MERGER POLICY IN AN INTERNATIONAL SETTING

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RESUMEN

Este artículo analiza la interacción entre la política comercial y un aspecto más restringido, pero relevante, de la política de competencia: la política de fusiones. En particular, el trabajo se centra en el tema clave de las fusiones con dimensión internacional. Se presenta un modelo de un mercado de política comercial internacional que funciona bajo competencia imperfecta, el cual nos permite estudiar los efectos de las fusiones domésticas y extranjeras sobre la política comercial óptima del país doméstico, así como sobre el bienestar doméstico y extranjero cuando el país doméstico se apega a su política comercial óptima. Al implementar tres reglas antimonopolio, se determinan las zonas de conflicto y de bloqueo para las fusiones. El trabajo también abarca los efectos de la liberalización comercial sobre la política de fusiones. Al comparar los casos de libre comercio y de política comercial, se evalúa si la liberalización comercial promueve políticas de fusión más duras o más permisivas.

Clasificación JEL: L44, L51
Palabras clave: Política de fusiones, fusiones internacionales, dimensión internacional de la política de competencia

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ABSTRACT

This paper is about the interaction between trade policy and narrow but important aspect of competition policy, namely merger policy. We focus on one key issue: mergers with international dimension. We introduce a one-market model of international trade policy under imperfect competition. We study the effects of domestic and foreign mergers on the domestic country's optimal trade policy and on domestic and foreign welfare when the domestic country pursues its optimal trade policy. By implementing three antitrust rules, we determine the 'conflict' and 'blocking' zones for mergers. Later on, we discuss the effects of trade liberalization on merger policy. By comparing the free trade case to the trade policy case, we assess whether trade liberalization leads to tougher or lenient merger policies.

JEL Classification: L44, L51

Keywords: Merger policy, international mergers, international dimension of competition policy

I. INTRODUCTION

National governments and international organizations alike are focusing on the international dimensions of competition policies.[1] National competition authorities are increasingly examining the conduct of foreign producers. The WTO is paying increasing attention to international mergers competition issues. At the Ministerial meeting of the World Trade Organization held in Singapore in December 1996, the members decided to establish a Working Group to study the interaction

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[1] The interest is not new. This issue has been the subject of discussion for many years; competition law and policy disciplines were on the agenda of the negotiations to establish an International Trade Organization (ITO) after the Second World War. See Davidow (1981) for a discussion of the developments in the 1960s and 1970s. In addition, see Hoekman (1997) for a discussion of the various options for a multilateral agreement on competition policy. Bliss (1996) and Levinsohn (1996) provide an introduction to the policy issues.

between trade and competition policy.[2] Previously, competition policy and its enforcement had been considered domestic policy. However, it is now broadly recognized that in an increasingly integrated world economy, competition policy, if it is to remain effective, must explicitly consider the international aspects of mergers and anticompetitive conducts.

International mergers are very common in the business world. Over the past decade, most of the growth in international production has been via cross-border mergers. The value of this type of concentrations rose from less than $100 billion in 1987 to $720 billion in 1999 (UNCTAD, 2000). Two big international mergers waves can be distinguished during the period 1980-1999: one in 1988-1990 and another from 1995 onwards. The recent wave continues at a rapid and breathtaking pace. Each week there are announcements of new mergers, many of which appear to restructure industries or create firms of a size that was unimagined a few years ago.

There is a small, mainly recent, literature dealing with theoretical aspects of mergers in an international context. The pioneering work in this area is Barros and Cabral (1994), who extend Farrell and Shapiro's (1990) externality condition to the case of an open economy. Their principal point is that the domestic antitrust authority disregards the effect of mergers on foreign firms and consumers. Head and Ries (1997) study the divergence between countries on merger policy by examining the welfare effects of horizontal mergers between firms based in different countries. Head and Ries' starting point is that the regulation of such activity, is still carried out by national antitrust authorities. They then investigate the circumstances that give rise to conflict between a hypothetical world antitrust authority and the competition authorities of individual countries.

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[2] Previous to this working group, an International Antitrust Code Working Group was established in 1992. Composed manly of German antitrust experts, the Working Group produce a draft International Antitrust Code, which was submitted to GATT in the summer of 1993. Although the draft was widely criticised, it did succeed in drawing attention to the international dimension of competition policy (Trebilcock, 1996).

Kabiraj and Chaudhuri (1999) examine the welfare consequences of cross-border mergers. They provide a comparative welfare analysis of domestic and cross-national mergers. The main claim of Kabiraj and Chaudhuri's analysis is that cross-border merger can be beneficial for the domestic country's welfare. As a result of, cross-border merger may be preferred at the instead of domestic one.

This literature is mainly concerned with the incentives for, or the consequences of, mergers between exogenously chosen groups of firms. In such a framework, a group of firms will have incentives to merge if the profit of the merged firm in the new equilibrium is higher than the joint profits of the merging firms before the merger.[3]

There is a related literature concerning interaction between trade and competition policy. Examples of this are Auquier and Caves (1979), who examine the trade-off between domestic consumer welfare and monopoly profits from abroad. They stress that the optimal policy for a government is to promote competition in the domestic market while allowing its firms to extract monopoly profits in foreign markets through an export cartel. Dixit (1984) and Brander and Spencer (1984), investigate how domestic welfare, in an oligopolistic model of international trade, depends on the number of domestic firms, the number of foreign firms, and export subsidies. They show that a country will never be damaged by a foreign export subsidy if it pursues an optimal trade policy, and that a partially countervailing tariff is generally optimal. Rysman (1999) uses a Cournot framework in which a government first selects the number of firms in the industry, and then sets the optimal trade policy, and firms then compete in a Nash game. Rysman analyses how countries use competition policy as a tool for strategic trade, and finds that countries choose monopoly and subsidise that monopoly.

Finally, Collie (1997), using a model of international trade policy under imperfect competition, studies the effects of domestic and foreign mergers

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[3] The exception to this approach is Horn and Persson (2001). Who derive a pattern of mergers endogenously, in order to determine under what circumstances mergers are likely to take place between domestic firms, or between domestic and foreign firms.

when the domestic country pursues its optimal trade policy. Collie shows that if the domestic country pursues an optimal trade policy then it always loses from a foreign merger. The optimal domestic response to a foreign merger is to decrease (increase) the tariff if demand is concave (convex) and to increase the production subsidy. A foreign merger reduces foreign welfare when the domestic country pursues its optimal trade policy. Lastly, the optimal domestic response to a domestic merger is to leave the tariff unchanged and to increase the production subsidy.

This paper builds upon the existing literature, particular Collie (1997), to investigate how foreign mergers affect countries' welfare and how countries should respond to foreign mergers within the context of competition policy when both governments, domestic and foreign have an active merger policy. In other words, we study the interaction between competition policies of the countries. In addition, we investigate the relationship with trade policy. What distinguishes our analysis from existing theoretical literature is that we examined mergers with international dimensions in the light of two aspects: jurisdiction and the link between trade policy and merger policy. Our purpose here is to provide an integrative treatment of the welfare effects of mergers and these two aspects.

By introducing three antitrust policy rules that determine the respective jurisdiction of foreign and domestic antitrust authorities, we extend Collie's analysis to investigate the interaction between international mergers and merger policy that Collie (1997) and the received literature on international mergers does not analyse at all.

