Rules of Origin as Strategic Commercial Instruments in a Free Trade Area

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Abstract

Rules of origin are a necessary part of every free trade area (FTA), because member countries maintain independent tariff and non-tariff barriers against non-members. This paper examines the effects of restrictive rules of origin in a model of oligopoly with quotas on imports from non-members in a FTA in order to investigate the possibility of using rules of origin as a strategic trade policy. Specifically, the ability of firms within the FTA to capture profits and the effect of the FTA on profits of non-member firms is examined. This paper shows that although the restrictiveness of the quota does not change at all, profits earned by firms from non-member countries as a result of the quota are reduced by rules of origin.

Key Words: rules of origin, free trade agreements, import quotas.

JEL classification: F12, F13, F15

1. INTRODUCTION

Free Trade Agreements (FTAs) require rules of origin in order to distinguish the origin of goods and services between member and non-member countries because rules of origin insure that goods and services originating from within the FTA receive preferential treatment compared to those from outside of the FTA.

In his seminal paper, Shibata (1967) identifies the problem of trade deflection that arises in a free trade area without rules of origin and distinguishes that case from a customs union. In essence, the FTA relaxes internal tariffs among members, while members independently set external tariffs. In contrast, in a customs union there is a common external tariff. The FTA without rules of origin becomes a *de facto* customs union, with goods entering the FTA through the member with the lowest tariff and then transshipped to the other FTA members.

Further analysis of Free Trade Agreements with independently set external tariffs established that such arrangements are inherently unstable. In a FTA where members set tariffs independently and prices vary among members prior to the FTA, the member with the high tariff will shift imports to the low tariff member once internal tariffs are eliminated. Consumer arbitrage within the FTA leads the low tariff member to export the good to the high tariff member until internal prices are equalized. Consumers in the low tariff member are unaffected by the exports because the country imports a like amount from rest of the world. The low tariff member thereby captures all the tariff revenue. The high tariff member consequently lowers its own tariff and sets off a competition for tariff revenues. Ultimately, there is "a race to the bottom" until all members' tariffs are reduced to zero (Vousden 1990).

Pomfret (1997) summarizes these results and argues that the problem of indirect trade deflection and competition for tariff revenues means that FTAs ultimately are replaced by customs unions, as members agree to a common external tariff and a revenue-sharing formula. Hence, the analysis of FTAs is subsumed by the literature on Customs Unions.

Despite the domination of Customs Unions in the theoretical literature, in practice Free Trade Agreements have not faded away. The number of FTAs reported to the GATT reached 70 by the end of 1994, with no fewer than 27 new FTAs being reported during the 1990-1994 period (James 1997). In practice, competition for tariff

revenue does not seem to be an important consideration for countries entering into Free Trade Agreements (Cadot, de Melo and Olarreaga 1998). The North American Free Trade Agreement (NAFTA) rules of origin drew critical notice from economists analyzing the agreement (Hufbauer and Schott 1993 and Krishna and Krueger 1995). The possible use of restrictive rules of origin as a protectionist tool began to attract the attention of economists and revived interest in analytical work on FTAs.

The new wave of studies of FTAs is providing both interesting theoretical papers (Ju and Krishna 1998), (Falvey and Reed 1998), (Arndt 1998), and more practical policy-oriented studies (Imada and Naya 1992). *Ex ante* studies of trade creation and trade diversion resulting from formation of FTAs and other forms of deep regional integration (Kreinin and Plummer 1992; Congressional Budget Office 1993)[1] have been followed by *ex post* analysis of such arrangements (Plummer and Kreinin 1998, James and Umemoto 2000). Others highlight how product specific rules of origin have been used in a protectionist and discriminatory fashion in both FTAs and Customs Unions (see Vermulst and Waer 1990 and Stephenson and James 1995).

