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Trade Liberalization and Oligopolistic Industries: a Welfare Appraisal

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TRADE LIBERALIZATION AND OLIGOPOLISTIC INDUSTRIES:
A WELFARE APPRAISAL*

by Tito Cordella

The welfare effect of an intra-industry trade liberalization between two different countries is studied in this paper. Firms are firstly assumed to behave *à la* Cournot, results are then generalized in a conjectural variation model.

If trade liberalization increases "world" welfare, it is nevertheless true that one country should be better off in the autarkic situation. The crucial parameters for evaluating the convenience of opening the market to foreign competition are the relative dimensions of domestic and foreign market and industry. In general small countries with oligopolistic industries have greater advantages from free trade. Consumers gains from trade liberalization are shown to be important, to open the market may, in fact, be considered a second-best competition measure if antitrust policy is not in place. Unilateral trade liberalization is studied; an example of Nash Equilibrium in policy, where only one country opens its market to foreign competition is furnished.

1. INTRODUCTION

In the last decade the application of industrial organization concepts to international trade has furnished a theoretical support to intra-industry trade and, at the same time, has created new motives for active trade policy. If markets are not competitive, government intervention can shift oligopoly rents from foreign to domestic firms.¹

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¹A useful survey of industrial organization models applied to international trade is Krugman [1989]

Brander and Spencer [1985] have shown that in a Cournot duopoly, where a domestic and a foreign firm compete on a third market, export subsidies can make domestic firms act as Stackelberg leaders.

Eaton and Grossman [1986] have investigated other forms of oligopolistic behaviour and have indicated different optimal trade policies in a conjectural variation model. If an export subsidy is optimal under Cournot, an export tax is shown to be optimal under Bertrand and free-trade under consistent conjecture. Since policy recommendations depend crucially on behavioural assumptions, and passing from Bertrand to Cournot the optimal policy is reversed, "given the shakiness of any characterization of oligopoly behaviour, this is not reassuring" ².

This is the reason why in this paper we go one step back, and studying the "simplest" policy i.e. the liberalization of trade, we focus on trade policy competitive effect. Trade policy, in presence of oligopolistic distortions, may, in fact, be used as a second best measure, in absence of a first-best antitrust policy, in order to reduce the difference between the price and the marginal cost of a product.

Donsimoni and Gabszewicz [1989] and Anderson, Donsimoni, Gabszewicz [1989] have examined whether oligopolistic industries operating in two different countries would gain from the passage from autarky to free trade. They have reached the conclusion that there is always at least one of the two countries where firms make higher profits under autarky than under free trade. When deciding whether to open the market or not a trade-off between consumers and firms interests may thus appear, consumers always gain, firms may gain or lose.

This paper studies the overall welfare effect of an intra-industry trade liberalization. Policy-makers, concerned with total welfare generated by the industry (consumers surplus plus firms profits), have to decide whether to open their domestic market to foreign competition or not.

In section 2 the demand model is presented, section 3 and 4 are devoted to characterize autarky and free-trade equilibria, in section 5 trade liberalization welfare gains (losses) are analyzed. Section 6 and 7 are concerned with the use of trade policy as a second best antitrust measure. In section 8 the model is generalized in a conjectural variations approach, section 9 presents some concluding comments.

² Krugman [1989] pag.1205

2. THE MODEL

Following Donsimoni and Gabszewicz [1989] two distinct industries producing an identical and homogeneous good but operating in two different countries ($i = 1, 2$) are considered. Firms are supposed to be equal in all relevant aspects, their number is supposed to be n_i . A constant return technology is taken into consideration, marginal costs are normalized to zero and transport costs are also supposed to be nil.

The two markets are segmented and initially no trade occurs between the two countries. We suppose firms compete in quantity *à la* Cournot. We further suppose that within the two countries population tastes and incomes are identically distributed, what is allowed to vary is consumer density³. Any particular type of consumer is represented by an index t , $t \in [0, 1]$. A t -type consumer has an initial income $R(t)$ defined by:

$$R(t) = R_1 + R_2 t, \quad R_1 > 0, R_2 > 0$$

Consumers are ranged along the interval in increasing order, in the same way in the two countries. Consumer choice is a yes-no one, he decides whether to buy or not one unit of the indivisible good.