These antitrust policy rules are: (*i*) the domestic country only has jurisdiction over domestic firms and the foreign country only has jurisdiction over foreign firms; (*ii*) each national antitrust authority has jurisdiction over its own firms' concentrations, and concentrations in its own market; and finally, (*iii*) each national antitrust authority has jurisdiction only over its own market. Moreover, using these rules we identify the "conflict zone", i.e., the set of parameters for which the two countries would hold different views on domestic and foreign mergers, "blocking zone" (or stable points), i.e., the set of parameters for which

mergers would be blocked, and "possible equilibria", i.e. the market structures that would arise if all allowed mergers were ahead.

Having derived the predictions of the model by implementing these antitrust policy rules, we turn out attention to trade liberalization and antitrust enforcement. We use our results to discuss the effects of trade liberalization on competition policy. By comparing the case of free trade to the case where the domestic government uses its optimal trade policy, we assess whether trade liberalization leads to tougher or more lenient merger policies.

We find that although domestic welfare may or may not be reduced by foreign mergers under free trade, it would undoubtedly be reduced if the domestic government pursues an optimal trade policy. This result is similar to that obtained by Collie (1997). However, in contrast to Collie who finds that a foreign merger reduces foreign welfare, a foreign merger will increase foreign welfare if the number of foreign firms is sufficiently high relative to the number of domestic firms. This result holds both under free trade and when the domestic government pursues optimal trade policy.

Moreover, when the domestic country pursues its optimal trade policy, a domestic merger always reduces the domestic welfare, while it increases foreign welfare. On the contrary, in Collie's model a domestic merger would not affect either the domestic country's welfare or the foreign country's welfare. We also show that a foreign merger could be more opportune for domestic welfare under free trade than using an optimal trade policy.

On the other hand, applying the antitrust policy rules we find the following main results; first, when the domestic country only has jurisdiction over domestic firms, and the foreign country only has jurisdiction over foreign firms, we show that domestic are never approved. This result holds both under free and optimal trade policy. Moreover, foreign mergers may be approved even though it is only beneficial for the foreign country. Further, we find that the "blocking zone" i.e. range of parameters for which mergers are blocked, is smaller in the free trade case than in the optimal trade case. This predicts that antitrust enforcement would be softer as international trade is liberalized.

Second, when each national antitrust authority has jurisdiction over its own firms' concentrations, and concentrations in its own market, all mergers are blocked both under free trade and when the domestic country follows its optimal trade policy.

Third, when each national antitrust authority has jurisdiction only over its own market, a domestic merger always hurts domestic welfare, in the free trade case as well as in the optimal trade case, so that the domestic competition authority will always refuse a domestic merger. When the domestic country pursues a free trade policy, a foreign merger may occur, and the merger will only be advantageous for the domestic country. On the contrary, considering an optimal trade policy a foreign merger never take place given that the domestic antitrust authority will always block it. Furthermore, the "blocking zone" in the optimal trade case is larger than free trade case so consequently the antitrust enforcement would be stricter in the optimal trade policy case than in the free trade case.

The model is clarified in detail in section II. The welfare effects of mergers under free trade are analysed in section III. In section IV, we derive the optimal trade policy and describe the effect of a foreign merger on the welfare of each country. In section V, we also derive the optimal trade policy but describe the effect of a domestic merger on the welfare of each country.

In section VI, we describe the antitrust policy rules and analyse the merger policy when the domestic government pursues a free trade policy as well as when it pursues an optimal trade policy. Later on, we derive the implications for merger policy within the context of trade liberalization. Finally, some concluding remarks are made in section VII.

II. THE MODEL

Assume that there are two countries, domestic and foreign, with n identical firms located in the domestic country and m identical firms located in the foreign country. The firms compete in an homogeneous product Cournot oligopoly in

the domestic market. Moreover, the number of domestic and foreign firms is assumed to be exogenous.

For simplicity, it is assumed that all consumption of this product occurs in the domestic country and that there is no consumption of this product in the foreign country. Each domestic firm has constant marginal cost c_1 while each foreign firm has constant marginal cost c_2. Domestic firms each sell y units and foreign firms each sell x units of output in the domestic market, hence domestic production is   , foreign exports (domestic imports) are   and total sales $Q = X + Y$.

In addition, we assume that consumers in the domestic market have utility functions that are additively separable and linear in a competitive numeraire good. Therefore the aggregate indirect utility function is of the form: $V(P)+I$, and this indirect utility function has a quadratic form. Where P is the price of the oligopolistic industry's product and I is income; hence by Roy's identity   and linear inverse demand function of the form: $P = a - bQ$.

The domestic government is assumed to maximize national welfare using a specific tariff t while the foreign government is assumed to be passive. Following Salant et al. (1983) and Dixit (1984), a foreign (domestic) horizontal merger will be modeled as an exogenous reduction in the number of foreign (domestic) firms.[4]

In the Cournot equilibrium, the domestic and foreign firms simultaneously and independently set outputs to maximize their profits given the tariff set by the domestic government. Profits of the domestic and foreign firms, respectively, are:[5]

$$(1)$$

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[4] The number of foreign and domestic firms will be treated as continuous variable.

[5] These solutions are an equilibrium only if second-order conditions are satisfied:

$$\prod_{xx} = xP'' + 2P' < 0 \qquad \text{and}$$
$$\prod_{yy}\prod_{xx} - \prod_{yx}\prod_{xy} > 0$$

Which in turn implies that reaction function cross only once that the equilibrium is stable. See Nikaido (1968).

$$\Pi_2 = (p - c_2 - t)x \qquad (2)$$

The closed form solution for the following variables are obtained as:[6]

$$(3)$$

$$\Pi_2 = b(x)^2 \qquad (4)$$

$$y = \frac{(a - c_1)(m+1) - m(a - c_2 - t)}{b(m+n+1)} \qquad (5)$$

$$x = \frac{(a - c_2 - t)(n+1) - n(a - c_1)}{b(m+n+1)} \qquad (6)$$

$\Pi_1 = b(y)$Taking into account the fact that the market is supplied by both domestic production and imports, the first order conditions for a Cournot equilibrium are:

$$\frac{\partial \Pi_1}{\partial y} = p + yp' - c_1 = 0 \qquad (7)$$

$$\frac{\partial \Pi_2}{\partial x} = p + xp' - c_2 - t = 0 \qquad (8)$$

To obtain the comparative static results for the effects of the tariff, the number of foreign firms, and the number of domestic firms on the Cournot equilibrium outputs, we totally differentiate these first order conditions:

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[6] It can be easily verified that,with linearity of demand, the second order condition are always satisfied.

$$(9)$$

The determinant of the matrix on the left-hand side is $\Delta = (n+m+1) > 0$. The signs of the off-diagonal elements are negative. This is because of domestic and foreign output are strategic substitutes.[7]

$$\begin{bmatrix} dy \\ dx \end{bmatrix} = \frac{1}{\Delta} \begin{bmatrix} m & -x & -y \\ -(n+1) & -x & -y \end{bmatrix} \begin{bmatrix} dt \\ dm \\ dn \end{bmatrix} \qquad (10)$$

Recalling that the total output of the domestic industry is $Y = ny$ and that the total output of the foreign industry is $X = mx$, the comparative static results for the total outputs of the domestic and foreign industries are:

$$\begin{bmatrix} dY \\ dX \end{bmatrix} = \frac{1}{\Delta} \begin{bmatrix} nm & -xn & y(m+1) \\ -m(n+1) & x(n+1) & -ym \end{bmatrix} \begin{bmatrix} dt \\ dm \\ dn \end{bmatrix} \qquad (11)$$

As expected, an import tariff reduces the total output of the foreign industry and increases the total output of the domestic industry. Total output of the foreign industry increases as a result of an increase in the number of foreign firms but total output of the domestic industry decreases. Recalling that $Q = X + Y$ and that $dP = -bdQ$, the comparative static results for the effects on total output and price are:

[7] Strategic substitutes are generally considered to be the "normal" case in the literature on Cournot oligopoly. See Bulow *et. al.* (1985).

$$\begin{bmatrix} dQ \\ dP \end{bmatrix} = \frac{1}{\Delta} \begin{bmatrix} -m & x & y \\ m & -x & -y \end{bmatrix} \begin{bmatrix} dt \\ dm \\ dn \end{bmatrix} \tag{12}$$

A tariff increases the price, and an increase in the number of domestic or foreign firms reduces the price. We know that the terms of trade is the price of a country's exports divided by the price of its imports, and generally, an increase in the terms of trade increases a country's welfare while a reduction in the terms of trade decreases its welfare.

