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Trade creation and residual quota protection in a free trade area with domestic monopoly

David Feldman and Martin Richardson

NZ Trade Consortium Working Paper No. 16

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1. INTRODUCTION

This paper explores the consequences of discriminatory trade liberalization in the presence of quota-protected single-firm industries. In recent years, trade liberalization among developing nations increasingly has occurred outside of the multi-lateral, GATT-based, negotiating rounds. Instead we have discriminatory “mini-lateral” arrangements like NAFTA, MERCOSUR, the Andean Pact, or ASEAN. At the same time, protection often takes the form of quantitative restraints and other non-tariff barriers.¹ Lastly, the single-firm industry is a common occurrence in developing economies both currently and historically.

Small domestic markets create a predisposition for dominant-firm local industries. As Tybout (2000, p. 29) notes, the log of GDP alone explains two-thirds of the cross-country variation in measures of industrial concentration. Rapoport (1977) surveyed 320 manufacturing sectors in developing nations and found that in half of these industries a single firm accounted for more than 50% of domestic output. Concentration was stronger in intermediate goods and durable consumer goods, many of which competed with imports. The highest levels of seller concentration are found in industries such as tobacco, basic metals, certain chemicals, paper and paper products, cement, artificial fibers, and some processed foods and beverages (Lee, 1984).² Quota-protected single-firm industries are also present in the firm-level Moroccan data set used by Dutz (1996). High levels of concentration are also evident in some newly industrialized East Asian economies. Of 2,260 Korean sectors surveyed in the early 1980s, 533 were domestic monopolies.³

Policy has often complemented geography in creating highly concentrated domestic industries in the developing world. Across Africa, many public enterprises have received protection in the form of non-tariff barriers (NTBs) coupled with special privileges including monopolies over domestic production and distribution.⁴ Under Jamaican incentive legislation, the government made use of quantitative import restrictions to protect designated domestic firms and, in many cases, granted them virtual monopoly power. Under this system, only one firm was normally “approved” as a manufacturer of a given product, ostensibly to help it achieve economies of scale (Stone and Wellisz, 1993). Other countries (India, for example) have used similar incentive systems. As Krueger (1993, pp. 20-21) notes, rationing of imported intermediate inputs coupled with licensing of new investment effectively guarantee high market share for existing quota-protected domestic firms.

Despite recent moves toward liberalization, the industrial sector remains relatively protected in the typical developing economy (Ng, 1996), and many highly-concentrated industries persist.

¹ A sampling of the political-economy literature on the choice between tariffs and quotas includes Young and Anderson (1980, 82), Cassing and Hillman (1985), and Kaempfer, McClure and Willett (1989). Vousden (1990) provides a good summary. See also Sweeney, Tower and Willett (1977) for the positive economics of the choice between tariffs and quotas under monopoly.

² Whitworth (1980), for example, examined the industrial structure of Tanzania in the mid-1970s. Of thirty-one domestic industries employing more than fifty people, sixteen had but a single firm. Some of these produced goods with a high ratio of transport cost to value (cement, boxes, tires), but others faced more significant potential competition from imports (cigarettes, aluminum household goods, steel manufactures, and farm implements). House (1973) finds a similar pattern for Kenya in the 1960s.

³ Monopoly was defined as a single firm controlling more than 80% of domestic output. See de Melo and Roland-Holst (1991, p. 290).

⁴ Chen and Hou (1993) estimate political economy models of non-tariff barriers for Taiwan in the 1980s. They show that the existence of major public sector enterprises strongly enhances that sector’s chances of being subject to quantitative import controls.

Remaining non-tariff barriers often protect the most highly concentrated domestic sectors.⁵ Privatization itself sometimes accentuates concentration.⁶

Since Viner (1950) the traditional comparative statics of economic integration have focussed on trade creation and trade diversion. Meade (1955, pp. 96-99) showed that a small nation whose quota-protected domestic markets are competitive must gain from an FTA with a preferred partner whose supply price is less than the quota-distorted domestic price. In his example all increased domestic consumption comes from trade creation, and trade diversion is not present. Goodman and Kaempfer (1993) formalize this proposition and extend it to the large-country case. In section 2 we review this competitive, small-country case as a benchmark for comparing the single-firm case presented in section 3. If the domestic industry is composed of a single firm, we show how an FTA may not lead to any trade creation, though it must be welfare improving. This single-firm case is a useful simplification if domestic industries are more highly concentrated than those in the preferred partner.

The single-firm case also affects the political economy of integration. We use a simple political-support maximization model to explore the desirability of FTA formation and its probable consequences on the politically optimal level of residual quota protection. In this endogenous protection model the policymaker finds the optimal tradeoff between political support from policy surpluses (composed of enterprise profits and quota rents) and higher prices that antagonize consumers. Like a quota liberalization, an FTA that lowers domestic price will reduce policy surplus. Thus a proposed FTA could be desirable only if the political support obtained from enterprise profit and quota revenue at the partner's price were sufficiently higher than with the price-equivalent quota.⁷ We show that a necessary condition for an FTA to dominate the initial quota-distorted equilibrium is that profit must have a higher weight to the policymaker than quota revenue. This follows from the fact that an FTA raises profit, but lowers total surplus (profit plus revenue) at any given partner price, relative to the price-equivalent quota.

