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Tariffs and Mergers in an Integrated Market

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Abstract

The last few decades have seen a significant reduction in trade barriers, which has brought the international aspects of competition policies into greater prominence. In this paper we explore the effects of tariffs on the profitability and welfare consequences of mergers in a simple model of the integrated world market for a single homogeneous product in which firms differ in their levels of efficiency. The results indicate that trade liberalisation is likely to encourage mergers involving the least efficient firm in the liberalising economy. Whether such mergers are likely to be permitted by national competition authorities depends on the identity of both merger participants.

Outline

1. Introduction
2. The Closed Economy
3. An Integrated World Market
4. Conclusions

Non-Technical Summary

This paper investigates the implications of tariff liberalisation for mergers in an open economy. Two questions are of particular interest. First, what type of merger activity will have been encouraged by the general process of trade liberalisation in the last few decades? Answering this question involves assessing the effects of trade liberalisation on the profitability of mergers to their potential participants. But given that mergers are regulated in most states, a second element must also be considered. Are competition authorities likely to view mergers more or less favourably in a more open economy? Answering this question involves consideration of the effects of trade liberalisation on the welfare costs and benefits of mergers.

A simple model of an integrated international market for a single homogeneous product, in which firms are Cournot competitors and differ in their levels of efficiency, is employed. Demand is linear and firms have constant marginal costs. This structure allows for relatively simple solutions, where the effects of discrete changes in the number of firms (mergers) on profits and welfare can be considered. There are four types of mergers to consider, and profitability conditions and welfare effects in the two countries are derived for each. The possibility of international trade introduces opposing terms of trade effects into the calculations of the national competition authorities. The tariff also introduces a revenue term into the welfare calculations for the importing country.

Tariff liberalisation has two main implications for the profitability of potential mergers, at the margin. First, relatively inefficient firms in the formerly protected market now become more attractive merger partners. Second, mergers involving relatively inefficient firms elsewhere become less attractive. Either way trade liberalisation will generate merger related activity.

How are competition authorities likely to respond? Since all profitable mergers involving importing country firms tend to raise welfare in the exporting country, we would not expect them to be blocked by its competition authority. The competition authority in the importing country may decide to block some mergers, however, since we find that tariff liberalisation has a negative impact on the welfare effect of any marginal merger involving an importing country firm. While tariff liberalisation may make some mergers more profitable at the margin, the hurdle of approval by the competition authority in the liberalising country is also raised at that margin.

The welfare effects of mergers involving only exporting country firms depend on the importance of imports in the liberalising market. The higher this import penetration the more likely the merger is to increase (reduce) welfare in the exporting (importing) country. If there are more foreign firms than domestic firms, trade liberalisation by the importing country will have a positive (negative) impact on the welfare effect of the merger in the exporting (importing) country. Thus whether the merger is more likely to gain approval depends on the degree of involvement of the competition authorities in the two countries.

I Introduction

The objective of this paper is to explore the effects of tariffs on the profitability and welfare consequences of mergers in open economies. The general reduction in trade barriers in the last few decades has brought the international aspects of domestic competition policies into greater prominence, and there now exists a considerable literature on mergers¹, some of it dealing with mergers between firms located in different political jurisdictions. Two questions are of particular interest. First, what type of merger activity, if any, has been encouraged by this general process of trade liberalisation? Answering this question involves assessing the effects of trade liberalisation on the *profitability* of mergers to their potential participants. But given that mergers are regulated in most states, a second element must also be considered. Are competition authorities likely to view mergers more or less favourably in a more open economy? Answering this question involves consideration of the effects of trade liberalisation on the *welfare* costs and benefits of mergers.