All consumption occurs in the domestic market. This assumption greatly simplifies the derivation of the welfare effects as there is only one market that has to be analysed. With no exports to the foreign market, domestic welfare is given by the sum of consumer surplus, producer surplus and tariff revenue:

$$W_1 = V(P) + n \prod_1 + tX = V(P) + (P - c_1)Y + tX \tag{13}$$

With no consumption in the foreign market and all output exported to the domestic market, foreign welfare is just equal to the producer surplus from exports to the domestic market:

$$W_2 = (P - c_2 - t)X \tag{14}$$

III. WELFARE EFFECTS OF MERGERS UNDER FREE TRADE

With these measures of domestic and foreign welfare together with the comparative static results for the Cournot equilibrium, it is now possible to analyse the welfare effects of mergers as well as the optimal response of the domestic trade policy to mergers. However, before analysing the effects of

mergers when trade policy is set optimally, it will be useful to review the welfare effects of horizontal mergers when domestic country pursues a policy of free trade.

Under free trade, $t = 0$, the effect of an increase in the number of foreign firms on the welfare of the domestic country is given by differentiating (13) with respect to m:

$$(15)$$

The first term is the profit-shifting effect; an increase in the number of foreign firms reduces the output of the domestic industry thereby shifting profits to the foreign industry and reducing domestic welfare. The second term is the terms of trade effect. An increase in the number of foreign firms lowers the market price, improving the terms of the trade and increasing domestic welfare.

Evaluating (15) using the comparative static results from (10) – (12), together with the domestic firms' first-order conditions for profit maximization (7) yields:

$$\frac{dW_1}{dm} = \frac{x}{\Delta}(mx - ny) \qquad (16)$$

Proposition 1 *The derivative* $\dfrac{dW_1}{dm} = \dfrac{x}{\Delta}(mx - ny)$ *has a single critical value*

$m * st \dfrac{dW_1}{dm}(m*) = 0$ *as a result of* $(mx - ny)$ *changes sign only once.*

Proof. Let $m*$ be a critical point of   , s.t.

$$\frac{dW_1}{dm} \leq 0 \quad \forall$$

$$\forall$$

We know that the sign of   sign of $(mx - ny)$. To see whether

is positive or negative on any of these intervals, we only need to show $(mx - ny)$

that changes sign only once that interval. We know that   and $\dfrac{dY}{dm} < 0$.

Define $\Psi = mx - my$, thus

$$\Psi(m \to \infty) > 0$$

This mean that $\dfrac{d\Psi}{dm} = \dfrac{dX}{dm} - \dfrac{dY}{dm}$, hence   so that there is a single

$\dfrac{dW_1(m^*)}{dm} \gtreqless 0$ critical value of m. Considering the symmetrical case i.e., when $c_1 = c_2 = c$, the

critical value is $m^* = n$.[8]

The effect of an increase in the number of foreign firms on the foreign welfare is given by differentiating (14) with respect to m:

$$\frac{dW_2}{dm} = (P - c_2)\frac{dX}{dm} + X\frac{dP}{dm} \tag{17}$$

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[8] Alternative way to show that exist a single critical value is using the closed form solution from
(5) – (6) in equation (16) and solving for m could be shown that $m^* = \dfrac{n(a - c_1)}{(a - c_2)(2n + 1) - 2n(a - c_1)}$.
Moreover taking into account the symmetrical case when each domestic's firm constant marginal
cost is equal to each foreign firm's constant marginal cost, i.e., $c_1 = c_2 = c$, the critical value
will be $m^* = n$.

The first term is the profit shifting effect: an increase in the number of foreign firms increases exports which has a positive effect on foreign welfare. The second term is the terms of trade effect: an increase in the number of foreign firms lowers the price of exports, which have a negative effect on foreign welfare.

Using a comparative static results from (10) - (12), together with the foreign firms' first order conditions for profit maximization (8), to evaluate the welfare effect yields:

$$\frac{dW_2}{dm} = \frac{x^2}{\Delta}\big[(n+1)-m\big] \tag{18}$$

The critical value of equation (18) is $m^{**} = n + 1$. Thus,

$$\frac{dW_2}{dm} \le 0 \quad \forall$$

$$\forall$$

If   the equation (18) will be negative, that is, the number of foreign firms is sufficiently high compared with the number of domestic firms. This means that a foreign merger increases foreign welfare. Additionally, a foreign merger only can reduce foreign welfare if the number of foreign firms is small relative to the number of domestic firms.

On the other hand, concerning domestic mergers, the effect of an increase in the number of domestic firms on the welfare of the domestic country is given by differentiating (13) with respect to n:

$$\frac{dW_1}{dn} = (P - c_1)\frac{dY}{dn} - X\frac{dP}{dn} \tag{19}$$

Using the comparative static results from (10) - (12) together with the domestic firms' first-order conditions for profit maximization (7), to evaluate (19) yields:

$$\frac{dW_1}{dn} = \frac{y}{\Delta}\left[X + y(m+1)\right] > 0 \tag{20}$$

Since an increase in the number of domestic firms increases the output of the domestic industry and reduces the market price, both the terms of trade and the profit-shifting effects are positive. Hence a domestic merger always decreases domestic welfare.

The effect of an increase in the number of domestic firms on the welfare of the foreign country is given by differentiating (14) with respect to n:

$$\frac{dW_2}{dn} = (P - c_2)\frac{dX}{dn} + X\frac{dP}{dn} \tag{21}$$

Using the comparative static results from (10) – (12), together with the foreign firms's first order conditions for profit maximization from (8) in (21) yields:

$$\frac{dW_2}{dn} = -\frac{2mxy}{\Delta} < 0 \tag{22}$$

Both the terms of trade effect and profits-shifting effect are negative so that the welfare effect of an increase in the number of domestic firms is unambiguously negative; hence, a domestic merger, will unambiguously increase foreign welfare.

There are two main points to note from this review of welfare effects under free trade: firstly, the sign of the welfare effects of foreign mergers under free trade is ambiguous. It will depend on the initial number of foreign firms in the market. Secondly, the welfare effects of domestic mergers are unambiguous. It will be negative for the domestic country; a reduction in the number of domestic firms reduces domestic welfare, and it will be positive for the foreign country; a reduction in the number of domestic firms increases foreign welfare.

