Journal of International Economic
Integration 6(2) Autumn 1991. 34~46

Quality Shifts and Voluntary Export Restraints from the Perspective of the Exporter's Home Market**

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Abstract

This paper discusses the economic impacts of a change in the level of voluntary export restraints (VERS) from the perspective of the exporting country. It is shown that the market condition in the exporting country cannot be ignored unless marginal costs of production are constant. It is also shown that whether quality shifts will occur mainly depend on cost structures and demand elasticities. Without special restrictions on cost structures and demand elasticities, the degree of substitutability between two goods or market structures alone cannot determine the economic impact or quality shifts unambiguously.

I. Introduction

Voluntary export restraint (VER) agreements have become common protective devices for importing countries. The United States and the members of the European Common Market, for example, have VER agreements with Hong Kong, Japan, Korea and Taiwan for products such as cars, textiles and shoes. In recent years, the scope of products that are subject to VERs has been expanded, and the levels and growth rates of VERs on restrained products have also been tightened, making the impacts of VERs on exporting countries increasingly significant.

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** The author wishes to thank C. C. Mai, H. Hwang and a referee for their helpful comments on earlier drafts.

As they have become more common, VERs have gained attention among economists. Three groups of models have been developed in the economic literature. The first focuses on the effects of VERs or the equivalence of VERs with tariffs and import quotas in a one-good model. Those who assume a competitive framework include Allen, Dodge and Schmitz (1983) and Jones (1984); those who examine imperfectly competitive frameworks include Takacs (1978), Ono (1984) and Harris (1985). The second group studies the effects of the threat of quotas or VERs on the exporting countries, e.g., Bhagwati-Srinivasan (1976), and Stockhausen (1988). The third group, which includes Falvey (1979), Rodriguez (1979) and Feenstra (1984), examines theoretically or empirically the proposition that export composition shifts toward high-quality commodities as a result of the imposition of VERs.

The above papers have contributed greatly to the understanding of the motivations and economic impacts of VERs. But except for the second group, none have investigated VERs from the perspective of exporting countries. That is, writers assume implicitly or explicitly that the exporting country's domestic market will not be disturbed by the imposition of VERs. However, this may not be true. Many products subject to VERs (e.g., textiles, shoes and television) are necessary goods, and manufacturers' domestic sales may absorb for a significant share of production. Exporters may thus change sales decisions in the domestic market when a VER is imposed or tightened.

Therefore, this paper will address VERs from the perspective of the exporter's home market. It will discuss the effects of a decrease in the level of VERs on the exporting country given the import demand pattern of the importing country and with no change in supply from other sources. Instead of comparing the economic impact of VERs with tariffs and quotas, this parer will focus on the effects of VERs on the composition of the exporting country's domestic and foreign sales and also examine the quality shift effect.

Quality shifts have been discussed in a numder of papers. Some treat the quality content of commodities as given and use a two-differentiated-good model to discuss quality shifts under quantitative restrictions, e.g., Murray, Schmidt and Walter (1979) and Falvey (1979). Some, in a one-good model, assume that the quality content is an endogenous variable, e.g., Rodriguez (1979). Nevertheless, both models show that the imposition of quantitative restrictions will shift import

composition toward high-quality goods in a two-good model (the quality shift effect) or raise the quality of importable goods in a one-good model (the upgrading effect).

However, the above papers do not make it clear whether market structure and/or other assumptions play important roles in determining quality shifts (upgrading). For example, Murray, Schmidt and Walter (1979) argue that quality shifts occur only when exporters are competitive. Falvey (1979), however, shows that under the assumptions of constant marginal costs and close substitution, the above conclusion still holds even though the exporter is a monopolistic firm. As to the upgrading effect, Rodriguez (1979) shows that upgrading exists for the case of competitive exporters. Santoni and Van Cott (1980), however, obtain the upgrading result when importers act as price takers but not for the case when collusion exists among license - holding importers.