In the usual Vinerian framework, trade diversion creates a tension between regional and multilateral trading arrangements. In this monopoly model no trade diversion occurs, so one common defect of regionalism is not present. The level of residual protection within an FTA is another contentious, but sparsely modeled issue. Richardson (1993) uses political-support maximization to show why residual tariff protection of a competitive industry would likely fall. Once in an FTA the initial non-discriminatory tariff becomes partially redundant and the policymaker can reverse all trade diversion by reducing the tariff on non-members. Unlike a tariff, quota protection does not become redundant within an FTA. We show that a policymaker in these circumstances may or may not have an incentive to liberalize the initial quota. In the case examined here, discriminatory arrangements may not provide effective stepping stones to further liberalization, though they need not hurt third parties who might retaliate in ways that erode the multilateral system. Section 4 formalizes these arguments.

⁵ In Africa, these often include sugar, beer, soft drinks, cement, fertilizer, and steel products. (Adjustment in Africa, 1994, ch. 3).

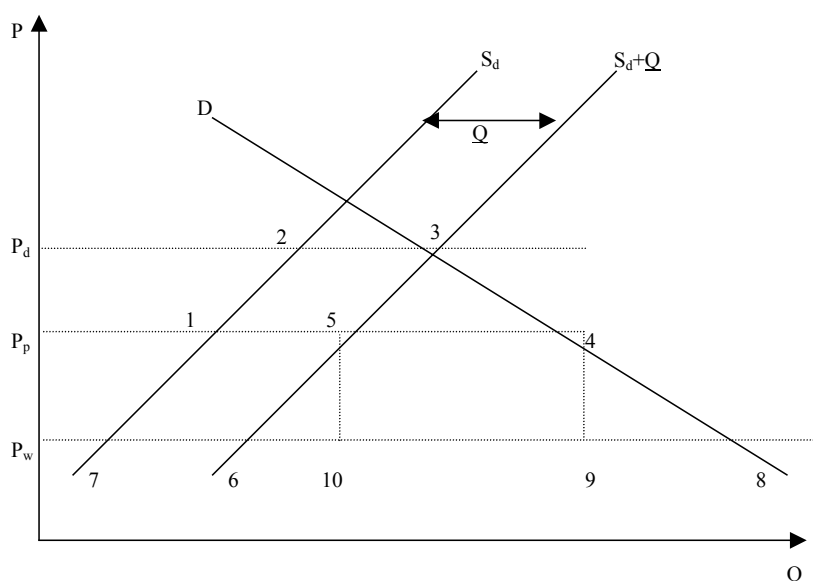
⁶ After privatization in Mexico, a single firm controlled 100% of the chloric acid industry, 96% of copper output, and 67% of the cement industry. The top four paper producers controlled over 60% of output. See Lustig (1992). Many other markets in Mexico are highly concentrated. As Ortiz (1989) noted, price controls led to production increases in many Mexican industries.. This is consistent with the behavior single firm industries (see Helpman, 1987).

⁷ Price-equivalence here refers to the quota that would decrease domestic price by the same amount as the FTA.

2. COMPETITIVE CASE

The home country is assumed to be small relative to the preferred partner and to the rest of the world (ROW). ROW is also presumed to be the low cost producer (P_w). For simplicity, the quota is auctioned (or a voluntary export restraint (VER) is directly allocated to the low cost producer.) In either case the quota rights initially will be exercised by producers in ROW. Thus in Figure 1 the quota-distorted supply curve in the domestic economy is $S_d + \underline{Q}$, where \underline{Q} is the fixed quota and S_d is the undistorted domestic supply curve. The quota-distorted domestic price is P_d , so domestic production occurs at point 2 on S_d . The quota allotment comes in from the ROW producer so consumption takes place at point 3 on the domestic demand curve. Quota rents equal the area (7,2,3,6) and domestic deadweight losses are (6,3,8).

Figure 1 Competitive Industry



Introducing a free trade area allows the preferred partner's exports to flow into the domestic market at the partner's supply price, P_p , which becomes the domestic equilibrium price. Exports from ROW are not displaced since the quota rights are still exercised in full. The residual demand (5,4) is supplied by the preferred partner, whose exports displace only domestic high cost output, so there is none of the trade diversion that accompanies FTA formation when the domestic market is protected by a non-discriminatory tariff.

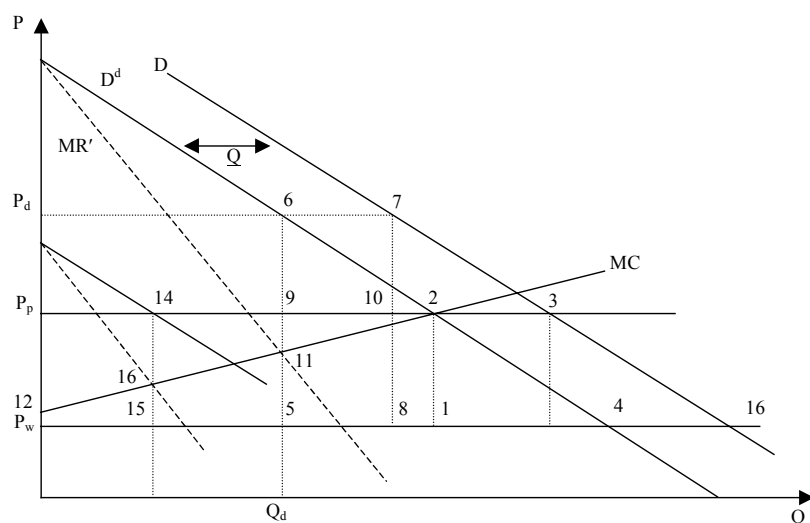
In the home economy, surplus rises by (1,2,3,4). Deadweight loss is reduced to (6,5,4,8), of which (6,5,10) is production loss, (4,9,8) is foregone consumer surplus and (5,4,9,10) reflects the remaining import price differential between the preferred partner and the rest of the world. The net welfare effect on the domestic economy depends on how the quota allotment is allocated. If the home government employs an auction quota, its revenues fall by (1,2,3,5), leaving (3,4,5) as the net welfare gain from the FTA. If the ROW initially held the quota rights, in the form of a VER for instance, then (1,2,3,5) is also a welfare gain from FTA formation since that area represents quota rents no longer transferred abroad. In either case home welfare rises unambiguously since trade creation occurs without any distortionary trade diversion.