IV. FOREIGN MERGERS AND OPTIONAL TRADE POLICY

When the domestic government pursues an optimal trade policy, it sets its import tariff to maximize domestic welfare, taking into account that the market is supplied by both domestic production and imports, maximizing domestic welfare (13) with respect to t.[9]

$$\frac{dW_1}{dt} = X\left(1 - \frac{dP}{dt}\right) + (P - c_1)\frac{dY}{dt} + t\frac{dX}{dt} = 0 \tag{23}$$

The first term is the terms of trade effect, the second term is the profit-shifting effect, and the third term is the tariff revenue effect. Using the comparative static results (10) – (12), together with the domestic firms' first order conditions for profit maximization from (7) into (23) and solve for the tariff yields the optimal tariff:[10]

$$t^* = x + \frac{Y}{(n+1)} \tag{24}$$

As in Brander and Spencer (1984), the tariff is used to improve the domestic country's terms of trade and to extract rent from the foreign producers. The optimal tariff is positive. In the previous section, it was shown that foreign mergers might reduce domestic welfare under free trade. Now consider the effect of a change in the number of foreign firms on domestic welfare when the domestic government sets its tariff optimally; the overall effect on domestic welfare is:

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[9] A sufficient second-order condition for welfare maximization to be concave is that $\frac{d^2 W_1}{dt^2} < 0$.

[10] This expression is the implicit form of the optimal tariff. We have computed the explicit form and proved that this optimal tariff is less than the prohibitive tariff. See appendix.

$$\frac{dW_1}{dm} = \frac{\partial W_1}{\partial m} + \frac{\partial W_1}{\partial t}\frac{dt^*}{dm} \tag{25}$$

Since the import tariff is set optimally, $\frac{\partial W_1}{\partial t} = 0$, only the direct effect of the change in the number of foreign firms has to be considered, hence the overall effect on domestic welfare is:

$$\frac{dW_1}{dm} = \frac{\partial W_1}{\partial m} = (P - c_1)\frac{dY}{dm} - X\frac{dP}{dm} + t^*\frac{dX}{dm} \tag{26}$$

The two first terms on the right-hand side are exactly the same as in equation (15) under free trade. We have shown that the effect of an increase in the number of foreign firms on the welfare of the domestic country was given by the expression $\frac{dW_1}{dm} = \frac{x}{\Delta}(X - Y)$. Thus, we only need to determine the sign of the new term on the right-hand side: $t^*\frac{dX}{dm}$. This new term is positive; an increase in the number of foreign firms raises the output of foreign industry and the optimal tariff is positive [see equation (24)].

With comparative static results from (10) – (12), together with the optimal policy in (24) and adding the term $\frac{x}{\Delta}(X - Y)$ yields:

$$\frac{dW_1}{dm} = x^2 > 0 \tag{27}$$

This expression is unambiguously positive. This is because using the tariff; the domestic government can compensate the negative effect due to the profit-

shifting effect. This positive effect together with the effect of terms of trade outweighs the negative effect caused by the profit-shifting effect. We can see that these results are closely related to those obtained by Dixit (1984,1988), Brander and Spencer (1984,1985) and Collie (1991).[11]

The effect of an increase in the number of foreign firms is equivalent to a foreign export subsidy. Under optimal policy, a foreign subsidy can only increase domestic welfare. If the domestic country applied fully countervailing tariffs, then the net effect on an export subsidy would be to transfer revenue from the foreign country to the domestic country, which would increase domestic welfare. The export subsidy increases the rent earned by foreign firms, and the tariff is increased to extract some of this extra rent. Formally, we write the following proposition:

Proposition 2 *When the domestic country pursues its optimal trade policy, a foreign merger decreases domestic welfare.*

From this result, we can see the first important difference with respect to foreign mergers under free trade. Under policy of free trade, we saw that the effect of foreign merger on domestic welfare is ambiguous: it depends on the initial number of foreign firms in the market. In contrast, we have shown that the effect of change in the number of foreign firms on domestic welfare is positive. Using the tariff the domestic government can improve the domestic country's terms of trade and extract rent from the foreign firms. This effect compensates the negative effect produced by the profit-shifting effect, so that a foreign merger would reduce domestic welfare.

Having derived the effect of foreign mergers on domestic welfare prompts the question of how the welfare of the foreign country will be affected by foreign mergers when the domestic country pursues its optimal trade policy. To

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[11] Optimal trade policy under oligopoly has been derived by Dixit (1984,1988), Brander and Spencer (1984,1985) and Collie (1991) has analysed the optimal response of trade policy to a foreign export subsidy. They show that under optimal trade policy a foreign export subsidy can only increase domestic welfare.

answer this question, it is first necessary to look at the effect of the foreign merger on the foreign firms' output and the market price when the domestic country pursues its optimal trade policy. Taking into account that the direct effect on the output of each foreign firm caused by an increase in the number of foreign firms, together with indirect effect because of the change in the domestic country's trade policy, the total effect of output of each foreign firm is:

$$\frac{dx}{dm} = \frac{\partial x}{\partial m} + \frac{\partial x}{\partial t}\frac{dt*}{dm} \tag{28}$$

How should the domestic country respond to the foreign merger? To obtain the comparative static result for the effect of a change in the number of foreign firms on the optimal tariff, totally differentiate (24) together with comparative static results yields:

$$\frac{dt*}{dm} = \frac{dx}{dm} + \frac{1}{(n+1)}\frac{dY}{dm} = -\frac{x(2n+1)}{(n+1)(m+n+1)} < 0 \tag{29}$$

This expression is unambiguously negative. An increase in the number of foreign firms reduces the import tariff so that a foreign merger will increase the optimal tariff.

Two opposing effects form the total effect on the output of each foreign firm. First, the direct effect [first term of the equation (28)] is negative; an increase in the number of foreign firms reduces the output of each foreign firm. Second, the indirect effect [second term of equation (28)] is positive; an increase in the number of foreign firms lowers the optimal tariff. Using comparative static results (10) – (12), together with (29) to evaluate (28) yields:

$$\frac{dx}{dm} = \frac{x(n-m)}{\Delta^2} \tag{30}$$

As a consequence of the two opposing effects, the total effect is ambiguous. The total effect will depend on the initial number of foreign (domestic) firms in the market. Supposing that the number of foreign firms is bigger than the number of domestic firms. In this case, a foreign merger will increase the output of each foreign firm, even though the optimal tariff increased. Similarly, the total effect on price is:

$$\frac{dP}{dm} = \frac{\partial P}{\partial m} + \frac{\partial P}{\partial t}\frac{dt*}{dm} \tag{31}$$

Using the comparative static results (10) – (12), together with (29), to evaluate (31) yields:

$$\frac{dP}{dm} = \frac{x\left[(n+1)(n+m+1)+m(2n+1)\right]}{(n+1)(n+m+1)^2} < 0 \tag{32}$$

The total effect of foreign merger on price is positive if the domestic country pursues its optimal policy. With these comparative results, it is now possible to evaluate the total effect of a change in the number of foreign firms on foreign welfare when the domestic country pursues its optimal trade policy; differentiating (14) yields:

$$\frac{dW_2}{dm} = (P - c_2 - t*)\left(x + m\frac{dx}{dm}\right) + X\left(\frac{dP}{dm} - \frac{dt*}{dm}\right) \tag{33}$$

The first term is the profit-shifting effect, the second term is the terms of trade effect. Using the total effect of the foreign merger on the output of the foreign firms (30) and the total effect on price (32) together with (29) and the foreign firms' first order conditions for profit maximization (8) to evaluate (33) yields:

$$\frac{dW_2}{dm} = \frac{x^2}{\Delta^2}\left[(n+1)^2 + m[2(2n+1) - m]\right]$$

(34)

The critical values of this equation are[12] $m_1'' = 2n + 1 + \sqrt{(5n^2 + 6n + 2)} > 0$ and $m_2'' = 2n + 1 - \sqrt{(5n^2 + 6n + 2)} < 0$. Obviously, the former is the important one for the economic analysis. Thus,

$$\frac{dW_2}{dm} \leq 0 \quad \forall$$

$$\frac{dW_2}{dm} \geq 0 \quad \forall$$

Also note that the critical value m'' is greater than the critical value m^{**}.[13] If the number of foreign firms becomes very large, the equation (34) will be unambiguously negative; a foreign merger will increase foreign welfare. In other words, if $m > n$ that is, if the number of foreign firms is sufficiently high relative to the number of domestic firms, a foreign concentration will catch on to the right of m''. In this case, the negative effect due to the terms of trade effect overweighs the profit shifting-effect so that equation (34) will be unambiguously negative therefore a foreign merger will increase foreign welfare.