The other purpose of this paper is therefore to identify the main determinants of quality shifts. The focus will be placed on three elements-cost structure, degree of substitutability and market structure, i.e., the degree of collusiveness among exporting firms. This degree of collusiveness will be measured by a conjectural variation index in the model set up in section Ⅱ. Section Ⅲ studies the economic impact of the change in the level of the VER. These results will be compared with those derived in Falvey (1979). Finally, a concluding remark is given in section Ⅳ.

Ⅱ. The Model

Consider a country that exports two different grades of a product, both of which are subject to voluntary export restraints. Assume that there are N identical firms producing both grades with different cost functions. These grades are sold at home and abroad at the same time. Let q_j^i and x_j^i ($i=1,\cdots, N$ and $j=1,2$) be the amount of the j-th good produced by the i-th firm selling at home and abroad. The cost function C_j^i therefore depends on the sum of q_j^i and x_j^i.

Assume that firms can price discriminate between home and foreign markets. Let P_j and P_j^* be the inverse demand functions of good j that firms face in the domestic and foreign markets, where $P_j=P_j(Q_1, Q_2)$, $P_j^*=P_j^*(X_1, X_2)$, $Q_j=\Sigma q_j^i$ and $X_j=\Sigma x_j^i$. These inverse demand functions are derived from utility maximiza-

tion and are assumed to be well defined[1].

Let X be the maximum quota that the country can export for both goods under the VER, i.e., $X_1+X_2\leq X$. Assume export quotas are binding but are freely distributed so that the cost of obtaining quotas is zero[2]. A representative firm's profit function, given the amount of quotas(x^i) it will obtain, can then be written as:

$$\pi = P_1q_1 + P_1^*x_1 - C_1(q_1 + x_1) + P_2q_2 + P_2^*x_2 - C_2(q_2 + x_2) \quad (1)$$
$$\text{subject to } x_1 + x_2 = x$$

where superscript i (indicating firm i) is omitted for notation simplification.

Assume that every firm, in making its decisions on domestic and foreign sales, will take other firms' response into consideration. Let ϵ be the Lagrangian multiplier for the quota constraint. The first-order conditions for a firm's optimal choice of q_1, q_2, x_1 and x_2 are:

$$P_1\mathcal{Q}_1 = C_1' \quad (2)$$
$$P_2\mathcal{Q}_2 = C_2' \quad (3)$$
$$P_1^*\mathcal{Q}_1^* = C_1' + \epsilon \quad (4)$$
$$P_2^*\mathcal{Q}_2^* = C_2' + \epsilon \quad (5)$$
$$x_1 + x_2 = x' \quad (6)$$

where $\mathcal{Q}_j = [1+\phi_j(\beta_{jj}P_jq_j+\beta_{kj}P_kq_k)/(P_jQ_j)]$, $j, k=1, 2$ and $j\neq k$.
$\mathcal{Q}_j^* = [1+\phi_j^*(\beta_{jj}^*P_j^*x_j+\beta_{kj}^*P_k^*x_k)/(P_j^*x_j)]$, $j, k=1, 2$ and $j\neq k$.
$\phi_j = dQ_j/dq_j$, and $\phi_j^*=dX_j/dx_j$, $j=1,2$ ($Q_j=\sum_1 q_j^i$, $X_j=\sum_1 x_j^i$).

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1. These inverse demand curves are downward sloping, i.e., $dP_j/dQ_j<0$, $j=1, 2$. Given concave utility in Q_1 and Q_2, the demand functions also have two additional properties: Slutsky symmetry ($dP_k/dQ_j=dP_j/dQ_k$, $j\neq k$), and definiteness ($dP_k/dQ_k \cdot dP_j/dQ_j - dP_k/dQ_j \cdot dP_j/dQ_k \geq 0$). One may note that $dP_k/dQ_j<0$, $k\neq j$, if two goods are gross substitutes (see Dixit (1986)). Also note that income effect is assumed to be dominated by substitution effect and thus can be ignored.
2. Even though export quotas are not free of charge, the cost of obtaining quotas does not affect the optimal choice of production and exports of marginal cost if obtaining quotas is constant..

$$\beta_{kj} = \frac{dP_k}{dQ_j}\frac{Q_j}{P_k}, \quad \beta_{kj}^* = \frac{dP_k^*}{dX_j}\frac{X_j}{P_k^*}.$$

$C_j' = dC_j/d(q_j+x_j)$, where $C_j'>0$ and $C_j''\geq 0$.