If he decides to buy we suppose he achieves a utility level $u(R_1 + R_2 t - p)$ if he decides not to buy his utility will be $u_0(R_1 + R_2 t)$ where $0 < u_0 < u$.

It follows that a t -type consumer buys one unit of the good if and only if $u(R_1 + R_2 t - p) \geq u_0(R_1 + R_2 t)$. If p is the market price, the set of consumers who decide to buy is given by the interval :

$$\left\{ t: \frac{up}{(u - u_0)R_2} - \frac{R_1}{R_2}, 1 \right\}$$

Since density of t -type consumer is allowed to vary country to country let α_i ($i = 1, 2$) be the number of consumer of t -type in country i ; it follows that at price p the quantity demanded Q_i in country i is :

$$Q_i = \alpha_i \left[1 - \frac{up}{(u - u_0)R_2} + \frac{R_1}{R_2} \right]$$

Inverse demand function is then given by:

³ This model utilized in Donsimoni and Gabszewicz [1989] is initially proposed by Gabszewicz and Thisse [1979]

$$1) \quad p_i(Q) = \frac{u - u_0}{u} \left(R_1 + R_2 - \frac{R_2}{\alpha_i} Q \right)$$

and since

$$Q = 0 \quad \Rightarrow \quad p = \frac{(R_1 + R_2)(u - u_0)}{u}$$

consumers surplus (CS) is defined by:

$$2) \quad CS_i = \int_{p^*}^{\frac{u - u_0}{u} (R_1 + R_2)} \left(\frac{\alpha_i (R_1 + R_2)}{R_2} - \frac{u}{u - u_0} \frac{\alpha_i}{R_2} p \right) dp$$

3. AUTARKY

In order to be able to evaluate the welfare effects of a trade liberalization let us firstly compute the autarky equilibrium. We suppose that firms compete *à la* Cournot in both countries and between the two countries no trade occurs.

In country i any symmetric firm λ chooses its Cournot quantity maximizing with respect to q_λ its profit function:

$$3) \quad \pi_\lambda^i = \frac{u - u_0}{u} \left[R_1 + R_2 - \frac{R_2}{\alpha_i} \left(q_\lambda^i + \sum_{k \neq \lambda, k=1}^{n^i} q_k^i \right) \right] q_\lambda^i \quad \lambda = 1, \dots, n \quad i = 1, \dots, 2$$

where

$$q_\lambda^i + \sum_{k \neq \lambda, k=1}^{n^i} q_k^i = Q_i$$

First order conditions under the hypothesis of symmetry imply:

$$4) \quad q_{i\lambda}^* = \frac{(R_1 + R_2)\alpha_i}{(n_i + 1)R_2}$$

Summing over n this expression, the aggregate output of equilibrium for the industry can be written:

$$5) \quad Q_i^* = n_i \frac{\alpha_i (R_1 + R_2)}{R_2 (1 + n_i)}$$

and substituting these values in 1) the equilibrium price is given by:

$$6) \quad p_i^* = \frac{(u - u_0) (R_1 + R_2)}{u (1 + n_i)}$$

Substituting now the equilibrium output into 3) , each firm profits of equilibrium are given by :

$$7) \quad \pi_{\lambda}^{i*} = \phi \frac{\alpha_i}{(n_i + 1)^2}$$

where

$$\phi = \frac{u - u_0}{u} \frac{(R_1 + R_2)^2}{R_2}$$

and aggregate profits for the industry in country i by :

$$8) \quad \Pi_i^* = \phi n_i \frac{\alpha_i}{(n_i + 1)^2}$$

Substituting now p^* in the expression for consumers surplus , 2) becomes:

$$9) \quad CS_i = \int_{\frac{u - u_0}{u} \frac{R_1 + R_2}{1 + n}}^{\frac{u - u_0}{u} (R_1 + R_2)} \left(\frac{\alpha_i (R_1 + R_2)}{R_2} - \frac{u}{u - u_0} \frac{\alpha_i}{R_2} p \right) dp$$

Solving the integral a manageable expression for consumers surplus in case of autarky is found:

$$9bis) \quad CS_{aut}^i = \phi \frac{\alpha_i n_i^2}{2(1 + n_i)^2}$$

The sum of firms profits and consumers surplus gives the welfare W originated by the production and the consumption of the good.