Remembering that a foreign merger involves a reduction in the number of foreign firms leads to the following proposition:

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[12] We know that sign is equal to sign $\left[(n+1)^2 + m[2(2n+1) - m]\right]$.

Rewritten this as $-m^2 + 2m(2n+1) + (n+1)^2$. Using the quadratic formula we get the critical values:

$m_1'' = 2n + 1 + \sqrt{(5n^2 + 6n + 2)} > 0$ and $m_2'' = 2n + 1 - \sqrt{(5n^2 + 6n + 2)} < 0$.

[13] It could be shown that $m'' - m^{**} = n + \sqrt{(5n^2 + 6n + 2)} > 0$. Then, $m'' > m^{**}$. Of course, this is the case when symmetry has been assumed i.e.,

Proposition 3 *When the domestic government responds optimally to a foreign merger, the foreign merger will produce the following results:*

    (a) If   , foreign welfare increases.

    (b) If   , foreign welfare decreases.

In this section, we saw that when the domestic country pursues an optimal trade policy, a foreign merger would have a negative effect on domestic welfare. Instead, in the section on foreign mergers under free trade, we showed that the effect of foreign concentrations on domestic welfare would depend on the initial number of foreign firms. Furthermore, if there were many foreign firms in the market, a foreign merger would increase foreign welfare.[14]

V. DOMESTIC MERGERS AND OPTIMAL TRADE POLICY

This section considers the effects of domestic mergers on the domestic country's optimal trade policy and the welfare effects of domestic mergers when the domestic country pursues an optimal trade policy. As in the previous section, the effect of a change in the number of domestic firms on domestic welfare when domestic government sets its tariff is given by:

$$(35)$$

Since the tariff is set optimally $\dfrac{\partial W_1}{\partial t} = 0$, only the direct effect has to be considered thus the overall effect on domestic welfare is:

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[14] We obtained similar situation in the free trade.

$$\frac{dW_1}{dn} = \frac{\partial W_1}{\partial n} = (P - c_1)\frac{dY}{dn} - X\frac{dP}{dn} + t*\frac{dX}{dn} \tag{36}$$

Using comparative statics results from (10) – (12), together with the optimal policy in (24) and (7) to solve (36) yields:

$$\frac{dW_1}{dn} = \frac{y^2}{(n+1)} > 0 \tag{37}$$

This derivative is positive and tells us that the domestic merger will decrease the welfare of the domestic country. Hence, a domestic concentration always will affect domestic welfare negatively. Therefore, the national antitrust authority of the domestic country always should reject a domestic merger. We can write the following proposition:

Proposition 4 *When the domestic government responds optimally to a domestic merger, the domestic merger reduces domestic welfare.*

As in the previous section, having derived the effect of domestic mergers on domestic welfare, we want to know how the welfare of the foreign country will be affected when the domestic country pursues its optimal trade policy. Firstly, it is necessary to look at the effect of the domestic merger on the foreign firms' output and the market price. Taking into account that the direct effect on the output of each foreign firm together with the indirect effect due to the change in the domestic country's trade policy, the total effect output of each foreign firm is:

$$\frac{dx}{dn} = \frac{dx}{dn} + \frac{dx}{\partial t}\frac{dt*}{dn} \tag{38}$$

To obtain the comparative static result for the effect of a change in the number of domestic firms of the optimal tariff, totally differentiate the optimal policy (24) and using comparative static results from (10) – (12) yields:

$$\frac{dt^*}{dn} = \frac{dx}{dn} + \frac{1}{(n+1)}\frac{dY}{dn} = \frac{y(m-n)}{(n+m+1)(n+1)} \tag{39}$$

The effect of a domestic concentration on optimal tariff is ambiguous. The optimal response of domestic government to a domestic merger will depend on the number of foreign and domestic firms in the market. Supposing that $m > n,$ the equation (39) will be positive therefore, the optimal response of domestic government to a domestic concentration is to decrease the optimal tariff, since doing so, will increase competition in the market. The reduction in the optimal tariff will increase the output of each foreign firm therefore there is more availability of the product in the market. In consequence, the anti-competitive effect due to a domestic merger is off set by the fall on the optimal tariff.

Using comparative static results (10) – (12), together with (39) to evaluate (38) yields:

$$\frac{dx}{dn} = -\frac{y(2m+1)}{(n+m+1)^2} < 0 \tag{40}$$

The total effect is negative. An increase in the number of domestic firms implies a reduction of the output of each foreign firm. Therefore, a domestic merger will increase the output of each foreign firm. Similarly, the total effect on price is:

$$\frac{dP}{dn} = \frac{\partial P}{\partial n} + \frac{\partial P}{\partial t}\frac{dt^*}{dn} \tag{41}$$

Using comparative static results (10) – (12), together with (39) to evaluate (41) leads:

$$\frac{dP}{dn} = \frac{y\left[m^2(m-2n)-(n+1)^2\right]}{(m+n+1)^2(n+1)} \tag{42}$$

The critical values of this derivative are[15] $n_1 = -(m^2+1)+\sqrt{m^4+2m^2+m^3}$ and $n_2 = -(m^2+1)-\sqrt{m^4+2m^2+m^3}$. The total effect of a domestic merger on price is uncertain. If $m > n$, the total effect on price will be positive therefore a domestic merger decreases the price. With these comparative results, it is now possible to evaluate the total effect of a change in the number of domestic firms on foreign welfare when the domestic country pursues its optimal trade policy; differentiating (14) with respect to n:

$$\frac{dW_2}{dn} = (P-c_2-t)m\frac{dx}{dn} + \left(\frac{dP}{dn} - \frac{dt^*}{dn}\right)X \tag{43}$$

The first term is the profit-shifting effect, the second term is the terms of trade effect. Using the total effect of domestic merger on the output of the foreign firms (40) and the total effect on price (42) together with (39) and (8) to evaluate (43) yields:

$$\frac{dW_2}{dn} = \frac{-2mxy(2m+1)}{\Delta^2} < 0 \tag{44}$$

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[15] We know that the sign $\dfrac{dP}{dn}$ is equal to sign $\left[m^2(m-2n)-(n+1)^2\right]$.

Rewritten this as $\left[(n+1)^2+m[2(2n+1)-m]\right]$.

Using the quadratic formula we get the critical values:

$n_1 = -(m^2+1)+\sqrt{m^4+2m^2+m^3}$ and $n_2 = -(m^2+1)-\sqrt{m^4+2m^2+m^3}$.

This equation is unambiguously negative hence domestic mergers, a reduction in the number of domestic firms, increases foreign welfare. A domestic concentration will always positively affect foreign welfare. The foreign competition authority could approve a domestic merger. This result leads to the following proposition:

Proposition 5 *When the domestic government responds optimally to a domestic merger, the domestic merger increases the foreign welfare.*

As in previous section, there are two main points to note from the analysis of merger and optimal trade policy. Firstly, foreign concentrations always affects domestic welfare negatively. Regarding foreign welfare the effect is not clear, it will depend on the initial number of foreign firms in the market. Secondly, as in the case of free trade, a domestic concentration always reduces domestic welfare while increases foreign welfare.