Ex ante studies estimating relatively large potential trade diversion resulting from the formation of NAFTA pointed to restrictive rules of origin in sectors such as textiles, clothing and automobiles and relatively high tariff preferences for members (Noland 1995). Other studies of the impact of NAFTA preferences predicted minimal effects of diverting trade because of the implementation of trade liberalization under the Uruguay Round Agreement (Laird 1990, Safadi and Yeats 1992). In sectors with potential for relatively large trade diversion, industry representatives lobbied vigorously for protective rules of origin, with a high degree of success. In textiles and apparel, a "triple transformation rule" effectively means that every stage of the production process must take place within North America for imports to be afforded preferential treatment. In autos, a progressively more restrictive local content rule of origin will eventually be implemented raising the share of NAFTA-made components to 65 percent of the value calculated by a tracing method[2]. Textiles and clothing have relatively high MFN tariffs but are also covered by very restrictive non-tariff barriers such as import quotas and antidumping tariffs. Voluntary restraint agreements

[1] The CBO (1993) summarizes the findings of 19 empirical studies of NAFTA, including those using computable general equilibrium models.

(VRAs) in sectors such as steel and autos can also be modeled as quantitative restrictions on imports. Markets for steel and autos are often thought to be oligpolistic and it is thus of interest to consider use of quantitative restrictions by FTA members in oligopolistic markets.

An obvious extension of past research on rules of origin in a FTA is to incorporate quantitative restrictions as opposed to tariffs (Cadot, de Melo and Olarraega, 1998). In the context of implementing a Free Trade Agreement where quotas are the principle import restriction, shifting profits from external producers to FTA member producers may become an important consideration. This paper evaluates the use of import quotas and rules of origin by the members of a FTA by considering liberalization of internal quotas and maintenance of external quotas in a model of oligopoly. We examine the potential role of restrictive rules of origin in shifting profits from non-members to member producers and the effect on welfare of members and non-members.

The remainder of this paper is organized as follows. Section 2 describes the model used and explains the situation before forming a FTA. Section 3 then analyzes the effect of a FTA with rules of origin on profits of each firm and section 4 considers the effect on the consumer surplus and profits of each producer. Finally, section 5 summarizes the findings and discusses the policy implications of the results.

2. THE MODEL

Consider a three-country world: with countries A, B, and C. Each country has one firm producing one product. Firms in each country compete with each other in country A's market. In other words, only country A has a market for the product. Its (inverse) demand function is $P[q_A + q_B + q_C]$ where q_i is the quantity of the output of the country i's firm in order to meet the demand in country A.

Unit production costs are constant in each firm and it is assumed that unit production costs in each country can be ranked as follows: $c_A > c_B > c_C$, where c_i is the unit cost of country i's firm ($i \in \{A, B, C\}$). For simplicity, it is assumed that country A imposes a quantitative restriction rather than a tariff.

[2] A tracing method only allows components produced in the FTA to be counted toward the local content rule of origin for the finished products, regardless of the local content value of the parts.

Imports are subject to an import quota imposed by the government of country A and $\overline{m}_j$ is the import quota imposed by country A on country j's exports, where $j \in \{B, C\}$. The profit for the firms from country B and country C is $\Pi_j = P[q_A + q_B + q_C]q_j - c_j q_j$ subject to the quota restriction, $q_j \le \overline{m}_j$. We assume that the import quota is restrictive enough to protect a monopoly firm in country A. Therefore each exporter chooses its output at the quota level ($q_j = \overline{m}_j$, $j \in \{B, C\}$) and the profit obtained is

$$\Pi_j = P[q_A + \overline{m}_B + \overline{m}_C]\overline{m}_j - c_j \overline{m}_j . \quad (1)$$

This profit consists of ordinary profit at market prices without any trade restrictions and a quota rent. If P^* is the ordinary market price level,

$$\Pi_j = \left(P^* - c_j\right)\overline{m}_j + \left(P[q_A + \overline{m}_B + \overline{m}_C] - P^*\right)\overline{m}_j , \quad (1')$$

where the first term is the ordinary market profit and the second term is the quota rent.