ϕ_j (ϕ_j^*) is a representative firm's conjecture of the response of aggregate domestic (foreign) sales of good j to a change of its own sales of that good. The larger ϕ_j (ϕ_j^*) is, the more collusively the firms behave in the domestic (foreign) market.[3] Since Ω_j (Ω_j^*) is a decreasing function of ϕ_j (ϕ_j^*), ϕ_j increases or Ω_j decreases as firms become more collusive. ϕ_j (ϕ_j^*), and Ω_j (Ω_j^*) can therefore be used to measure good j's domestic (foreign) market structure.

β_{kj} (β_{kj}^*) is the price elasticity of good k with respect to the domestic (foreign) sales of good j, holding domesic (foreign) sales of the other good constant. When the degree of substitutability between two goods is zero (i.e., cross-price elasticity σ_{kj} is zero), β_{kk} is the reciprocal of its own-price elasticity σ_{kk} and β_{kj} approaches zero[4]. As the degree of substitutability increases (σ_{kj} rises), β_{kj} becomes smaller or the absolute value of β_{kj} becomes larger. β_{kj} can therefore be used as a measure of the degree of substitutability.

Eqs. (2) and (3) say that the optimal levels of domestic sales for good 1 and good 2 will satisfy the condition that marginal revenue perceived by a representative firm equals marginal cost, where perceived marginal revenue will be affected by domestic market structure (ϕ_j) and the degree of substitutability measured by β_{kj}. But due to export quotas, the optimal exports of good 1 require that the perceived marginal profit from good 1's exports be equal to that from good 2's exports (eqs.(4) and (5)). Note also that when the quota constraint (6) is binding, the shadow price of an additional unit of quota (ϵ) is positive. This positive ϵ, through (4) or (5), verifies the traditional argument that the imposition of a VER will raise export price P_1^*(or P_2^*) and may thus benefit the exporting country. However, this conclusion is no longer valid when the necessary conditions

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3. When domestic and foreign markets are perfectly competitive, ϕ_j and ϕ_j^* will be zero; when firms behave in a Cournot-Nash noncooperative manner, ϕ_j and ϕ_j^* will be one; when firms act as a cartel, ϕ_j and ϕ_j^* will be N. See Buffie and Spiller(1986).

4. $\beta_{kj}=-\sigma_{kj}/(\sigma_{kk}\sigma_{jj}-\sigma_{kj}\sigma_{jk})\leq 0$, $k\neq j$. $\beta_{kk}=\sigma_{jj}/(\sigma_{kk}\sigma_{jj}-\sigma_{kj}\sigma_{jk})<0$, where $\sigma_{kk}(=dQ_k/dP_k\cdot P_k/Q_k)$ and $\sigma_{kj}(=dQ_k/dP_j\cdot P_j/Q_k)$ are the own-price elasticity and the cross-price elasticity respectively. See footnote 14 in Falvey (1979).

(eqs. (2) to (6)) are simultaneously considered, as the marginal costs of goods 1 and 2 may not remain unchanged.

Ⅲ. The Economic Impacts of a Change in the Level of a VER

Suppose that both exporting and importing countries agree to lower the level of a VER due to a surging trade deficit in the importing country. An assumption of identical firms implies that the maximum amount of the export quota which a single firm can obtain, i.e., x, will decrease.