Thus :

$$10) \quad W_{aut}^i = CS_{aut}^i + \Pi_{aut}^i = \phi \alpha_i \left[\frac{n_i (2 + n_i)}{2(1 + n_i)^2} \right]$$

4. FREE TRADE

We consider now autarky opposit case: free trade. We suppose no transport costs and perfect symmetry of the firms of both countries.

Firms now operate on a market where demand is given by:

$$1') \quad \hat{p}(Q) = \frac{u - u_0}{u} (R_1 + R_2 - \frac{R_2}{\alpha_1 + \alpha_2} Q)$$

From 4-10, it follows:

$$4') \quad \hat{q}_\lambda^i = \frac{(R_1 + R_2)(\alpha_1 + \alpha_2)}{R_2(1 + n_1 + n_2)}; \lambda = 1, \dots, n \quad i = 1, 2$$

total output produced in country 1 and in country 2 is given respectively by:

$$5') \quad \hat{Q}_1 = n_1 \frac{(\alpha_1 + \alpha_2)(R_1 + R_2)}{R_2(1 + n_1 + n_2)}$$

$$5' \text{ bis}) \quad \hat{Q}_2 = n_2 \frac{(\alpha_1 + \alpha_2)(R_1 + R_2)}{R_2(1 + n_1 + n_2)}$$

The price that clears the (common) market is:

$$6') \quad \hat{p}^* = \frac{(u - u_0)}{u} \frac{(R_1 + R_2)}{(1 + n_1 + n_2)}$$

at this price any firm has profits

$$7') \quad \hat{\pi}_\lambda^i = \phi \frac{\alpha_1 + \alpha_2}{(1 + n_1 + n_2)^2}$$

whereas total profit for country i industry are given by :

$$8') \quad \hat{\Pi}_\beta^i = \phi n_i \frac{(\alpha_1 + \alpha_2)}{(1 + n_1 + n_2)^2}$$

and consumers surplus by :

$$9') \quad \hat{CS}_\beta^i = \phi \alpha_i \frac{(n_1 + n_2)^2}{2(1 + n_1 + n_2)^2}$$

Finally total welfare in country 1 and 2, in case of free trade, is given respectively by:

$$10') \quad \hat{W}_\beta^1 = \hat{CS}_\beta^1 + \hat{\Pi}_\beta^1 = \phi \left[\alpha_1 \frac{(n_1 + n_2)^2}{2(1 + n_1 + n_2)^2} + (\alpha_1 + \alpha_2) \frac{n_1}{(1 + n_1 + n_2)^2} \right]$$

and

$$10' \text{ bis}) \quad \hat{W}_\beta^2 = \hat{CS}_\beta^2 + \hat{\Pi}_\beta^2 = \phi \left[\alpha_2 \frac{(n_1 + n_2)^2}{2(1 + n_1 + n_2)^2} + (\alpha_1 + \alpha_2) \frac{n_2}{(1 + n_1 + n_2)^2} \right]$$

5. FREE TRADE VERSUS AUTARKY

If it is evident that a trade liberalization increase world welfare, it is nevertheless true that one country may loose from the opening of the frontiers.

In this section we consider the gains (losses) deriving from a trade liberalization from one country point of view. We try to answer to the following question: under which circumstances is trade liberalization more (less) favourable ?