VI. MERGER POLICY

Now that we understand the effects of mergers in an open economy, we can turn our attention to merger policy. The purpose of this section is to stress that sometimes mergers will have opposite welfare effects for the two countries involved, and this could lead to a conflict, depending of the respective jurisdictions of the two countries' antitrust authorities.

The competition policy takes a simple form; the competent antitrust authority has veto power over mergers, i.e. the authority can approve or block a merger. To analyse the interaction between the competition policies of the 2 countries, we need some antitrust policy rules that determine the respective jurisdiction of foreign and domestic antitrust authorities.

These rules will permit us to identify the "conflict zones" i.e. the set of parameters for which the two countries would hold different views on

domestic and foreign mergers, but also the "blocking zones" (or "stable points") i.e. the set of parameters for which mergers would be blocked, and finally, these rules also make it possible to determine "possible equilibria" i.e. the market structures that would arise if all allowed mergers were ahead. Later on, we use our previous results to discuss the effects of trade liberalization on competition policy. By comparing the case of free trade to the case where the domestic government can use its optimal trade policy, we can assess whether trade liberalization leads to tougher or more lenient merger policies.

VI.1 ANTITRUST POLICY RULES

In this subsection, we shall describe the three antitrust policy rules proposed. These rules determine who has jurisdiction over domestic and foreign firms.

Rule 1. *We assume that each national antitrust authority controls its own firms' concentrations, that is, the domestic country only has jurisdiction over domestic firms in the market and the foreign country only has jurisdiction over foreign firms in the market.*

Rule 2. *We assume that each national antitrust authority has jurisdiction over its own firms' concentrations, and concentrations in its own market. For instance, the domestic antitrust authority could approve or block a foreign merger.*

Rule 3. *We assume that each national antitrust authority has jurisdiction only over its own market. In this case, given the model's structure the only relevant antitrust authority will be the domestic. Hence, the domestic antitrust authority once again could pass or decline either a domestic or a foreign merger.*

VI.2 ANTITRUST POLICY RULES UNDER FREE TRADE

Antitrust Policy Rule 1

We focus on figure 1 build upon the critical values derived in the previous sections.[16] In figure 1 the number of domestic firms is measured on the vertical axis, while the number of foreign firms is measured on the horizontal axis. The direction of the arrows indicates the positive or negative effect on welfare from domestic or foreign mergers. For instance $\uparrow W_1$, tell us that a domestic merger (because the arrow faces vertical position) raises domestic welfare. Another example, $\leftarrow W_2$ means that a foreign merger (because the arrow faces horizontal position) reduces foreign welfare.

Figure 1 shows the diverse possible stable points derived from considering competition policy rule number 1. For instance, taking into consideration the initial point C, we can see that this point is unstable. At this point, the domestic antitrust authority cannot prohibit a foreign concentration because it does not have any kind of jurisdiction over foreign firms. Hence, the foreign antitrust authority will approve the proposed merger since a foreign merger always increases foreign welfare at this initial point so that foreign firms keep merging until the number of foreign firms becomes equal to the critical value m^{**}. Then, a foreign merger takes place in the market despite the fact that it will hurt domestic welfare.

On the other hand, as can be seen in figure 1 domestic mergers never take place when the antitrust policy rule 1 is in operation since the domestic antitrust authority always will reject a domestic merger because of its jurisdiction over domestic firms. This is because a domestic merger always would hurt domestic merger.[17]

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[16] Recall that the m^* and m^{**} lines in these diagrams are only linear when symmetry is assumed.

[17] Recall that we showed that the effect of a change in the number of domestic firms on domestic welfare is positive, therefore a domestic merger always hurts domestic welfare. Mathematically, we have that   (see Equation 20).

FIGURE 1
Domestic and foreign mergers under rule 1
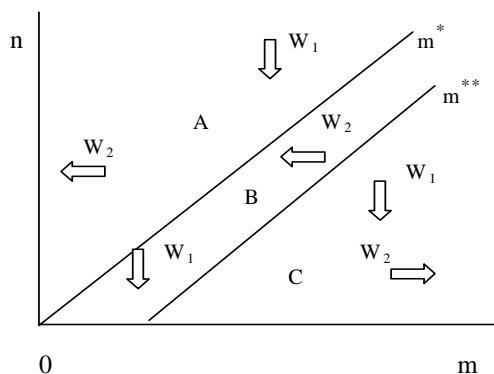
On the other hand, figure 1 shows that initial points *A* and *B* are stable. For instance, consider the initial equilibrium at point *A*, the antitrust policy rule 1 tells us that a foreign merger cannot occur. The foreign antitrust authority will block it since at this point; a foreign merger reduces foreign welfare. The situation prevails at point *B*.

We conclude that applying the rule number 1 when the domestic country pursues a free trade policy, a foreign merger can take place in the market. When the number of foreign firms is large enough, a foreign merger will only be beneficial for the foreign country, and the equilibrium converges to the critical value *m***. On the contrary, a domestic merger cannot occur in the market because the domestic antitrust authority will always block it.

Under the implementation of the antitrust policy rule 1, the blocking zone for foreign mergers –when the domestic government pursues a free trade– is determinate by any point to left of the critical value *m***.

Antitrust Policy Rule 2

Figure 2 shows that neither a foreign nor a domestic merger can occur. The domestic and foreign antitrust authority refuse a domestic or foreign merger.

For instance, consider the initial point *B*. Since the domestic authority has control over foreign and domestic mergers, the domestic competition authority will decline both a domestic and foreign merger. The same occurs at initial equilibrium point *C*. Finally, at point *A*, a foreign merger will reduce (increase) foreign (domestic) welfare, consequently the foreign (domestic) antitrust authority rejects (approves) the concentration. Further, at this initial point *A*, a domestic merger reduces domestic welfare, so that the domestic authority always will block a domestic merger in this zone.[18]

FIGURE 2
Domestic and foreign mergers under rule 2
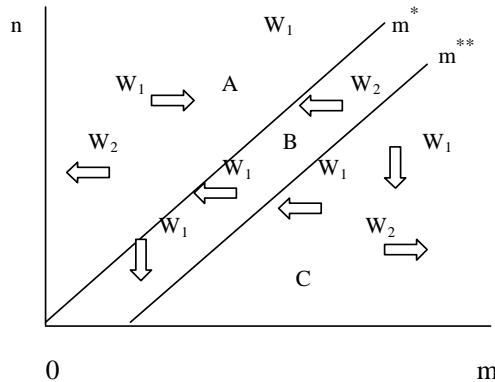
Applying antitrust policy rule 2 when the domestic country pursues a free trade policy, neither a foreign merger nor a domestic merger gets the approval from the relevant antitrust authority.

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[18] Recall that although we have two countries, in fact there is only one market in this model because of the assumption that all consumption of the product takes place in the domestic market. Hence, in this case it is not relevant the jurisdiction that the foreign country has over its own market. Nevertheless, the present model could be extended using a Brander and Krugman's (1983) to see the foreign country's role in competition policy. This is because could be relaxed the assumption that all consumption is consumed only in the domestic country by introducing a reciprocal model.

Antitrust Policy Rule 3

Under this rule, the only relevant antitrust authority will be the domestic one. Remembering that antitrust policy 3 establish that each national antitrust authority has jurisdiction only over its own market. Then, because of the model's structure the only relevant authority is the domestic one. As can be seen, in figure 3 domestic mergers never occur because the domestic authority always will be able to block such merger. As we have seen, a domestic merger always hurts domestic welfare. Then, the relevant analysis regards foreign mergers.