3. SINGLE DOMESTIC FIRM

Now consider the case in which the domestic industry consists of a single firm protected by a fixed quota. Again we presume that the domestic economy is small both on world markets and within the proposed FTA. In Figure 2, D is domestic demand and D^d is the net-of-quota demand facing the domestic firm i.e. $D - \underline{Q}$. Each demand curve has an associated marginal revenue curve. The domestic firm is presumed to face increasing marginal costs. The ROW is the low cost producer, and its supply to the domestic economy is perfectly elastic at the world price (P^w). The quota allotment is initially filled by imports from this source.

Suppose for now that the quota is a world-wide quota and that the rights are sold. In a non-competitive setting, auctions may not be able to capture quota rents in their entirety. If there is market power on the buyers' or sellers' side of product markets or license markets, license prices may fall short of the potential rent.⁸ The single-firm industry examined here does not exhibit this problem. If the firm were given the quota rights it would import the full allotment from the low cost source and earn the quota rent (5,6,7,8) as profit.⁹ With full information, the government could set the license price exogenously and convert quota rent into revenue. Under a fixed quota the domestic market is non-contestable so the firm chooses its output level (Q^d) to equate marginal revenue from its residual demand curve with marginal cost. The quota-distorted domestic price is P^d . Deadweight losses are ($P^w, 12, 11, 5$) and (7,8,16). Quota revenues equal (5,6,7,8).

Figure 2 Single-Firm Industry



⁸ See Krishna (1993) for a thorough survey of this literature.

⁹ If the quota rights price is set exogenously by the authorities, a monopoly firm whose output decisions affect domestic price may purchase the entire quota but exercise only a portion of it. This "water-in-the-quota" is analyzed by Hillman, Tower and Fishelson (1979). Water-in-the-quota becomes more likely if the domestic firm is "large" in the sense that its free-trade share of the market would be high. Consider a domestic firm whose MC curve intersects MR below P^w . Such a firm would supply more than half the free-trade consumption level. Here a competitive auction would not be feasible since the social marginal value of imports is less than the marginal value to the monopoly of destroying a license. Nevertheless, the full quota revenue could be realized by the government through a number of techniques, including price ceilings or direct government imports.

3.1 An FTA May Not Lead to Any Trade Creation

Suppose now that the preferred partner's supply price is P_p . Given the above assumptions the domestic market is now contestable at the partner's supply price. Thus $MR=P_p$ for the domestic firm and its output rises along MC from point 11 to point 2. The quota allotment continues to come in from the low cost source at price P_w , and quota revenues equal (1,2,3,4). In this example no trade is created since the increase in domestic consumption is supplied by the domestic firm. The threat posed by goods from the preferred partner changes the domestic firm's behavior, though no imports from that source actually enter the domestic market.¹⁰

The price P_p in Figure 2 is a critical margin as it is the price at which MC intersects D^d . For preferred partner's prices below P_p imports equal to the horizontal distance between D^d and MC do enter from the partner and trade is created, though some of the increased domestic consumption may be supplied by higher domestic output. For partner's prices between P_p and P^d the domestic firm produces along D^d between points 2 and 6. Though the potential entry of goods from the preferred partner sets the domestic price, the residual demand facing the domestic firm is D^d . The only imports come in from the low cost ROW producer who uses the full quota allotment.

Suppose we replace our working assumption that the quota is a world-wide quantity constraint with a country-by-country quota under which the preferred partner and the ROW producer each have 50% of the initial quota. Assume also that the shares are not transferable. This scenario requires either a country-by-country auction or (more reasonably) a transfer of the quota rents to producers abroad, as in the U.S. sugar quota disbursement system. The residual demand faced by the domestic firm remains D^d so the initial domestic price is still P^d . The partner and the ROW producer each sell $.5Q$ in the domestic market. If the partner's price and the ROW price differ then the value of the country-specific quotas would differ as well.

Relaxing the quota on the preferred partner shifts D^d to the right by $.5Q$ in addition to making the domestic market contestable at the partner's supply price. As in the previous example, if the partner's price is P_p the domestic firm will produce at point 2 on its marginal cost curve. Thus imports from the preferred partner in the FTA would exactly equal its initial quota allotment, i.e. there still is no trade creation. For partner's prices above P_p imports would fall in comparison to the world-wide quota case. Thus with a country-by-country quota an FTA may lead to trade destruction though, as we show below, without the usual negative welfare consequences.

3.2 Welfare Effects

In the competitive case, trade creation is assured and FTA formation proves unambiguously welfare enhancing. In the single firm case, trade creation is not assured. The FTA may worsen domestic overproduction relative to the competitive outcome. Nevertheless, the aggregate welfare effects remain unambiguously positive. The FTA guarantees domestic market contestability since exports from the preferred partner can enter in unlimited amounts at the partner's supply price. Although the FTA has the potential to move the economy further from the first best (free trade) equilibrium, the contestability gain proves dominant. So we have a case in which a second best policy response, in which a second distortion (the FTA) is combined with the initial distortion (the quota), must raise welfare.