The welfare changes caused by the passage from autarky to free trade can be written in the form

$$11) \quad \Delta W^i = \hat{W}_R^i - W_{aut}^i$$

Taking the corresponding values from expressions 10) and 10') and substituting these in 11), country 1 gains (losses) arising from a trade liberalization are given by :

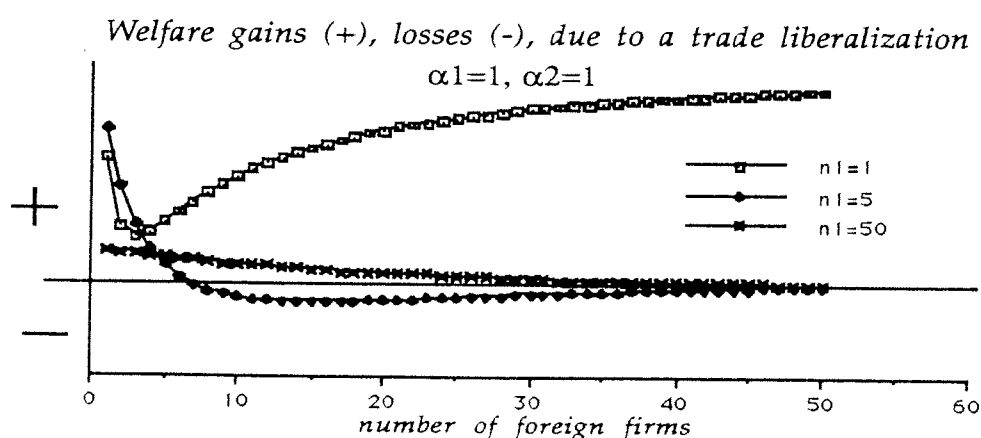
$$11bis) \quad \Delta W^1 = \phi \left[\alpha_1 \frac{(n_1 + n_2)^2}{2(1 + n_1 + n_2)^2} + (\alpha_1 + \alpha_2) \frac{n_1}{(1 + n_1 + n_2)^2} - \alpha_1 \frac{n_1(2 + n_1)}{2(1 + n_1)^2} \right]$$

This expression may be either negative or positive, its sign depends on the value of $\alpha_1, \alpha_2, n_1, n_2$.⁴

Conventionally, from now to the end we will refer to country 1 as "domestic country" and to country 2 as "foreign country".

In table 1 are plotted welfare gains and losses due to a trade liberalization when the dimension of the market (parametrized by α_i) is the same in the two countries. In table 2 foreign market is two-fold bigger than the domestic one.

TABLE 1



⁴The "world" welfare effect of a trade liberalization is given by:

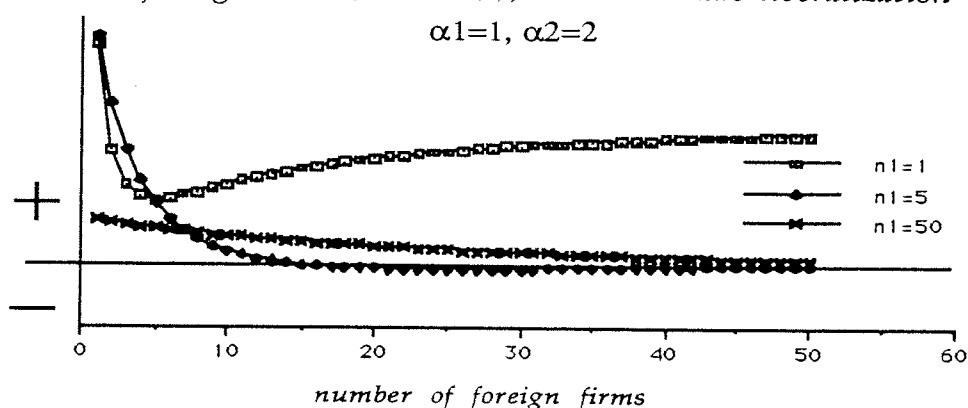
$$\phi \left[(\alpha_1 + \alpha_2) \frac{(n_1 + n_2) + (2 + n_1 + n_2)}{2(1 + n_1 + n_2)^2} - \alpha_1 \frac{n_1(2 + n_1)}{2(1 + n_1)^2} - \alpha_2 \frac{n_2(2 + n_2)}{2(1 + n_2)^2} \right],$$

this expression is, of course, always positive.

TABLE 2

Welfare gains (+), losses (-), due to a trade liberalization

$\alpha_1=1, \alpha_2=2$



From a first inspection of the graphs it is clear that the bigger is foreign market the bigger are the gains arising from a trade liberalization. Given the number of foreign firms (the competitive effect of foreign competition on domestic market) the opportunities of profit for domestic firms depend crucially on the density of foreign consumers .