Assuming that the effect of a change in a VER on Ω_j and Ω_j^* is negligible, the effect of a decrease in a VER on the domestic and foreign sales of a representative firm can be observed by totally differentiating (2) to (6). By using the binding and symmetry conditions ($x_2=x-x_1$, $\Sigma x^i=Nx^i$ and $\Sigma q^i=Nq^i$), we obtain:

$$\begin{pmatrix} J_1 & E_1-C_1'' \\ E_2 & J_2 & C_2'' \\ C_1'' & C_2'' & J_3 \end{pmatrix} \begin{pmatrix} dq_1 \\ dq_2 \\ dx_1 \end{pmatrix} = \begin{pmatrix} 0 \\ C_2'' \\ A \end{pmatrix} dx \tag{7}$$

where

$$J_j = N\Omega_j\beta_{jj}P_j/Q_j - C_j'', \quad j=1, 2.$$

$$J_3 = (N\Omega_1^*\beta_{11}^*P_1^*/X_1 - N\Omega_2^*\beta_{21}^*P_2^*/X_1 - C_1'') + (N\Omega_2^*\beta_{22}^*P_2^*/X_2 - N\Omega_1^*\beta_{12}^*P_1^*/X_2 - C_2'')$$

$$E_j = N\Omega_j\beta_{jk}P_j/Q_k, \quad j, k = 1, 2 \text{ and } j \neq k$$

$$A = N\Omega_2^*\beta_{22}^*P_2^*/X_2 - N\Omega_1^*\beta_{12}^*P_1^*/X_2 - C_2''$$

The stability condition assures that J_j ($j=1, 2, 3$) will be negative. This is because the stability condition requires that the principle minors of the 3×3 matrix in (7) alternate in sign, that is, $D_1<0$, $D_2>0$ and $D_3<0$, where $D_1=J_1$, $D_2=J_1J_2-E_1E_2$ and $D_3=J_1J_2J_3-C_2''^2J_2-C_2''^2J_1-C_1''C_2''E_1-C_1''C_2''E_2-E_1E_2J_3$. Negative J_j ($j=1, 2$) implies that the perceived marginal profit of good j sold in the domestic market is decreasing. Negative J_3 implies decreasing perceived marginal profits for both goods sold abroad. Since β_{kj} is nonpositive and Ω_k is positive, E_k will be nonpositive. As to the sign of A (or J_3-A), it is negative by assuming that the perceived marginal profit from the exports of good 2 (or good 1) is decreasing.

By solving (7), we obtain:

$$\frac{dq_1}{dx} = \frac{-C_2''(E_1J_3+C_1''C_2'')+A(E_1C_2''+J_2C_1'')}{D_3} \tag{8}$$

$$\frac{dq_2}{dx} = \frac{C_2''(J_1J_3-C_1''^2)-A(J_1C_2''+E_2C_1'')}{D_3} \tag{9}$$

$$\frac{dx_1}{dx} = \frac{-C_2''(J_1C_2''+E_1C_1'')+A(J_1J_2-E_1E_2)}{D_3} \tag{10}$$

and $$\frac{dx_2}{dx} = 1 - \frac{dx_1}{dx} \tag{11}$$

The signs of (8) to (11) are ambiguous. However, three factors - cost structure, the degree of substitutability (measured by β_{kj}) and the degree of collusiveness (measured by Ω_k and Ω_k^*), might play important roles in determining the magnitude and signs of (8) through (11).

Case 1: Cost Structure

When $C_1''=C_2''=0$, the sign of (8) to (11) can be determined:

$$\frac{dq_1}{dx} = 0,\ \frac{dq_2}{dx} = 0,\ \frac{dx_1}{dx} = \frac{A}{J_3} > 0,\ \frac{dx_2}{dx} = \frac{(J_3-A)}{J_3} > 0 \tag{12}$$

Proposition 1: When $C_1''=C_2''=0$, a more restrictive VER (i. e., a decrease in X or x)(i) does not change domestic sales of good 1 and good 2, but lowers the exports of both goods, unambiguously; (ii) does not affect domestic prices of both goods, but increases export prices of both goods and thus quota rent ϵ; (iii) lowers the welfare of the exporting country.