The objective function for the profit maximizing monopolist in country A is the following.

$$\underset{q_A}{Max}\ P[q_A + \overline{m}_B + \overline{m}_C]q_A - c_A q_A . \quad (2)$$

The optimal condition is $P'q_A + P = c_A$,[3] because marginal revenue must be equal to the marginal cost. Using a simple linear form of the inverse demand function: $P = \alpha - \beta\sum_i q_i$, the profit maximizing condition yields the optimal output level of country A's firm which is written as

$$q_A = \frac{\alpha - c_A - \beta\left(\overline{m}_B + \overline{m}_C\right)}{2\beta} . \quad (3)$$

Therefore, the price of the product would be

$$P = \frac{\alpha + c_A - \beta\left(\overline{m}_B + \overline{m}_C\right)}{2} . \quad (4)$$

The profit of country A's firm is

$$\Pi_A = \frac{\left\{\alpha - c_A - \beta\left(\overline{m}_B + \overline{m}_C\right)\right\}^2}{4\beta} . \quad (5)$$

The profits for firms of country B and country C are as follows.

[3] P' denotes the first derivative of the inverse function with respect to the total demand in country A, that is, $\frac{dP}{dQ}$, where $Q = \sum_i q_i$, $i \in \{A, B, C\}$.

$$\Pi_B = (P - c_B)\overline{m}_B = \frac{\alpha + c_A - 2c_B - \beta(\overline{m}_B + \overline{m}_C)}{2}\overline{m}_B . \quad (6)$$

$$\Pi_C = (P - c_C)\overline{m}_C = \frac{\alpha + c_A - 2c_C - \beta(\overline{m}_B + \overline{m}_C)}{2}\overline{m}_C . \quad (7)$$

Before forming a FTA, country A's firm had a monopoly in country A because of the restrictive import quota.

3. The Effects of Rules of Origin

In this section, the effects of rules of origin on the profits of each firm by assuming that country A and country B form a FTA excluding country C. After forming a FTA, there are no more quotas between member countries. However, the firm in the non-member country (country C) still faces an import quota in FTA countries which is expressed as $\overline{m}_C$. After the FTA is formed, the firm in the non-member country C has two choices, to obey the quota restriction as a non-member producer or to comply with the rules of origin in order to be treated as a member producer.

The case of obeying the quota restriction:

When the non-member country's firm obeys the quota restriction, the quantity produced by the non-member country C's firm is already determined as $q_C = \overline{m}_C$. In this case, the firms from the member countries A and B will compete in country A's market as a duopoly. The objective function of the firms in the member countries is

$$\underset{q_i}{Max}\ (P[q_A + q_B + \overline{m}_C] - c_i)q_i ,\ i \in \{A, B\}. \quad (8)$$

Reaction functions are obtained from the profit maximizing conditions (marginal revenue = marginal cost).

$$q_A = h_A[q_B] = \frac{\alpha - c_A - \beta(q_B + \overline{m}_C)}{2\beta} . \quad (9)$$

$$q_B = h_B[q_A] = \frac{\alpha - c_B - \beta(q_A + \overline{m}_C)}{2\beta} . \quad (10)$$

In Cournot-Nash equilibrium, output in each member country is as follows:

$$q_A = \frac{\alpha - 2c_A + c_B - \beta\overline{m}_C}{3\beta} \quad (11)$$

$$q_B = \frac{\alpha - 2c_B + c_A - \beta\overline{m}_C}{3\beta} \qquad (12)$$

In the previous section, the quota was assumed to be very restrictive and the level of output under the quota was much less than optimal. However, after the FTA, $q_B > \overline{m}_B$. In other words, the output of country A's firm declines and the output of country B's firm increases. Thus, trade creation takes place because country A's firm loses part of its monopoly power.

In this duopoly situation, total output increases and the price decreases:

$$P = \alpha - \beta Q = \frac{\alpha + c_A - \beta(q_B + \overline{m}_C)}{2} = \frac{\alpha + c_A + c_B - \beta\overline{m}_C}{3}. \qquad (13)$$

Although the price of the product declines, the output of the non-member country's firm does not change because of the binding import quota. Therefore, the FTA with a quota restriction reduces the quota rent, $(P - P^*)\overline{m}_C$, and the total profit of the non-member firm.