Calculating the partial derivatives of 11bis) with respect to the parameters of the model, we have:

$$12) \quad \frac{\partial(\Delta W^1)}{\partial \alpha_1} = \phi \frac{(n_1 + n_2)^2 + 2n_1 - n_1(2 + n_1)(1 + n_1 + n_2)^2}{2(1 + n_1 + n_2)^2(1 + n_1)^2}$$

The expression is positive only if the number of foreign firms is sensitively bigger than the number of domestic ones. Table 3 gives the critical value of n_2 (n_2^*) for 12) to be positive, for some values of n_1 .

TABLE 3

n_1	1	2	3	4	5	10
n_2^*	4	12	24	40	60	220

We can then state:

Trade liberalization welfare gains (losses) decrease (increase) at the increasing of the dimension of domestic market, if domestic industry is not too small with respect to foreign industry.

From

$$13) \quad \frac{\partial(\Delta W^1)}{\partial \alpha_2} = \phi \frac{n_1}{(1 + n_1 + n_2)} > 0$$

it follows:

Trade liberalization welfare gains (losses) increase (decrease) at the increasing of the dimension of foreign market.

Since

$$14) \quad \frac{\partial(\Delta W^1)}{\partial(\frac{\alpha_2}{\alpha_1})} = \alpha_1 \frac{\partial(\Delta W^1)}{\partial \alpha_2} > 0$$

It is thus possible to state:

Trade liberalization is more convenient (less inconvenient) the bigger is foreign market with respect to the domestic one.

Considering now the partial derivatives of 11 with respect to the number of foreign firms:

$$15) \quad \frac{\partial(\Delta W^1)}{\partial(n_2)} > 0 \quad \text{iff} \quad n_2 > \frac{n_1(2\alpha_2 + \alpha_1)}{\alpha_1}$$

It follows that:

if foreign industry is big enough, trade liberalization gains (losses) are an increasing (decreasing) function of the number of foreign firms.

Profits losses caused by opening domestic market to a very "oligopolistic" foreign industry may not be compensated by consumers gains. On the contrary, if foreign industry is "competitive", price reduction due to the stronger rivalry, more than compensate profit losses.

More ambiguous is the effect of the dimension of domestic industry on the welfare consequences of trade liberalization:

$$16) \quad \frac{\partial(\Delta W)}{\partial n_1} = \phi \left[\frac{\alpha_1(1+2n_2) + \alpha_2(1+n_2-n_1)}{(1+n_1+n_2)^3} - \frac{\alpha_1}{(1+n_1)^3} \right]$$

In this case we have to take into consideration several factors. The bigger the industry the greater the penetration on foreign markets, but also the greater the competition on that market and so the smaller the profits. The bigger domestic industry the smaller the profit losses on domestic market, but also the less important foreign industry competitive pressure .

6. UNILATERAL TRADE LIBERALIZATION

Supposing that antitrust measures do not exist in our economy, we now consider the possibility of opening the market as a second-best competition policy.

We try to answer to the following question: under which circumstances is to open domestic market a dominant strategy for total welfare-concerned policy makers? Or differently stated, under which circumstances may a unilateral trade liberalization be convenient?

Let us then suppose that foreign firms can sell in our domestic market, while domestic firms cannot operate on the foreign market; $n_1 + n_2$ firms compete on the domestic market each of them producing a quantity:

$$4'') \quad \bar{q}_\lambda^* = \frac{(R_1 + R_2)\alpha_1}{R_2(1 + n_1 + n_2)}; \lambda = 1, \dots, n$$

The price in the domestic market is the same as in the case of free-trade⁵, and is given by :

$$6') \quad \bar{p}^* = \hat{p}^* = \frac{(u - u_0)}{u} \frac{(R_1 + R_2)}{(1 + n_1 + n_2)}$$

while any domestic firm make profits

$$7'') \quad \bar{\pi}_\lambda^* = \frac{\alpha_1(u - u_0)(R_1 + R_2)^2}{u(1 + n_1 + n_2)^2 R_2} \quad \lambda = 1, \dots, n_1$$