Remark: Since constant marginal costs allow firms to make separate decisions on sales in different markets, domestic sales will thus not be affected by a VER (see(i)). This implies that domestic market conditions can be ignored when studying VERs, e.g., Falvey (1979), only if marginal costs of producing both goods are constant. However, the assumption of constant marginal costs may not be the general case. (ii) follows directly from the downward sloping property of the demand curves. By eqs. (4) and (5), the increase in export prices implies an increase of quota rent (ϵ) when a VER decreases. (iii) Let welfare be the sum of the consumer and producer surpluses, i.e., $W=[U(Q_1, Q_2)-P_1Q_1-P_2Q_2]+$

$N\pi$. Totally differentiating W with respect to X and using eqs.(12), (4) and (5), we obtain $dW/dX=Nd\pi/dX=N\epsilon>0$. Since a decrease in a VER lowers firms' profit without changing the consumer surplus, the welfare of the exporting country decreases even though quota rent increases.

Changes in the composition of exports will depend on the relative shifts in the perceived marginal profits of both goods:

$$\frac{dx_1}{x_1dx}-\frac{dx_2}{x_2dx}\gtrless 0, \text{ if } (J_3-A)x_1\gtrless Ax_2 \tag{13}$$

If the change of the perceived marginal profit from export of good 1 is larger than that of good 2 (i.e., $(J_3-A)x_1>Ax_2$), the composition of exports will shift in favor of x_2 when a VER decreases. But does this condition also imply that good 2 is more expensive than good 1 (in the sense of having higher marginal cost) so that quality shifts toward expensive goods will occur as suggested by some papers, e.g., Falvey(1979)? Using the definition of J_3 and A and also (4) and (5), the condition $(J_3-A)x_1>$(or$<$)Ax_2 can be rewritten as $(C_1'+\epsilon)(\beta_{11}^*+\beta_{12}^*)>$(or $<$) $(C_2'+\epsilon)(\beta_{21}^*+\beta_{22}^*)$.

Proposition 2: When $C_1''=C_2''=0$, as long as an equiproportionate decrease in the exports of both goods results in a larger proportional increase in the price of good 1, i.e., $0>(\beta_{21}^*+\beta_{22}^*)\geq(\beta_{11}^*+\beta_{12}^*)$, the composition of exports will shift toward good 2 where $C_2'>C_1'$. Similarly, if $0>(\beta_{11}^*+\beta_{12}^*)\geq(\beta_{21}^*+\beta_{22}^*)$, the composition of exports will shift in favor of good 1 where $C_1'>C_2'$. These results hold regardless of the degree of substitutability[5] and the market structure.

Remark: Proposition 2 shows that the assumption of close substitution[6] (β_{11}^*

5. For example, in the case of zero substitution ($\beta_{kj}^*=0$, $\beta_{kk}^*=1/\sigma_{kk}^*$), the sufficient condition for the composition of exports to shift toward good 2 is $\beta_{11}^*\leq\beta_{22}^*$ (or $\sigma_{22}^*\leq\sigma_{11}^*$).

6. Both goods are close substitutes in the sense that an equiproportionate rise in the exports of both goods will result in the same proportional change in the price of both goods. Since $\hat{P}_1^*=\beta_{11}^*\hat{x}_1+\beta_{12}^*\hat{x}_2$, and $\hat{P}_2^*=\beta_{21}^*\hat{x}_1+\beta_{22}^*\hat{x}_2$ (where '$\wedge$'indicates proportional change), close substitutes thus imply $\beta_{11}^*+\beta_{12}^*=\beta_{21}^*+\beta_{22}^*$ or $\sigma_{11}^*+\sigma_{12}^*=\sigma_{21}^*+\sigma_{22}^*$ as assumed in Falvey.

$+\beta_{12}^*)=(\beta_{21}^*+\beta_{22}^*)$ made by Falvey (1979) is too restrictive.[7] Moreover, quality shifts not only occur in the cases of perfect competition and monopoly as discussed in Favley but also in all other market structures.