The case of compliance with the rules of origin:

Country C's firm has the option of complying with the rules of origin so that its output is treated as output from a member country. By doing so country C's firm can avoid the quota restriction. In this case country C's firm is faced with increasing costs because it must use higher cost inputs from country B. If rule of origin requires that a certain percent of inputs must originate from FTA member countries, the unit cost of country C's firm can be written as $c_C^\gamma = \gamma c_B + (1-\gamma)c_C$, where $\gamma \in [0,1]$ is the required percentage of inputs originating in the FTA.

Then the objective function for firms of country A and B is :

$$\underset{q_i}{Max}\ (P[q_A + q_B + q_C] - c_i)q_i,\ i \in \{A, B\}. \qquad (14)$$

However, the objective function of country C's firm with a rule of origin constraint would be :

$$\underset{q_C}{Max}\ (P[q_A + q_B + q_C] - c_C^\gamma)q_C \qquad \text{s.t. } c_C^\gamma = \gamma c_B + (1-\gamma)c_C. \qquad (15)$$

Country C's firm is then able to choose the quantity of output strategically, yielding three reaction functions from each optimal condition:

$$q_A = h_A[q_B, q_C] = \frac{\alpha - c_A - \beta(q_B + q_C)}{2\beta}. \qquad (16)$$

$$q_B = h_B[q_A, q_C] = \frac{\alpha - c_B - \beta(q_A + q_C)}{2\beta}. \quad (17)$$

$$q_C = h_C[q_A, q_B] = \frac{\alpha - c_C^{\gamma} - \beta(q_A + q_B)}{2\beta}. \quad (18)$$

Then the optimal output level of each firm and new equilibrium price are as follows:

$$q_A = \frac{\alpha - 3c_A + c_B + c_C^{\gamma}}{4\beta}. \quad (19)$$

$$q_B = \frac{\alpha - 3c_B + c_A + c_C^{\gamma}}{4\beta}. \quad (20)$$

$$q_C = \frac{\alpha - 3c_C^{\gamma} + c_A + c_B}{4\beta}. \quad (21)$$

$$P = \alpha - \beta Q = \frac{\alpha + c_A + c_B + c_C^{\gamma}}{4}. \quad (22)$$

The assumption about the unit costs implies that $c_A > c_B \geq c_C^{\gamma}$. Combined with the equilibrium outputs in equations (19) to (21) this ranking further implies that $q_A < q_B \leq q_C$ and therefore that $\Pi_A < \Pi_B \leq \Pi_C$.

The case of no rules of origin ($\gamma = 0$):

Below the effects of a FTA without rules of origin, or equivalently rules of origin that "require" zero percent local content, are investigated in the presence of a quota restriction on imports by FTA members from the non-member country C. The firm in the non-member country first exports the product to country B, which then re-exports the product to country A. This process is called trade deflection and in this case the quota restriction is no longer effective.[4]

Unit production costs for the non-member country C's firm remain the same as the domestic level, $c_C^{\gamma=0} = c_C^0 = c_C$ because country C's exports are treated the same as output by firms of FTA members. As a result, the FTA market becomes and oligopoly. Then the optimal output levels derived from the three reaction functions (16) to (18) would be

[4] Trade deflection occurs because country B has lower restrictions on imports from non-member countries. In this case, country B does not have a quota restriction. Trade deflection does not occur before the formation of a FTA because country A imposes a quota restriction on exports from both country B and country C.