Summing over n_1 we have the expression for domestic industry profits :

$$8'') \quad \bar{\Pi}_1^* = n_1 \frac{(u - u_0)(R_1 + R_2)^2(\alpha_1 + \alpha_2)}{u(1 + n_1 + n_2)^2 R_2}$$

Consumers surplus is the same as in free-trade, and is given by :

$$9') \quad \bar{CS}^1 = \hat{CS}_{\beta}^1 = \alpha_1 \frac{u - u_0}{u} \frac{(R_1 + R_2)^2}{R_2} \frac{(n_1 + n_2)^2}{2(1 + n_1 + n_2)^2}$$

Total welfare is then given by :

$$10'') \quad \bar{W}_1 = \phi \alpha_1 \left[\frac{2n_1 + (n_1 + n_2)^2}{2(1 + n_1 + n_2)^2} \right]$$

In order to compare this case with autarky we define

$$11'') \quad \Delta \bar{W}^i = \bar{W}^i - W_{aut}^i$$

⁵This result depends on the hypothesis made about consumers density

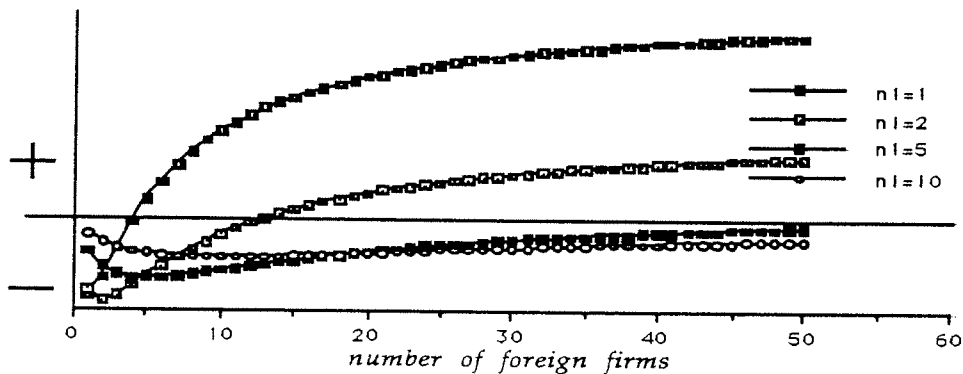
Computations yield:

$$11''bis) \quad \Delta \bar{W}^i = \phi \alpha_1 \left[\frac{2n_1 + (n_1 + n_2)^2}{2(1 + n_1 + n_2)^2} - \frac{n_1(2 + n_1)}{2(1 + n_1)^2} \right]$$

This expression may be either positive or negative, its sign depends by the value of n_1 and n_2 . In Table 4 the value of 11'' for some values of n_1 and n_2 are plotted.

TABLE 4

Welfare gains (+), losses (-), due to a unilateral trade liberalization



If foreign industry is big enough it is obvious that welfare improves, profits losses are more than compensated by consumers gains and this for the well-known limit behaviour of Cournot equilibrium⁶. As we can expect the fewer the domestic producers the greater their individual losses, but also the greater the consumers benefits due to the stronger competition. Table 4 shows that for a wide range of values the more "oligopolistic" domestic industry is the more convenient is the unilateral trade liberalization. In the next section we consider closer the case of monopoly and we find under which conditions unilateral "liberalization" is a dominant strategy. It must be clear that through antitrust policy the same result may be obtained at an inferior "cost". If antitrust works only consumers and not also foreign firms are advantaged by domestic firms profits losses.

⁶If n tends to infinity, Cournot equilibrium tends to a competitive one

7. DOMESTIC MONOPOLY

In this section we suppose that domestic industry is a monopoly, and that domestic and foreign policy-makers, concerned as before with total welfare generated by the industry, play a non cooperative game in policies. To open the market or not is still the only possible strategy.