Suppose that only one good has constant marginal cost, say $C_1''=0$ while $C_2''>0$. The signs of eqs. (8) to (11) can be determined:

$$\frac{dq_1}{dx_1} \geq 0 \text{ (if } E_1 \leq 0), \quad \frac{dq_2}{dx_1} < 0, \quad \frac{dx_1}{dx_1} > 0, \quad \frac{dx_2}{dx_1} > 0. \tag{14}$$

Proposition 3: When $C_1''=0$ but $C_2''>0$, as a result of a decrease in a VER (i) domestic sales of good 1 are nonincreasing, while that of good 2 increase unambiguously; (ii) the exports of both goods decrease; (iii) the necessary condition for the welfare of the exporting country to increase is that the degree of substitutability between two goods in the domestic market is zero or sufficiently small.

Remark: A decrease in a VER will lower the exports of good 2 and thus its marginal cost of production. This in turn increases domestic sales of good 2 through cost effects while decreases sales of good 1 through substitution effects (E_1). The production of good 2 contracts (i.e., $d(X_2+Q_2)/dX > 0$)[8] and C_2' thus decreases. The increase in P_2^* (due to the shrinking of X_2) together with a decrease in C_2' implies an increase of quota rent (by eqs. (5)). Since C_1' is constant, it can be shown from eqs. (4) that at equilibrium P_1^* increases and the exports of good 1 decreases. As to the welfare effect, since the producer surplus decreases as a result of a decrease in a VER, welfare could increase only if the consumer surplus increases. This is more likely to happen when the degree of

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7. However, under the assumption of close substitution, $C_2'>$ (or$<$) C_1' will be both the sufficient and the necessary conditions for the composition of exports to shift toward good 2 (or good 1).

8. Here, the definiteness property of the demand curve, i.e., $\beta_{11}\beta_{22}>\beta_{12}\beta_{21}$, is used so that $D_2+J_1C_2''>0$. See footnote 1.

substitutability (or $|E_1|$) is zero or smaller[9].

By using the definition of A and (J_3-A) and eqs. (4) and (5), the following result can be obtained: $1/x_1 \cdot dx_1/dx-1/x_2 \cdot dx_2/dx>$(or$<$)0 if $ND_2\{(\beta_{21}^*+\beta_{22}^*)(C_2'+\epsilon)-(\beta_{11}^*+\beta_{12}^*)(C_1'+\epsilon)\}<$(or$>$)$C_2''x_2(D_2+J_1C_2'')$, where the right hand side of the inequality is positive. We then have:

Proposition 4: When $C_1''=0$, $C_2''>0$, even if close substitution between two goods are assumed, $C_2'>$(or$<$)C_1' is only a sufficient but not a necessary condition for the composition of exports to shift toward good 2 (or good 1)

Case 2: The Degree of Substitutability

Suppose marginal costs are not constant. Will the degree of substitutability alone determine the signs of eqs. (8) to (11) unambiguously?

When the degree of substitutability between two goods is zero, β_{kj} and β_{kj}^* will be zero and β_{kk} and β_{kk}^* equal $1/\sigma_{kk}$ and $1/\sigma_{kk}^*$ respectively. The exports of both goods decrease ($dx_1/dx>0$, $dx_2/dx>0$), but domestic sales increase ($dq_1/dx<0$, $dq_2/dx<0$). The economic development of industries may also be deterred by a decrease in a VER as the production of both goods shrinks ($d(q_i+x_i)/dx>0$). However, the welfare of the exporting country will increase if the increase in the consumer surplus more than offsets the decrease in the producer surplus.

When two goods are close substitutes, the signs of (8) to (11) remain undetermined.