Using Figure 2, consider again the case in which the preferred partner's supply price is P_p and the auctioned quota rights sell for their full value. The consumption gain is $(P^d, 7, 3, P_p)$. The firm's profit falls by $(P^d, 6, 9, P_p) - (9, 2, 11)$, while quota revenue declines by $(7, 6, 9, 10)$. The net change in welfare is thus $(7, 10, 3) + (9, 2, 11)$. Alternatively, we can measure the gain in terms of deadweight

¹⁰ The partner's price should properly be viewed as a relative price of the firm's output. The partner presumably levies a quota or tariff on some other good imported from the home economy. Relaxing that barrier reduces the relative price of the good considered here.

loss before and after the FTA. The fall in consumption deadweight loss (1,2,6,5) minus the rise in production deadweight loss (1,2,11,5) gives the net gain (6,2,11) = (7,10,3)+(9,2,11).

Similar logic shows a welfare gain for all partner's prices below P^d . This is clear if the FTA leads the domestic firm to produce less as this corrects the over-production distortion of the quota as well as yielding consumption gains. To see that it also holds even if domestic output increases, consider some partner's price $P^f < P^d$ to which the domestic firm responds by producing some quantity $Q^f > Q^d$. As the domestic price falls from P^d to P^f there is a transfer from the domestic firm to consumers (of $(P^d - P^f)Q^d$) as well as an increase in the domestic firm's profits corresponding to the area above the MC curve but below P^f , between Q^f and Q^d . On top of this gain, there are further gains to consumers represented by the CS triangle on D^d below P^d and above P^f .

Indeed, for partner prices below the quota-distorted price under perfect competition (P_p in figure 2) the FTA yields *larger* gains in the single firm case than in the corresponding competitive case. With a single-firm industry, the FTA induces an additional gain due to market contestability. Domestic welfare is thus a monotonic decreasing function of the partner's price.¹¹

4. THE POLITICAL ECONOMY OF FTA FORMATION

We have shown that an FTA must increase aggregate economic welfare in this setting, and that the lower the partner price the greater the rise in welfare. This does *not* imply that an FTA also must be politically desirable. Nor does it suggest that the FTA becomes more appealing the lower the partner's price. In this section we explore the political economy of FTA formation between a larger partner and a smaller home country in which quota protected single-firm industries are an important part of the economy. We use a simple political-support maximization model in which enterprise profits and policy revenues are substitutes to the policymaker. The model is compatible with a political preference for quotas over tariffs.

We also evaluate whether FTA formation encourages or discourages further liberalization of the initial quota. Richardson (1993) has studied residual *tariff* protection of a small *competitive* industry. Once an FTA is in place, the tariff on the low-cost non-member becomes redundant. Using Figure 1, if $(P^d - P_w)$ is the initial external tariff and P_p is the partner's price, then the portion of the tariff equal to $(P^d - P_p)$ is redundant within the FTA. The policymaker then can reduce the external tariff by an amount epsilon larger than the redundancy. This switches imports back to the rest of the world and reverses the initial trade diversion.¹² Richardson (1993) shows that reducing the residual tariff must increase political support as long as the policymaker welfare function gives some positive weight (no matter how small) to consumer surplus and tariff revenue relative to producer surplus.¹³ With our single-firm industry, the initial quota does not become redundant within the FTA, so the liberalization incentives at work in Richardson's model are not present here.

A policymaker welfare function is useful in understanding government behavior in many developing countries in which the state itself is a strong player and the multiplicity of private interests (civil society) that predominate in more pluralistic settings are weaker followers.

¹¹ The function is not concave to the origin. For partner's prices between P^d and P_p , welfare increases at a decreasing rate, while prices progressively lower than P_p yield gains that increase at the margin.

¹² Feldman (1993) shows why redundant tariff protection may persist in a political equilibrium given world price uncertainty.

¹³ A similar logic is at work in a *quota*-protected competitive industry, though the magnitude of the potential gain is less. Again using Figure 1, trade creation equal to the segment (5,4) is assured within the FTA without any trade diversion. Liberalizing the quota on ROW by (5,4) adds a gain of (5,4,9,10), smaller than the gain from reducing the non-discriminatory tariff by epsilon more than $(P^d - P_p)$.

Formally, we assume policymaker welfare depends on policy surplus (firm profits and quota revenues) and domestic price:

$$W = w[r(\pi, R), P] \quad (1)$$

where r refers to policy surplus, the components of which are industry profit (π) and quota revenue (R), and $P = P_d - P_w$ is the quota-induced wedge between domestic and world prices. Policy-induced increases in domestic price antagonize consumers and reduce policymaker welfare, while added profits and quota rents raise it, or $w_r = (\partial W / \partial r) > 0$ and $w_p = (\partial W / \partial P) < 0$. The politically optimal quota equates at the margin the policymaker's willingness to substitute between policy surplus and domestic price with the transformation relation between the two.

The first order condition for an optimum is,

$$-\frac{w_p}{w_r} = r_\pi \frac{d\pi}{dP} + r_R \frac{dR}{dP} > 0 \quad (2)$$

where $r\pi$ and rR are the weights on profit and revenue in the utility function. Profit is monotonic increasing in price between the world price (no quota barrier) and the monopoly price (a zero quota). Revenue follows a Laffer curve. As the government's first order condition (2) demonstrates, the politically efficient quota is unlikely to yield maximum quota revenues. It may be so restrictive that $dR/dP < 0$. This could occur if $d\pi/dP$ is sufficiently high, and/or if the weight on profit at the margin sufficiently exceeds the weight on quota revenue.