Focusing at initial point A, we can see that such initial point is unstable; a foreign merger increases domestic welfare so that the domestic antitrust authority will approve a foreign merger as a consequence of the jurisdiction that it has over foreign firms. Foreign firms keep merging until the number of foreign firms becomes equal to one, i.e. $m=1$ (monopoly case). A foreign merger takes place even though it will hurt foreign welfare. On the other hand, the initial points B and C are stable points. For example, consider the initial point B. At this initial point, the domestic authority will turn down the foreign merger since a foreign merger decreases domestic welfare. In consequence, a foreign merger would not occur in the market. The same situation is illustrated at initial point C.
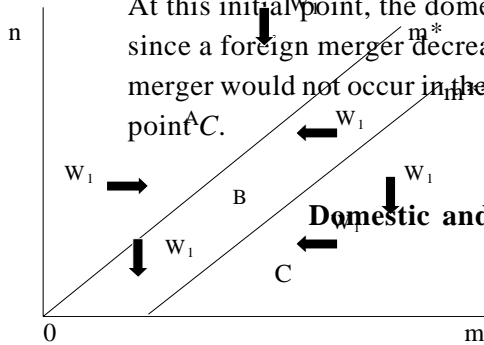
FIGURE 3

Domestic and foreign mergers under rule 3

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We conclude that because of applying the antitrust rule 3 when the domestic country pursues a free trade policy, a foreign merger occurs in the market, and the merger will only be advantageous for the domestic country. Moreover, a domestic merger always hurts domestic welfare, then, the domestic antitrust authority will always block a domestic merger.

Under the implementation of the antitrust policy rule 3, the blocking zone for foreign mergers –when the domestic government pursue a free trade– is determinate by any point to right of critical value m^{**}.

VI.3 ANTITRUST POLICY RULES UNDER OPTIMAL TRADE POLICY

Antitrust Policy Rule 1

Using the critical values from section IV, we can construct a figure for merger policy under optimal trade policy as in the previous free trade section.[19]

Figure 4 shows the diverse initial points derived under the antitrust policy rule 1. Once again, from figure 4 we can see that domestic mergers never occur in the market. The domestic antitrust authority due to its power over such mergers, will always block them since they will always hurt domestic welfare. Then, the relevant analysis concerns foreign mergers.

For example, suppose the initial point B. This initial point is unstable, i.e., foreign firms keep merging until the critical value m''. The domestic authority cannot avoid this process because the lack of jurisdiction over foreign firms. By contrast, the foreign antitrust authority will approve the foreign merger because they increase foreign welfare at this point.

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[19] Recall that critical value is $m'' = 2n + 1 + \sqrt{5n^2 + 6n + 2} > 0$ and is the critical value of equation (34). Further, we saw that this critical value is greater than m^{**}. It could be shown that $m'' - m^{**} = n + \sqrt{5n^2 + 6n + 2} > 0$. This is true where symmetry has been assumed i.e., $c_1 = c_2 = c$.

FIGURE 4
Domestic foreign mergers under rule 1
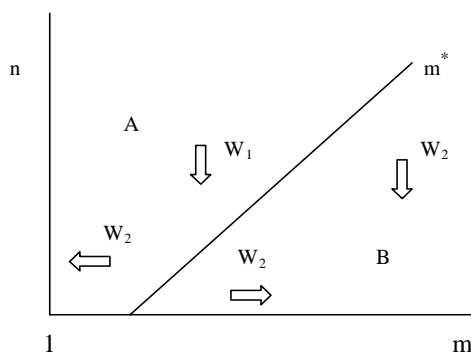
In other words, foreign firms keep merging until the number of foreign firms becomes equal to the critical value *m"*, beyond the critical value a foreign merger will hurt foreign welfare, and thus the foreign competition authority will refuse the foreign merger. Therefore, a foreign merger occurs in the market even though it will hurt domestic welfare.

On the other hand, at initial point *A*, we have a different picture for foreign mergers. This initial point *A* will be stable, i.e., a foreign merger will not take place. Foreign merger decreases foreign welfare so that any foreign merger will be rejected by the foreign competition.

We conclude that under antitrust policy rule, when the domestic country pursues an optimal trade policy, a foreign merger may occur in the market, but it will only be advantageous for the foreign country. Furthermore, a domestic merger never occurs in the market since the domestic competition authority always rejects a domestic merger.

We obtained the same result in the previous section, when the domestic government pursues a free trade policy. However, one important difference is that the blocking zone in the free trade case is smaller than the blocking zone with optimal trade case under antitrust rule 1.[20]

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[20] See figures (1) and (4). This holds only when symmetry has been assumed then *m"* > *m***. In this case, optimal trade policy, the blocking zone is determinate by any value to the left of *m"*.

Antitrust Policy Rule 2

Figure 5 shows that mergers never occur in the market. The domestic competition authority always refuses any kind of concentration. For instance, suppose the initial equilibrium point *B*. Since the domestic competition authority has control over foreign and domestic mergers, the domestic antitrust authority will decline the merger proposed even though it will be positive for the foreign country. Hence, any foreign or domestic merger will not get the approval from the domestic authority at this initial point. Exactly the same situation is in operation at the initial point *A*. Finally, because no merger can take place in the market, the blocking zone for any merger is total.

<div align="center">

FIGURE 5

Domestic and foreign merger effects under rule 2

</div>

We conclude that by implementing the antitrust rule 2 when the domestic country pursues an optimal trade policy, neither a foreign nor a domestic merger obtains approval from the relevant antitrust authority. We obtained the same result when the domestic government pursues a free trade policy.

Antitrust Policy rule 3

As we have seen, implementing the antitrust policy rule number 3, the only relevant competition authority is the domestic one. As shown in figure 6, mergers never take place in the market. A domestic (foreign) merger damages domestic welfare in any initial point therefore the domestic competition authority refuses any kind of merger. In addition, as in the case of rule 2, there is a total conflict situation for domestic and foreign mergers, thus the blocking zone for any merger is total.

FIGURE 6
Domestic and foreign merger under rule 3
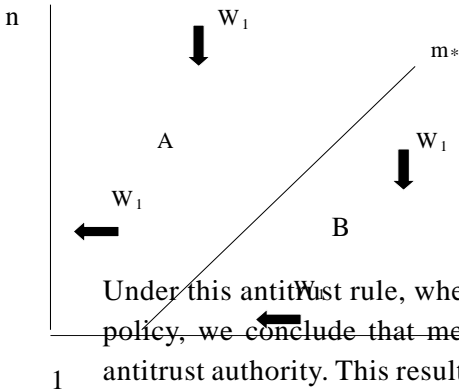
Under this antitrust rule, when the domestic country pursues an optimal trade policy, we conclude that mergers never get the approval from the relevant antitrust authority. This result differs from the analysis under free trade, where we showed that a foreign merger can take place in the market under competition policy rule 3.

Also, from this analysis we can establish another important difference regard to the "blocking zone" for foreign mergers. Obviously, the blocking zone in the free trade case is smaller than in the optimal trade case when the antitrust rule 3 has been implemented. In the latter, the blocking zone is "total".

Based on all preceding arguments, we can conclude that using the antitrust policy rules a foreign merger could be more opportune for the domestic country when it pursues a free trade policy than when it pursues an optimal trade policy. Moreover, the application of the antitrust policy rules makes a domestic competition authority always reject a domestic merger. We showed that a domestic merger always reduces domestic welfare.