As to the composition of exports, it can be shown that

$$\frac{dx_1}{x_1dx}-\frac{dx_2}{x_2dx}\gtrless 0, \text{ if } ND_2\{(\beta_{22}^*+\beta_{21}^*)(C_2'+\epsilon)-(\beta_{11}^*+\beta_{12}^*)(C_1'+\epsilon)\}\lesseqgtr C_2''X_2(J_1C_2''+E_1C_1''+D_2)-C_1''X_1(J_2C_1''+E_2C_2''+D_2)$$

Since the sign on the right hand side of the inequality is ambiguous if the marginal costs of both goods are increasing, any assumption as to the degree of

9. Using (8) to (11), $dW/dX=N(d\pi/dx_1 \cdot dx_1/dx+d\pi/dx_2 \cdot dx_2/dx)-P_1'Q_1 \cdot dQ_1/dX-P_2'Q_2 \cdot dQ_2/dX=N\epsilon+NC_2''(J_3-A)(P_1'Q_1E_1-P_2'Q_2J_1)/D_3$, where the first term is positive and the second term will be negative if the degree of substitutability between two goods in the domestic market is zero or small, i.e., $|E_1|$ is zero or sufficiently small.

substitutability cannot guarantee the occurrence of quality shifts.

Proposition 5: The effect of the degree of substitutability on the composition of trade is ambiguous unless marginal costs are assumed constant. $0>(\beta_{21}^*+\beta_{22}^*)\geq(\beta_{11}^*+\beta_{12}^*)$ (or $0>(\beta_{11}^*+\beta_{12}^*)\geq(\beta_{21}^*+\beta_{22}^*)$) is neither a sufficient nor a necessary condition for the quality shifts to occur when marginal costs of two goods are not constant.

Case 3: The Degree of Collusiveness

In the general case where marginal costs are not constant, the degree of collusiveness (measured by ϕ_j, ϕ_j^* or Ω_j or Ω_j^*) will affect the magnitude of the impacts of a VER. But, in general, the direction of the impact will be ambiguous.

However, in the case where both goods have constant marginal costs, the direction of the impact can be derived. Since the optimal choice of domestic and foreign sales are separate decisions, the degree of collusiveness among firms in the domestic market will not affect export decisions when a VER changes. But when firms become more competitive in the export market, say good 1 (Ω_1^* increases), a decrease in a VER will lower the exports of good 1 at a decreasing rate (i.e., $d(dx_1/(x_1dx))/d\Omega_1^*<0$), while lowering that of good 2 at an increasing rate, $d(dx_2/(x_2dx))/d\Omega_1^*>0$. The reason for these results is that firms have less influence on the export price of good 1 when the export market of good 1 becomes more competitive. By reducing the exports of good 2 more than that of good 1, firms will be able to raise the price of good 2 more than that of good 1 and thus earn a larger profit when a VER decreases.

Proposition 6: When the marginal costs of both goods are constant, the composition of exports will shift toward the good where the export market is more competitve.

Ⅳ. Concluding Remarks

This paper discusses the economic impacts of a change in the level of a VER from the perspective of the exporter's home market. It is shown that the optimal level of domestic sales in the exporting country, which is often assumed constant in previous papers, will vary with the level of a VER unless marginal costs are constant. However, constant marginal costs may not be the general case, it is

therefore invalid to assume away the market conditions in the exporting country in the discussion of the impacts of a VER.

It is also shown in this paper that cost structures and own - and cross - price elasticities of demand are the main elements in determining quality shifts. Without special restrictions on cost structures and demand elasticities, the degree of substitutability or market structures alone may not determine the economic impact and quality shifts unambiguously. Falvey's argument that the composition of exports shifts toward expensive goods is derived under very restrictive assumptions - both goods have constant marginal costs and are close substitutes. Indeed, constant marginal costs and a less restrictive condition on demand elasticities are sufficient to guarantee the occurrence of quality shifts. Moreover, when both goods have constant marginal costs, the composition of exports will shift toward the good where its export market is more competitive. However, when marginal costs are not constant, the assumption of close substitution is neither a sufficient nor a necessary condition for quality shifts to occur.

Under the model considered here, a VER may not be a *voluntary* agreement from the exporting country's perspective, as its welfare may not increase. For example, if marginal costs are constant, the exporting country's welfare actually decreases even though quota rent increases when VER is tightened. However, if one good has increasing marginal cost, the exporting country's welfare may increase. The necessary condition for welfare to increase is that the degree of substitutability between two goods in the domestic market is zero or sufficiently small.

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