In general, quota revenues are given by

$$R = P\underline{Q} \quad (3)$$

where Q is the quota amount. Domestic price is a function of the quota, so

$$\frac{dR}{d\underline{Q}} = P + \underline{Q} \frac{dP}{d\underline{Q}} \quad (4)$$

The firm maximizes profits given the residual demand curve it faces,

$$\Pi = P[Q(P_d) - \underline{Q}] - c(q) \quad (5)$$

where $Q(P)$ is total quantity demanded, $q = Q(P_d) - \underline{Q}$ is the firm's output and $c(q)$ is the cost function. As the interesting case here is where the country would be an importer of this good so we assume henceforth (as in Figure 2) that $c'(0) \geq P_w$, which ensures that the domestic firm's marginal cost exceeds the world price for all levels of domestic output. We then have the standard first order condition for a monopoly,

$$\frac{d\Pi}{dq} = qP'_d(q + \underline{Q}) + P_d(q + \underline{Q}) - c'(q) = 0 \quad (6)$$

From this,

$$\frac{dq}{d\underline{Q}} = -\frac{(P'_d + qP''_d)}{(2P'_d + qP''_d - c'')} \quad (7)$$

and hence,

$$\frac{dP}{d\underline{Q}} = P'_d \left(1 + \frac{dq}{d\underline{Q}} \right) = P'_d \left(\frac{P'_d - c''}{2P'_d + qP''_d - c''} \right) < 0 \quad (8)$$

where the sign in (8) follows from the firm's second-order condition.

From (4) and (8) the effect on revenues of relaxing the quota is ambiguous. For domestic prices above the revenue maximizing level, quota revenue falls more rapidly than profit rises, so policy surplus may decline. This policy surplus relationship is the binding constraint on the policymaker's welfare.

4.1.1 A FTA is politically unattractive when profits and revenues are equally valued

This model has been used to examine the choice between tariffs and quotas.¹⁴ If the policymaker equally values a unit of enterprise profit or tariff/quota revenue, then quotas dominate tariffs since the sum of profits and revenues under a quota is always as large or larger than under the price-equivalent tariff. This equal weighting of profit and revenue is consistent with a kleptocratic regime in which individuals (groups) who have claims to the state's revenue also have claims to enterprise profits. As the weight on revenue approaches zero, the model collapses into the Cassing-Hillman (1985) case in which tariffs politically dominate quotas.

We begin the formal analysis by examining the effects of an FTA on enterprise profit and quota revenue separately, and conclude by showing that a policymaker that weights revenue and profits equally might never choose to form a FTA in this setting. The political desirability of FTA formation depends on how an FTA affects the tradeoff available to the policymaker between policy surplus and domestic price. Thus we must first compare how an FTA that lowers domestic price affects profit and revenue relative to a price-equivalent quota liberalization.

Let us suppose that the surplus function can be written as,

$$r(\pi, R) = \delta\pi + (1 - \delta)R \quad (9)$$

where $\delta \in [0,1]$ is the weight placed on profits versus quota rents. Then, absent a FTA, a government choosing Q to maximise (1) obtains, from (2),

$$0 < -\frac{w_p}{w_r} = \delta \frac{d\pi}{dP} + (1 - \delta) \frac{dR}{dP} \quad (10)$$

The domestic price that follows from Q^* , the optimal quota implicit in (10), we shall denote P_d^* , and the level of welfare that obtains we shall denote W^* . Suppose that this government now forms a FTA and faces a partner price of $P_p < P_d^*$. Denote the level of welfare that follows if the quota is unchanged as W^{**} . Now, the domestic price will fall to $P_d = P_p$ so $Q = D(P_p) - Q \equiv Q_p$. Thus $\pi = P_p Q_p - c(Q_p)$ and $R = (P_p - P_w)Q$, so

$$\frac{d\pi}{dQ} = (P_p - c') \frac{dQ_p}{dQ} = -(P_p - c') \quad (11)$$

and

$$\frac{dr}{dQ} = \delta \frac{d\pi}{dQ} + (1 - \delta)(P_p - P_w) = (1 - \delta)(P_p - P_w) - \delta(P_p - c'). \quad (12)$$

Thus in the case where revenues and profits are valued equally ($\delta = 1/2$) we get

$$\frac{dr}{dQ} = -\frac{1}{2}(P_w - c') \quad (13)$$

¹⁴ See Cassing and Hillman (1985), and Feldman (1993b).

So long as MC exceeds the world price, our maintained assumption, this government would wish to expand the quota. A small expansion would have no effect on domestic price (unchanged at P_p) and thus no effect on consumers, but would increase $r(\pi, R)$. The liberalization thus raises government welfare monotonically above W^{**} , but eventually the quota will be expanded to the level that would have sustained a domestic price of P_p in the absence of a FTA. At this point the level of government welfare has risen to that which would have prevailed had they chosen the quota that yielded P_p without a FTA. By definition, this is less than W^* (as the initial quota was optimal) so, overall, the government can be no better off in the FTA than without it.¹⁵