$$q_A = \frac{\alpha - 3c_A + c_B + c_C}{4\beta}. \quad (23)$$

$$q_B = \frac{\alpha - 3c_B + c_A + c_C}{4\beta}. \quad (24)$$

$$q_C = \frac{\alpha - 3c_C + c_A + c_B}{4\beta}. \quad (25)$$

Assuming that $c_A > c_B > c_C$, it follows that $q_A < q_B < q_C$ and the new equilibrium price is:

$$P = \alpha - \beta Q = \frac{\alpha + c_A + c_B + c_C}{4}. \quad (26)$$

This equilibrium price is equivalent to the ordinary market price level without any trade restrictions. Therefore, quota rents disappear and total profits are equal to the ordinary market profits. However, the removal of quota restrictions and use of rules of origin leads to increased output in countries B and C, despite the decrease in country A. Consequently, compared with the situation before forming the FTA, changes in profits in countries B and C are uncertain, but a decline in profits is inevitable in country A. Correspondingly, profits are lowest for the firm in country A and highest for the firm in country C, or $\Pi_A < \Pi_B < \Pi_C$.

The case with strict rules of origin ($\gamma = 1$):

Next, the effects of the most restrictive rule of origin, a 100 percent local content requirement are investigated, assuming that the non-member country's firm still chooses to follow the rules of origin instead of the quota restriction. Under such restrictive rules of origin, the non-member country's firm has to use inputs produced in the FTA instead of inputs produced in the non-member country. In order to minimize unit production costs, the firm from country C would use the least expensive inputs within the FTA and the unit cost of production would be $c_C^\gamma = c_C^1 = c_B$.

Then the optimal production levels obtained from the reaction functions (16) to (18) would be:

$$q_A = \frac{\alpha - 3c_A + c_B + c_C^1}{4\beta}. \quad (27)$$

$$q_B = \frac{\alpha - 3c_B + c_A + c_C^1}{4\beta}. \quad (28)$$

$$q_C = \frac{\alpha - 3c_C^1 + c_A + c_B}{4\beta}. \quad (29)$$

Assuming that $c_A > c_B = c_C^1$, it follows that $q_A < q_B = q_C$ and the new equilibrium price is:

$$P = \alpha - \beta Q = \frac{\alpha + \left(c_A + c_B + c_C^1\right)}{4}. \quad (30)$$

In this case, profits are again lowest for the firm in country A, but equal for the firms in countries B and C, or $\Pi_A < \Pi_B = \Pi_C$. Here the difference between the new equilibrium price and the ordinary market price yields ordinary market profits, which can be considered as a substitute for quota rents. In the case of a one hundred percent content requirement, these ordinary profits are also lowest for the firm in country A, and equal for the firms in countries B and C. However, the increase in the unit production cost in country C reduces ordinary market profits. Consequently, total profits are lower for the firm in country C if rules of origin are strict.

Comparing this case and the case of lax rules of origin discussed in the previous subsection, it can be seen that more restrictive rules of origin increase output in firms located in the FTA (countries A and B) and decrease output and profits in the non-member country firm. In other words, more restrictive rules of origin lead to trade diversion, which benefits firms in the FTA by increasing costs in the firm in the non-member country. In other words, implementation of strict rules of origin forces the non-member country's firm to move down its reaction function, decreasing its output and profits. In addition, the downward shift in the reaction function of the firm in country C also decreases the total output sold in country A.

4. WELFARE EFFECTS

Consumer surplus

Using the reaction of country A's firm, the price of the product in the FTA can be written as $P = \frac{\alpha + c_A - \beta\left(q_B + q_C\right)}{2}$. This price is a function of the sum of the quantities of output of country B's and country C's firms. Of the cases considered in

the previous sections, price would be highest and consumer surplus lowest in the case of no FTA. This is because the firm in country A has monopoly power resulting from the quota restriction on imports. However, after forming a FTA, the firm in country B enters the market in country A, and the market power of country A's firm diminishes because it loses its monopoly. Thus, the establishment of the FTA lowers price and increases consumer surplus.

In the case when the non-member country's firm follows the rules of origin, it also enters the FTA, leading to a further decline in price and increase in consumer surplus. In contrast, in the case of strict rules of origin the firm in country C could be excluded from the oligopolistic competition in the FTA. More generally, stricter rules of origin lead to increases in price and decreases in consumer surplus within the FTA.