If domestic industry is a monopoly 11'') becomes

$$11''') \quad \Delta \bar{W}_1 = \phi \alpha_1 \frac{4(2+(1+n_2))^2 - 3(2+n_1)^2}{8(2+n_2)^2}$$

This expression is positive if and only if $n_2 > 4$. Without giving too much importance to this numerical result it is possible to affirm that, if domestic industry is a monopoly, to open the market to foreign firms may be a convenient policy, even if the number of foreign competitors is quite small. Let us consider the case in which unilateral trade liberalization improves domestic total welfare ($n_2 > 4$). In this situation trade liberalization is a dominant strategy, i.e. is the best reply for any strategy (autarky or free-trade) of foreign country. In this case which is the foreign country best reply? Once domestic market is open to foreign firms, foreign policy-makers have to decide their trade policy choosing between liberalizing the market or continuing protectionism.

If they decide not to open the market foreign country faces a welfare level

$$17) \quad \bar{W}_2 = W_{aut}^2 + \bar{\Pi}_1^2$$

where

$$18) \quad \bar{\Pi}_1^2 = \phi n_2 \frac{\alpha_1}{(1+n_1+n_2)^2}$$

are the profit of foreign industry in domestic country. If they decide to open the market the welfare level is the same as defined in 10'). Subtracting 10') from 17) we have the following expression for the difference in welfare levels between protectionism and free trade :

$$19) \quad \Delta \bar{W}^2 = \phi \alpha_2 \left[\frac{2n_2 + n_2^2}{2(1+n_2)^2} - \frac{2n_2 + (n_1 + n_2)^2}{2(1+n_1+n_2)^2} \right]$$

For $n_1 = 1$, i.e. in case of domestic monopoly, this expression is positive if at least one foreign firm operate in the market.

Since we have seen that unilateral trade liberalization is a dominant strategy if $n_2 > 4$, it is possible to state that under Cournot quantity competition:

if domestic industry is a monopoly and unilateral trade liberalization is a dominant strategy, the only Nash Equilibrium in policy is that domestic market is opened to foreign firms, while foreign market remains protected.

8. CONJECTURAL VARIATIONS

If until now Cournot behaviour has been assumed, in this section previous results are generalized taking into account different oligopolistic behaviours.

Following the current literature on oligopolistic behaviour, we now assume that each firm has a conjectural variation γ of the expected industry output change following a change in its own output ⁷. Cournot behaviour is parametrized by $\gamma=1$, Bertrand by $\gamma=0$, full collusive behaviour by $\gamma=n$. Intermediate case describe intermediate degree of collusion.

First order conditions 4) become now

$$4''') \quad q_\lambda^* = \frac{(R_1 + R_2)\alpha}{(n + \gamma)R_2}$$

In case of autarky welfare is given by :

$$10''') \quad \bar{W}_{aut}^i = \bar{C}S_{aut}^i + \bar{\Pi}_{aut}^i = \alpha_i \phi \left[\frac{n_i(2\gamma + n_i)}{2(n_i + \gamma)^2} \right]$$

and in case of free trade for country 1 and 2 respectively by :

$$10''') \text{ bis) } \quad \bar{W}_\beta^1 = \bar{C}S_\beta^1 + \bar{\Pi}_\beta^1 = \phi \left[\alpha_1 \frac{(n_1 + n_2)^2}{2(\gamma + n_1 + n_2)^2} + (\alpha_1 + \alpha_2) \frac{n_1 \gamma}{(\gamma + n_1 + n_2)^2} \right]$$

and by :

$$10''') \text{ tris) } \quad \bar{W}_\beta^2 = \bar{C}S_\beta^2 + \bar{\Pi}_\beta^2 = \phi \left[\alpha_2 \frac{(n_1 + n_2)^2}{2(\gamma + n_1 + n_2)^2} + (\alpha_1 + \alpha_2) \frac{n_2 \gamma}{(\gamma + n_1 + n_2)^2} \right]$$

As previously we can calculate country 1 gains (losses) due to a trade liberalization :

⁷For a conjectural variation in intra-industry trade see Buffie and Spiller [1986], Eaton and Grossman [1986], Anderson, Donsimoni, Gabszewicz [1989]

$$11''') \quad \Delta \bar{W}_1 = \phi \left[\alpha_1 \frac{(n_1 + n_2)^2}{2(\gamma + n_1 + n_2)^2} + (\alpha_1 + \alpha_2) \frac{n_1 \gamma}{(\gamma + n_1 + n_2)^2} - \alpha_1 \frac{n_1(2\gamma + n_1)}{2(\gamma + n_1)^2} \right]$$