Intuitively, the government sets its optimal quota initially to trade off not only policy surplus against consumer surplus but also revenues against domestic profits. In Figure 2, if Q is the optimal quota then the marginal profit from another unit of domestic production is given by height (6,11) and marginal quota rent from a one-unit quota expansion is (6,5). When a FTA is formed and the domestic price falls, this latter trade-off is disturbed: the impact of a lower price on the marginal profit ($P_d - c'$) is greater than that on the marginal quota rent ($P_d - P_w$). Equation (12) shows that the optimal trade-off equates the δ -weighted marginal profit with the $(1-\delta)$ -weighted marginal quota rent so marginal profits must rise relative to marginal rents and this leads to an expansion of the quota. In Figure 2, if the quota is unchanged after the FTA is formed then marginal profit falls to zero (as the domestic firm produces at point 2 where $P_p = MC$) while the marginal quota rent is given by (2,1). Expanding the quota pushes the domestic firm back down its MC curve and raises the marginal profit accordingly. That expansion raises policy surplus continuously until the quota is reached that would have sustained P_p as a domestic price in the absence of a FTA; that is, in Figure 2, until a quota of (3,14) is reached (at which point policy surplus has expanded from $(2,12, P_p) + (1,2,3,4)$ to $(14,16,12, P_p) + (3,4,15,14)$). At this point total welfare is the same as that which the government could have achieved by setting a quota of (3,14) in the first place absent the FTA: by revealed preference this cannot be as desirable as Q .

So far we have taken the usual approach to a FTA and assumed that the partner's price operates as a ceiling price only in the domestic country. Richardson (1995) notes that it might also be considered a price floor in that the domestic firm can always sell in the partner at that price. If this were the case then, in the analysis above, the government would wish to expand the quota up to the full quantity demanded – $D(P_p)$ – once the FTA is formed! The reason is that the domestic firm would produce at point 2 in Figure 2 but sell its entire output in the partner country at price P_p and the total volume of domestic consumption – out to point 3 – would be imported from the rest of the world, yielding quota rents of $(3,4, P_w, P_p)$. In this case the FTA is clearly desirable even for a government that weights revenue and profit equally.

4.1.2 A FTA can only be politically attractive if profits are more highly valued than revenues

Returning to the case where the FTA provides a price ceiling and not a floor, is it possible that a FTA could be attractive to a government that did not weight revenue and profits equally? This could only be the case if a FTA can offer a trade-off that is not otherwise available, and in this section we identify exactly such a tradeoff. Consider Figure 2 and suppose that the optimal quota, absent a FTA, was (3,14). This yields a domestic price of P_p , corresponding consumer surplus, domestic profits of $(12,16,14, P_p)$ and quota rents of $(3,4,15,14)$. If the home economy joins a FTA

¹⁵ The mathematics in equations (11) through (13) holds for partner prices between p^d and p_p in Figure 2 (outcomes without trade creation). The logic, however, extends to the trade creation case as well. Once in a FTA the firm's marginal revenue curve becomes perfectly elastic at the partner's price until its output equals residual demand. Increasing the quota on non-member imports would have no effect on domestic price until the quota equaled the amount that, in the absence of an FTA, would have driven price down to the partner's price. At best, a policymaker that values profit and revenue equally always faces the original tradeoff between policy surplus and domestic price.

with a partner whose price is P_p and the initial quota is maintained, then the FTA will have no effect. If the quota is tightened, however, domestic price won't change but domestic output will increase along the MC curve potentially as far as point 2. With a quota of Q , for instance, the FTA gives profits of $(2,12,P_p)$ and rents of $(1,2,3,4)$, as we have noted earlier. The important point here is that profits are higher under the price-equivalent FTA and appropriate quota than under a quota alone, even though the sum of revenue and profits is lower. Accordingly, one would anticipate that joining a FTA might be more attractive to a government that values profits over revenues. Of course, the FTA will reduce profit if the partner's price is too low, which also suggests that the FTA is more likely to be attractive when the partner's price is "close" to the pre-FTA domestic price.

To answer this question more generally we must compare welfare levels between two discretely different regimes: an optimally chosen quota alone, and a FTA with an optimally adjusted quota. This is intractable even in this simple model so we turn to some numerical simulations to illustrate the intuitive results suggested above. We simulate a linear version of the model above in which $P_d = a - bQ$, $w[r, P] = \beta CS(P_d) + (1 - \beta)r$, $r(\pi, R) = \delta\pi + (1 - \delta)R$ and $MC(q) = \alpha + \gamma q$ for constants a , b , β , δ , α and γ . We confine our attention to cases in which a quota is initially preferred to a tariff (in the absence of a FTA). In this setting we can show that the optimal quota when a FTA is joined (given that domestic production remains positive) is given by:

$$\underline{Q}^{FTA} = \frac{1}{b\delta\gamma} \left[\delta(\gamma + b)(a - P_p) + b(1 - \delta)(P_p - P_w) - b\delta(a - \alpha) \right] \quad (14)$$

We can also calculate the maximum value of this FTA quota such that the domestic price is exactly P_p – this is the equivalent of the quota $(3,14)$ in Figure 2:

$$\underline{Q}^{max} = \frac{1}{b(\gamma + b)} \left[(\gamma + b)(a - P_p) + b(\alpha - P_p) \right] \quad (15)$$

Following our earlier reasoning, if $Q_{FTA} > Q_{max}$ it must be true that the FTA is politically undesirable: the welfare level achieved at Q_{max} was attainable in the absence of the FTA by setting $Q = Q_{max}$. But if the quota in the FTA exceeds Q_{max} then domestic price will be affected and the FTA is redundant. Again, whatever welfare is achieved at such a Q_{FTA} must have been attainable in the absence of a FTA and so, by revealed preference, such a FTA cannot be politically attractive. Thus a necessary condition for a FTA to be politically attractive is that $\underline{Q}^{FTA} < \underline{Q}^{max}$. This condition can be manipulated as follows:

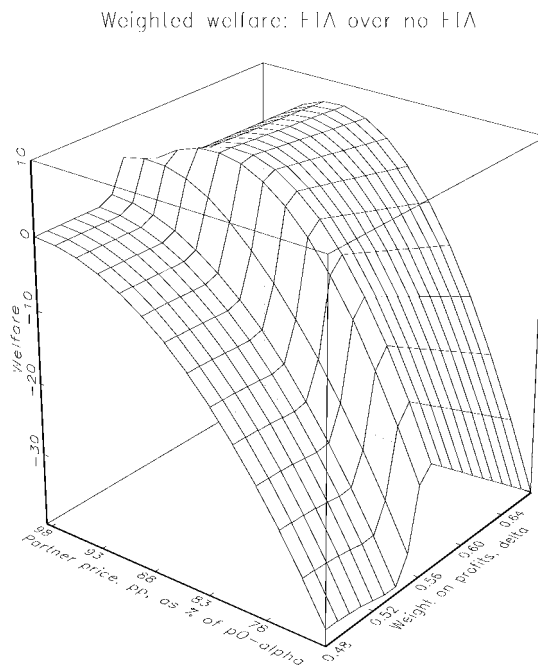
(16)

$$\begin{aligned} & \delta\gamma[b(\alpha - P_p) + (\gamma + b)(a - P_p)] > \\ & \quad (\gamma + b)[b(1 - \delta)(P_p - P_w) + \delta(\gamma + b)(a - P_p) - b\delta(a - \alpha)] \\ \Leftrightarrow & \delta\gamma b(\alpha - P_p) > (\gamma + b)\delta(\gamma + b - \gamma)(a - P_p) + b(1 - \delta)(\gamma + b)(P_p - P_w) \\ & \quad - b\delta(\gamma + b)(a - \alpha) \\ \Leftrightarrow & \delta\gamma(\alpha - P_p) > (\gamma + b)\{\delta(a - P_p) + (1 - \delta)(P_p - P_w) - \delta(a - \alpha)\} \\ \Leftrightarrow & (\delta\gamma - \delta(\gamma + b))(\alpha - P_p) > (\gamma + b)(1 - \delta)(P_p - P_w) \\ \Leftrightarrow & \delta b(P_p - \alpha) > (\gamma + b)(1 - \delta)(P_p - P_w) \end{aligned}$$

This is a necessary condition only, so if (16) does not hold then a FTA cannot be politically attractive, which is more likely the lower is δ .

Turning to the results of the simulations, our earlier intuitions are indeed borne out. Figure 316 shows the difference in welfare in the FTA and without it as δ and P_p are varied. The partner's price is varied between α , the minimum marginal cost of the domestic firm, and P_d , the domestic price absent a FTA and is reported as a percentage of that difference. The Figure shows that the FTA becomes less attractive as the partner's price gets further from the initial price absent the FTA, for most values of δ . Further, the FTA is only preferred when δ is sufficiently high – in this case above 0.54 or so – and P_p is also high. Also, the FTA is more likely to be attractive the lower is β , the relative weight the government places on consumer surplus. This, too, is intuitive. As we suggested earlier, a FTA will only be attractive if it offers a trade-off that is otherwise unavailable, and what it offers is the ability to increase profits, at any given price, beyond that which is achievable absent a FTA. When β is high the initial optimal quota is also high, so the domestic price is low. If this price is less than α there is no domestic production at all and a FTA is redundant.

Figure 3 Excess of welfare in FTA over initial welfare, with optimal quotas

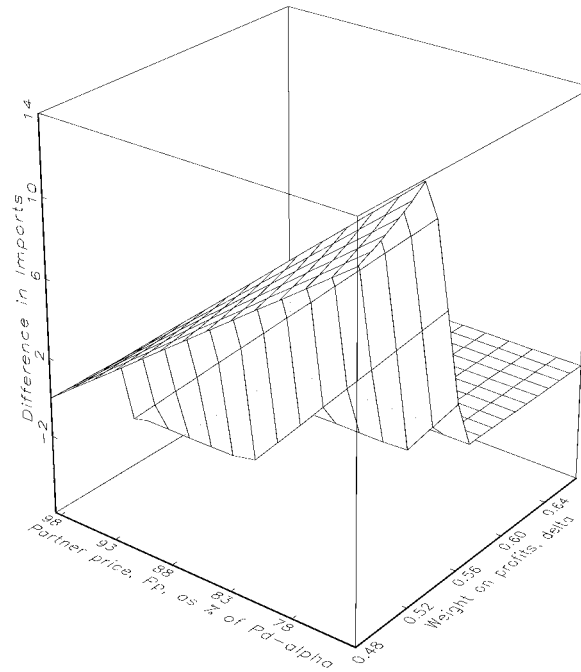


Interestingly, when β is high an increase in δ is likely to lead to an expanded quota. The reason is that when δ is low a quota will be imposed to earn quota rents which are relatively highly valued. This comes largely at the expense of consumer surplus. As δ rises, however, and profits become more valued relative to rents, the cost of a quota in terms of foregone consumer surplus becomes more acute since the marginal effect on profits of a tighter quota is smaller than its effect on rents (given $MC > P_w$.) So, for high β , the attractiveness of a quota to raise profits is less than its attractiveness to raise quota rents, in a sense, and as profits become more valued (δ rises) so the government finds it more attractive simply to liberalize the quota entirely. Our simulations also show that the quota may be either liberalized or tightened when the FTA is formed. Figure 4 illustrates the increase in imports in the FTA compared to no FTA, when the quota is set optimally

¹⁶ The simulations reported here were run using the following parameter values: $a=150$, $b=2$, $\beta=0.1$, $P_w=\alpha=25$ and $\gamma=0.3$. More details are available from the authors on request.

in each case. It suggests that the quota is more likely to be tightened when δ is low. Note that for high δ and P_p the policy-maker chooses a prohibitive quota in this setting both within a FTA and in its absence, hence the difference in imports shown in Figure 4 is zero in those cases. Figure 4 also suggests that, for given δ , the quota is more likely to be tightened when the partner's price is high. This contrasts with Richardson's (1993) tariff-protected competitive industry where joining a FTA leads to an incentive to liberalize tariffs against non-members.

