pi_{3F} - \pi_3).$

Using (4), we get, for *i*=1,2 and 3 $\pi_{3F} = \sum_j (q_{jF}^3)^2$ and $\pi_3 = \sum_j (q_j^3)^2$ .

Finally, using (9), (10), (11), and (12) we get ,

$$(\pi_{3F} - \pi_3) = \left[\tfrac{1}{4}\{A_1 - C - 3t_{1F}\}\right]^2 + \left[\tfrac{1}{4}\{A_2 - C - 3t_{2F}\}\right]^2 + [\tfrac{1}{4}\{A_3 - C + 2t_{3F}\}]^2$$
$$- [\tfrac{1}{4}\{\frac{4(A_1 - C)}{10}\}]^2 - [\tfrac{1}{4}\{\frac{4(A_2 - C)}{10}\}]^2 - [\tfrac{1}{4}\{\frac{4(A_3 - C)}{10}\}]^2$$
$$= \tfrac{51}{4900}\left[(A_1 - C)^2 + (A_2 - C)^2\right]. \tag{31}$$

Note $(\pi_{3F} - \pi_3) > 0.$ Therefore, $W_{3F} > W_3.$

FTA between country 1 and country 2 leaves total output sold in country 3 unchanged. Therefore, price and consumers' surplus do not change. Also, since tariff imposed by country 3 does not change, total import and hence, tariff revenue do not change. However, a lower tariff imposed by FTA members leads to an increase in market share for country 3 in FTA members' market. Therefore, profit and consequently, welfare for country 3 increase.

Finally, we specify the condition under which a multilateral free trade agreement is politically viable. In other words, we find conditions under which a multilateral FTA including all 3 countries will be feasible.

We let $q_{iFR}^{j}$, $CS_{iFR}$, $\pi_{iFR}$ and $W_{iFR}$ denote output sold by country j in country i, consumers' surplus, profit and welfare for country I under multilateral free trade where $q_{iFR}^{j} = \frac{1}{4}(A_i - C)$, i and j= 1,2 and 3,

$$CS_{iFR} = \tfrac{1}{2}[\sum_{j} q_i^{j^2}]^2 = \tfrac{1}{2}[\tfrac{3}{4}(A_i - C)]^2,$$

$$\pi_{iFR} = \sum_{j} q_{jFR}^{i^2} = [\tfrac{1}{4}(A_1 - C)]^2 + [\tfrac{1}{4}(A_2 - C)]^2 + [\tfrac{1}{4}(A_3 - C)]^2, \text{ and}$$

$$W_{iFR} = CS_{iFR} + \pi_{iFR} = \tfrac{1}{2}[\tfrac{3}{4}(A_i - C)]^2 + [\tfrac{1}{4}(A_1 - C)]^2 + [\tfrac{1}{4}(A_2 - C)]^2 + [\tfrac{1}{4}(A_3 - C)]^2 \quad . \tag{32}$$

Country 3 will join FTA, if $W_{3FR} - W_{3F} > 0$, where from (29), (30) and (31)

$$W_{3F} = \tfrac{1}{2}[\tfrac{3}{5}(A_3 - C)]^2 + [\tfrac{1}{7}(A_1 - C)]^2 + [\tfrac{1}{7}(A_2 - C)]^2 + [\tfrac{3}{5}(A_3 - C)]^2 + \tfrac{6}{10}(A_3 - C)^2 \tag{33}$$

Using (32) and (33), we get after some manipulation, $W_{3FR} - W_{3F} > 0$ if

$$\frac{(A_3 - C)^2}{(A_1 - C)^2 + (A_2 - C)^2} < \frac{1650}{2205} \tag{34}$$

Country 1 will support a multilateral FTA if $W_{1FR} - W_{1F} > 0$, where by (15), (18) and (25),

$$W_{1FR} = \tfrac{1}{2}[\tfrac{5}{7}(A_1 - C)]^2 + [\tfrac{2}{7}(A_1 - C)]^2 + [\tfrac{1}{10}(A_3 - C)]^2 + [\tfrac{1}{7}(A_1 - C)]^2 + [\tfrac{2}{7}(A_3 - C)]^2. \tag{35}$$

Using (32) and (35), we get $W_{1FR} - W_{1F} > 0$, if

$$2058(A_3 - C)^2 > 750(A_2 - C)^2 + 525(A_1 - C)^2. \tag{36}$$

Similarly, Country 2 will support the multilateral FTA if $W_{2FR} - W_{2F} > 0$. Again using (32), (15), (18), (21) and (25) we get $W_{2FR} - W_{2F} > 0$, if

$$2058(A_3 - C)^2 > 750(A_1 - C)^2 + 525(A_2 - C)^2. \tag{37}$$

Combining (36) and (37), a sufficient condition for Country 1 and Country 2 to support a multilateral FTA is

$$\frac{(A_3 - C)^2}{(A_1 - C)^2 + (A_2 - C)^2} > \frac{750}{2058}. \tag{38}$$

Therefore in view of (34) and (38) a multilateral FTA will be supported by all three countries, if

$$\frac{750}{2058} < \frac{(A_3 - C)^2}{(A_1 - C)^2 + (A_2 - C)^2} < \frac{1650}{2205} \quad . \tag{39}$$

Equation (39) shows that there exists a possibility of formation of a multilateral FTA under imperfect competition.

## 3. Conclusion:

Using a three country-one good Cournot oligopoly model, we have analyzed the feasibility of an FTA between two of the three countries. In this model, governments choose tariff endogenously by maximizing a welfare function which is a sum of consumers' surplus, profit and tariff revenue. We have shown that tariffs imposed by FTA members are lower under FTA than those that prevailed before FTA was formed. However, tariff imposed by the non-member remains unchanged. Our result differs from Bond et al (2004) in that tariff imposed by rest of the world in Bond et al (2004) increases. We also show that an FTA will be supported by the member countries if gain in consumers' surplus at home and an increase in profit in partners' markets exceed loss in profit at home and an increase in tariff revenue. Furthermore, the non-member experiences a higher welfare due to FTA since its profits are higher while consumers' surplus and tariff revenue remain unchanged. The result differs from Krishna (1998) in that we do not need FTA members to gain at the expense of the non-member for FTA to be viable. Finally, we derived a sufficient condition under which a multilateral FTA will be supported by all three countries.

## Endnotes

1, An earlier version of this paper was presented at the 11th Annual Academic Conference of the Society for the Business, Industry and Economics. We thank the conference participants for their comments. We also thank the editor of this journal for his help. The usual caveat about error applies.

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