These results of course, are extreme cases. Remember that our analysis is based only on "market power" effects. In practice, there could be circumstances where a domestic merger increases domestic welfare. For example, we can think of a situation when a domestic country wants to have very large firms in order to compete effectively against foreign firms. In this case, a domestic merger could contribute to such a task, the domestic government can use antitrust measures to affect the number of firms in its country and thereby grab a larger share of the international market.

VII. TRADE LIBERALIZATION AND ANTITRUST ENFORCEMENT

Our previous results can be used to discuss the effects of trade liberalization on competition policy. By comparing the case of free trade to the case where the domestic government can use its optimal trade policy, we can assess whether trade liberalization leads to tougher or more lenient merger policies.

Antitrust policy rule 1

Implementing the antitrust policy rule 1 we found that in both schemes free trade policy and optimal trade policy, a foreign merger takes place in the market but will only be favourable for the foreign country. However, comparing the blocking zones, we can see that the blocking zone in the free trade case is smaller than the blocking zone in the trade policy case.[21] This suggests that

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[21] Recall that this is true, when symmetry is has been assumed.

antitrust enforcement would be softer regarding international mergers when the domestic government pursues a free trade policy than when it pursues an optimal trade policy. In other words, trade liberalization would lead to a more lenient attitude towards foreign mergers.

On the other hand, by implementing antitrust policy rule 1, domestic mergers never take place since the domestic antitrust authority would always block it. In both cases, under free trade policy or under the optimal trade policy, a domestic merger reduces domestic welfare so that trade liberalization would not change the policy enforcement towards domestic mergers by the domestic antitrust authority.

Antitrust policy rule 2

In both cases under free trade policy or under optimal trade policy, we showed that by implementing antitrust policy rule 2, neither a foreign merger nor a domestic merger occurs in the market. This is because the antitrust authorities would be able to block any kind of merger as a result of their jurisdiction over firms in the market. There is a total blocking zone for domestic and foreign mergers in both free trade case and optimal trade case. Consequently, trade liberalization would not change anything under antitrust policy rule 2.

Antitrust policy rule 3

Implementing antitrust policy rule 3 when the domestic country pursues a free trade policy, we showed that foreign mergers can occur, and such mergers will be only advantageous for the domestic country. Furthermore, we also found that a domestic merger always hurts domestic welfare, so that the domestic antitrust authority will always block a domestic merger.

Alternatively, under optimal trade policy we found a total conflict; mergers never take place since the domestic antitrust authority will always turn down any kind of concentration. Then, in the case of foreign mergers, clearly the blocking zone in the free trade case is smaller than in the optimal trade case.

Consequently, we would expect trade liberalization to lead to a more lenient policy towards international mergers as in the case of antitrust policy 1.

We conclude that trade liberalization would make a softer merger policy approach towards foreign mergers when antitrust policy rules 1 and 3 have been implemented. While in the case of antitrust rule 2, trade liberalization would not change anything. This is because neither a domestic nor a foreign merger can take place since the domestic antitrust authority would always block any merger in the market.

VIII. CONCLUSIONS

In the model presented in this paper, three aspects interact to determine whether or not the relevant antitrust authority will block mergers: the initial number of firms in the industry, the presence of (optimal) trade or free trade policy, and the implementation of the antitrust policy rules.

The model shows that under the antitrust policy rule 1, a foreign merger occurs in the market but will only be advantageous for the foreign country. This conclusion holds whether the domestic government pursues a free trade or pursues an optimal trade policy. Instead, when policy rule 3 applies, a foreign merger may take place, but will only be valuable for the domestic country. This result holds when the domestic country pursues a free trade policy. When the domestic government pursues an optimal trade policy, however, a foreign merger may occur, but will only be beneficial for foreign welfare. Further, when policy rule 2 applies, makes the antitrust enforcement stricter, mergers never occur as a result of the relevant antitrust authority always will have incentive to block the concentration no matter if the domestic government pursues a optimal trade or free trade policy.

On the other hand, the model predicts that domestic mergers never take place, because they always decrease domestic welfare and the relevant antitrust authority (domestic one) will always be able to block any domestic merger. We showed that the effect of an increase in the number of domestic firms on

domestic welfare is positive, and then a domestic merger always redu-
ces domestic welfare. This result of course, is extreme case. In practice,
there could be circumstances where a domestic merger increases domestic
welfare. For example, the introduction of synergies allows such possibility.

Broadly speaking, we found that trade liberalization leads to a softer merger
policy towards foreign mergers: by implementing policy rules 1 and 3, we found
that the blocking zone is bigger when the domestic government pursues a trade
(optimal) policy than in the free trade case. By contrast, implementing policy
rule 2, trade liberalization would not change things.

Another relevant aspect is that the model suggests that international mergers
typically have a beggar-my-neighbour impact on a country, i.e., a merger will
only be beneficial for one of the countries. As we have mentioned above, a
beggar-my-neighbour impact is permitted under the implementation of policy
rules 1 and 3, while in the case of policy rule 2 is not, since merger never
occur.

In the context of policy relevance, this result has the following implication.
The literal prediction of the theory that international mergers may have a beggar-
my-neighbour effect occurs in real world examples. Another policy implication
is that our analysis stresses the need of clear policy rules to determine the
jurisdiction of the antitrust authorities.

The basic assumptions of the model presented in this paper rule out some
features that are relevant for merger policy. We have only concentrated on
market power motives. In practice, market power is not the only aspect taken
in consideration by the antitrust authorities. The introduction of synergies,
differentiated products, coordinated effects, may change the robustness of our
model's predictions.

We believe, however, that our conclusions have some general implications,
i.e. we can expect that some predictions to remain valid. For instance, consider
the Deneckere and Davidson's (1985) price-setting framework. They show
that prices always increase because of the merger, and then consumer surplus
is reduced. Hence, within this context a domestic merger will also always damage
domestic welfare, so that any domestic merger will be blocked just as in our

model. Similarly, in the free trade case, we can expect in this framework that, a foreign merger will increase price, thus will reduce consumer surplus.

In addition, domestic firms' profits and foreign firms' profits will increase. Hence, the domestic country's incentives are of the same nature as in our model. The only significant difference would be that, in a Deneckere-Davidson framework, the foreign country might now favour a merger between its own firms. In contrast, in the case of optimal trade policy we cannot say anything with any accurate about the effect of a foreign merger in a price-setting framework, since such effect will rely heavily on the optimal tariff, which, we know, depends mainly on the type of the imperfect competition considered.[22]

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[22] See Eaton and Grossman (1986).

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APPENDIX

This appendix proves, for the linear case, that the optimal tariff is less than the prohibitive tariff. It can be showed that the explicit form of the prohibitive tariff is given by the following equation:

$$\hat{t} = \frac{(a + nc_1) - (n+1)c_2}{(n+1)} \tag{A.1}$$

Assuming the symmetry case when $c_1 = c_2 = c$ we have that:

$$\hat{t} = \frac{(a - c)}{(n+1)} \tag{A.2}$$

It can be showed that for the linear case the implicit form of the optimal tariff is given by the following equation:

$$t^* = x + \frac{Y}{(n+1)} \tag{A.3}$$

Using the closed form solutions (linear case) the equation (A.3) can be written as:

$$t^* = \frac{(a - c_2)\left[(n+1)^2 - mn\right] + (a - c_1)\left[n(m+1) - n(n+1)\right]}{2(n+1)^2 + m} \tag{A.4}$$

Assuming the symmetry case when $c_1 = c_2 = c$ we have that:

$$t^* = \frac{(a - c)(2n + 1)}{2(n+1)^2 + m} \tag{A.5}$$

It can be easily to show that $\hat{t} - t^* > 0$ so that the optimal tariff is less than the prohibitive tariff.