Figure 4 Excess of optimal quota in FTA over initial optimal quota



Lastly, the new political equilibrium will never lead to trade creation in this industry, so long as quota rents are valued at all. The only case in which it might appear to is where the residual demand curve (D' in Figure 2) in the post-FTA political equilibrium intersects the marginal cost curve above the partner's price. In that case, the domestic firm would produce to where $MC=P_p$ and this output plus the quota would be less than demand at the price P_p . However, such a situation could not reflect an optimal quota as the quota could be expanded with no consequence for domestic price (and hence consumer surplus) or for domestic profits. Such an expansion, however, would increase quota rents.

5. CONCLUSIONS

This paper has evaluated the positive and political-economy consequences of FTA formation for a small domestic economy with quota-protected single-firm industries. In contrast to the competitive case, FTA formation will not create trade in the single-firm case when the quota is chosen optimally (and may not create trade even for an arbitrary quota). Nevertheless, an FTA must prove welfare enhancing in the traditional sense of increasing real national income. Although the FTA may worsen domestic overproduction relative to the first best optimum (free trade) the reduction in consumption deadweight loss unambiguously dominates any extra production loss.

Conventional welfare gains rarely motivate discriminatory liberalization. We use a political-support function in which the firm's profits and quota rents are substitutable to the policymaker to make three points. First, for an FTA to dominate the initial quota-distorted equilibrium, the weight on profit must exceed the weight on revenue in the policymaker welfare function. Second, politically feasible FTAs require a partner price close to the initial domestic price. Partner prices closer to that of the low cost producer cost too much political support from foregone profits and revenues to justify the lower consumer price. Lastly, moving into an FTA may create an incentive for the policymaker to liberalize the residual quota on non-members. Thus, FTA formation need not reduce the volume of world trade outside of discriminatory regional arrangements. With a quota-protected domestic monopoly, regional arrangements are neither poison nor panacea.

6. APPENDIX

In this appendix we provide the derivations of equations (14) and (15) in the paper: first, equation (14) which gives the optimal in-FTA quota in the linear case when domestic output is positive. The government sets the quota to maximise the following:

$$W = \beta CS + (1 - \beta)r \quad (A1)$$

where the domestic price is fixed at $P^d=P_p$ thus demand and hence CS is unchanged as the quota varies. So:

$$dW = (1 - \beta)dr \quad (A2)$$

From the paper we have:

$$\frac{dr}{d\underline{Q}^{FTA}} = \delta \frac{d\pi}{d\underline{Q}^{FTA}} + (1 - \delta)(P_p - P_w) = (1 - \delta)(P_p - P_w) - \delta(P_p - c') \quad (12)$$

So the optimal quota solves:

$$\frac{dr}{d\underline{Q}^{FTA}} = 0 \Rightarrow c' = \frac{1}{\delta} \{ (1 - \delta)P_w + (2\delta - 1)P_p \} \quad (A3)$$

Now, in this linear case we have:

$$c' = \alpha + \gamma Q = \alpha + \gamma(Q - \underline{Q}^{FTA}) \Rightarrow \underline{Q}^{FTA} = Q + \frac{1}{\gamma}(\alpha - c') \quad (A4)$$

where Q is total domestic demand. Substituting (A3) into (A4) and simplifying gives:

$$\underline{Q}^{FTA} = Q(P_p) - \frac{1}{\delta\gamma} \left[(1 - \delta)P_w - \delta\alpha - (1 - 2\delta)P_p \right] \quad (A5)$$

Finally, substituting in for $Q(P_p)=(a-P_p)/b$ and simplifying gives equation (14):

$$\underline{Q}^{FTA} = \frac{1}{b\delta\gamma} \left[\delta(\gamma + b)(a - P_p) + b(1 - \delta)(P_p - P_w) - b\delta(a - \alpha) \right] \quad (14)$$

What is the maximum value of this FTA quota such that the domestic price is exactly P_p ? To solve this we need to calculate the maximum quota that yields this price when P^d is not fixed. From equation (6) of the paper – the firm's FOC – we have:

$$\begin{aligned} (Q - \underline{Q})P_p' + P_p - c' &= 0 \Rightarrow b\underline{Q} + a - 2bQ - (\alpha + \gamma(Q - \underline{Q})) = 0 \\ \Rightarrow Q &= \frac{(a - \alpha - b\underline{Q})}{\{\gamma + 2b\}} \end{aligned} \quad (A6)$$

Substituting this into the inverse demand curve and solving gives the domestic price as a function of the quota:

$$p = \frac{1}{\{\gamma + 2b\}} \left((\gamma + b)(a - b\underline{Q}) + \alpha b \right) \quad (A7)$$

which can be inverted to find the quota that yields a particular domestic price:

$$\underline{Q} = \frac{1}{b(\gamma + b)}((\gamma + b)a + \alpha b - (\gamma + 2b)p) \quad (\text{A8})$$

So for $p=P_p$ we have equation (15) of the paper:

$$\underline{Q}^{\max} = \frac{1}{b(\gamma + b)}[(\gamma + b)(a - P_p) + b(\alpha - P_p)] \quad (15)$$

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