Profits

Forming a FTA reduces the quota rent and thus profits of the non-member country's firm because the market within the FTA becomes more competitive and the equilibrium price decreases after the formation of the FTA. However, if the non-member country's firm chooses to follow the rules of origin, profits accruing from the market power gained in the FTA can be earned, offsetting the decline in quota rents. More restrictive rules origin reduce these profits in the non-member country's firm because the rules of origin force the firm to use higher cost inputs from FTA member countries.

On the other hand, more restrictive rules of origin lead to increased profit for firms in FTA member countries because the rules of origin lead to a downward shift of the reaction function of the non-member country's firm, giving an advantage to firms of FTA members in oligopolistic competition with firms from non-members. In the preceding analysis it was assumed that the import quota is very restrictive and the firm from the non-member country chooses to satisfy the rules of origin. However, there is another case in which it is more beneficial for the non-member country's firm to obey the quota restriction instead of complying with the restrictive rules of origin.

Suppose the import quota is set at exactly the same level of output as would obtain under restrictive rules of origin and that the firm from the non-member country must choose the quota restriction instead of complying with the rules of origin. The Cournot-Nash equilibrium outputs are then:

$$q_A = \frac{\alpha - 2c_A + c_B - \beta\overline{m}_C}{3\beta} \tag{33}$$

$$q_B = \frac{\alpha - 2c_B + c_A - \beta\overline{m}_C}{3\beta} \tag{34}$$

$$\overline{m}_C = \frac{\alpha - 3c_C^{\gamma} + c_A + c_B}{4\beta}. \tag{35}$$

Then, the equilibrium output level for member countries as:

$$q_A = \frac{\alpha - 3c_A + c_B + c_C^{\gamma}}{4\beta}. \tag{36}$$

$$q_B = \frac{\alpha - 3c_B + c_A + c_C^{\gamma}}{4\beta}. \tag{37}$$

This is the same optimal bundle as in the case of the rules of origin.

However, the profits for the non-member country's firm are greater than those under the case of the rules of origin.

$$\Pi_C = (P - c_C)\overline{m}_C > (P - c_C^{\gamma})q_C. \tag{38}$$

Here the rules of origin reduce the profits of country C's firm compared to a quota resulting in an identical output level because the rules of origin increase unit costs of production for the non-member country's firm whereas the quota does not have this effect.

5. CONCLUSIONS

This paper has evaluated the use of import quotas and rules of origin by the members of a FTA. It was found that the quota rent and total profit of the non-member country's firm decreases when the FTA implementation of rules of origin, even though the quota restriction does not change after forming the FTA. The market within the FTA becomes more competitive, changing from a domestic monopoly to an oligopoly after forming the FTA. As a result, the equilibrium price decreases and the profits of the non-member's firm decrease.

If the FTA does not have rules of origin, trade deflection occurs. In other words, the non-member country's firm exports its output to the FTA through the member country that does not impose a quota restriction. Therefore, the FTA without rules of origin becomes an oligopoly market rather than a duopoly or monopoly.

Alternatively, the non-member country's firm could choose to comply with the rules of origin and avoid the quota restriction. However, in order to follow the rules of origin, the firm must accept a larger proportion of high cost inputs produced in the FTA. Thus, more restrictive rules of origin lead to an increase in costs and downward shift of the non-member firm's reaction function. This process makes improves the profits of competitors from FTA members and reduces the profits of non-member firms.

Although more restrictive rules of origin capture transfer profits from the non-member firm and to member firms, this transfer does not necessarily improve welfare within the FTA. This is because the rules of origin cause trade diversion and distort the competition within the FTA market. Correspondingly, the loss of consumer surplus within the FTA may be larger than the gain in profits.

These results differ from those of other analyses of the effects of a preferential tariff in a FTA under imperfect competition. Key differences are that the tariff can only induce a downward shift of the reaction function for the non-member country's firm and that the tariff can never exclude a non-member firm from the oligopolistic competition in the FTA. However, the import quota can completely exclude the non-member from the FTA market. Therefore the combination of the FTA with rules of origin and an import quota could be a powerful strategic tool for member countries' firms in a FTA under imperfect competition.

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