Differentiating this expression with respect to γ we have:

$$20) \quad \frac{\partial(\Delta \bar{W}_1)}{\partial \gamma} = \frac{(\alpha_1 + \alpha_2)n_1(\gamma - n_1 + n_2) - \alpha_1(n_1 + n_2)}{(\gamma + n_1 + n_2)^3} + \frac{n_1 \gamma}{(n_1 + \gamma)^3}$$

A sufficient condition for 20) to be positive is:

$$n_2 > n_1$$

It is then possible to state :

the more "collusive" the oligopolistic behaviour the more convenient is trade liberalization, if foreign industry is bigger than the domestic one.

If the competitive effect due to trade liberalization is strong enough⁸, its importance raises with oligopolistic collusion.

9. CONCLUSIONS

It is first of all necessary to recognize the restrictions of the foregoing analysis.

If the equilibrium assumptions are shown to be easily generalizable (through conjectural variations parameters) , on the demand side tastes have been considered identical. Homogeneous products, identical and constant (normalized to zero) costs, zero transport costs have been assumed. The effect of competitive entry has not been considered in a way that the number of firms operating in each market has been fixed exogenously.

In spite of the semplicity of the model a number of fairly general propositions about the welfare effects of a trade liberalization emerges. Small countries with oligopolistic industries receive the greater benefits from free-trade. To open the market works in fact as a second best competition policy, if antitrust is not in place. We have also seen that unilateral trade liberalization may improve domestic welfare, even if antitrust policy can do better. An exemple of a Nash equilibrium in policy where only one country opens its market to foreign competition has been considered, the study of

⁸ Having assumed constant conjectural variation the competitive effect is due only to the increase in the number of firms operating on the market. Import may nevertheless threat oligopolistic stability generating a further competitive influence. This argument is developed by Feinberg [1989]

other possible equilibria may be of some interest. If results are shown to be generalizable in a conjectural variation framework, it is nevertheless true that foreign competition may change the rules of the game. To endogenize conjectural variations parameter may be a way to strengthen the results. I hope to continue the research on this lines.

BIBLIOGRAPHY

- Anderson, S.P., M.P. Donsimoni and J. Jaskold Gabszewicz, (1989), "Is International Trade Profitable to Oligopolistic Industries?", *International Economic Review* , 30 n°4, 725-733
- Buffie, E. F., and P. T. Spiller, (1986), "Trade Liberalization in Oligopolistic Industries", *Journal of International Economics* , 20, 65-81.
- Cheng, L. K. (1988), "Assisting Domestic Industries under International Oligopoly: The Relevance of the Nature of Competition to Optimal Policies", *American Economic Review* , 78 n°4, 747-58.
- Dixit, A., and G. M. Grossman, (1986), "Targeted Export Promotion with Several Industries", *Journal of International Economics* , 21, 233-49.
- Donsimoni, M.P., and J. Jaskold Gabszewicz (1989), "Le Commerce International Profite-t-il aux Industries Oligopolistiques?" In D. Laussel, & C. Montet (Ed.), *Commerce International an Concurrence Imparfaite* , (pp. 137-52), Paris: Economica.
- Eaton, J., and G.M. Grossman, (1986), "Optimal Trade and Industrial Policy under Oligopoly", *Quarterly Journal of Economics* , 101, 383-406.
- Feinber, R. (1989), "Imports as a Threat to Cartel Stability", *International Journal of Industrial Organization* , n°7, 281-288
- Gabszewicz Jaskold , J., and J. F. Thisse, (1979), "Price Competition, Quality and Income Disparities", *Journal of Economic Theory* , 20, 340-59.
- Krugman, P. R. (1989). "Industrial Organization and International Trade". In Schmalensee, R., and R. D. Willig (Ed.), *Handbook of Industrial Organization* , (pp. 1181-1223). Elsevier Science Publisher B.V.
- Venables, A. J., and A. Smith, (1986). Trade and Industrial Policy under Imperfect Competition, *Economic Policy* , 1, 622-72.