The success of international agreements constraining the ability of governments to use trade policies because of their undesirable beggar-thy-neighbour consequences, has raised concern that some governments may be tempted to substitute other policies, competition policy in particular, with similar outcomes. This concern has prompted a literature investigating the links between competition policy and trade policy, where the latter is broadly defined to include import and export taxes and subsidies, and domestic production subsidies. Because this literature focuses on the welfare effects of mergers, the competition policy decision is typically modelled as the choice of the number of identical domestic firms for simplicity. In the standard “cross-hauling” trade model, increasing the number of domestic firms is both import-substituting and export-promoting (Bliss, 1996), and competition policy choices are then influenced by the range of trade policy options available and the sequences in which policy decisions are made. Where countries have symmetric exporting and import-competing interests in the same sector, Horn and Levinsohn (1997) show that there is no unambiguous answer to the question of whether increased foreign competition will lead governments to choose more or less domestic competition².

¹ See Horn and Levinsohn (1997) and WTO Annual Report 1997 for reviews of the literature investigating the links between trade policy and competition policy.

² Horn and Levinsohn are able to rank the optimal numbers of firms for a variety of policy-constrained cases, and find that these rankings are broadly similar for tariff and export subsidy policies. A clearer picture emerges in less symmetric cases: for example the Brander-Spencer profit-shifting model (Rysman, 1999) and the interactions between the importing and the exporting governments in a single market (Cowan, 1989).

There is also a smaller literature that explicitly considers the merger decision in an open economy context³. Salant, Switzer and Reynolds (1983) have shown that identical Cournot-competing firms with constant marginal costs have no incentives to merge in a closed market, unless the participants collectively have a large share of the market pre-merger, or the merger saves on fixed costs⁴. But small tariffs will have rather a limited impact where the incentive to merge is avoiding fixed costs⁵, and so the natural focus in this paper is on firms that differ in their marginal costs. Perry and Porter (1985) introduce an explicit link between marginal cost and firm size through a tangible asset, assumed to be in fixed supply to the industry, whose quantity in the hands of a firm determines its unit costs. Then the merged firm has more of the asset and therefore lower costs⁶.

A somewhat simpler way to introduce inter-firm efficiency and size differences, is to suppose firms have different technologies, reflected in different (constant) marginal costs. In this context, Lahiri and Ono (1988) have shown that the exit of the most inefficient firm can be welfare improving. A merger with a more efficient firm is one mechanism through which this might occur, but this requires that the merger is also profitable to the participants. Long and Vousden (1995) use this structure to investigate the effects of unilateral and bilateral trade liberalisation on the incentives for firms to merge in a world composed of two countries with symmetric segmented markets. They characterise potential mergers in terms of the differences in the pre-merger marginal costs of the participants. The merged firm is assumed to have the lower of these costs. For any given tariff only a range of cost differences generate profitable mergers, and this range shifts with changes in the tariff. They find that a unilateral tariff reduction will increase the profitability of mergers

Richardson (1999) considers the advantages of harmonisation of competition policies, where different governments place different weights on the welfare of their producers and consumers in computing national welfare.

³ Horn and Persson (1999) use a simple model of firm formation to derive the equilibrium competitive structure and the way in which it is related to trade costs.

⁴ This analysis has been extended to non-Cournot behaviour and non-linear demand. See, for example, Deneckere and Davidson (1985), Kwoka (1989) and Fauli-Oller (1997). If a merger is proposed it can be assumed to be profitable to its participants, and so Farrell and Shapiro (1990) focus on its effects on non-participants ("external effects"). Their work has been extended to a multicountry context by Barros and Cabral (1994), who derive conditions on the output shares of participants and non-participants sufficient for the external effects of the merger to be positive.

⁵ Gaudet and Kanomi (2000) consider the incentive that different levels of the tariff provide for a fixed-cost saving domestic merger. The main impact arises when the tariff is large enough to influence the number of foreign competitors in the market.

⁶ This approach has also been extended to a multi-country context. See Horn and Levinsohn (1997) for example. Kabiraj and Chaudhuri (1999) compare the relative profitability and welfare effects of national and cross-border mergers, and show that there exists a range of merger efficiency gains for which a cross-border merger would lead to higher domestic welfare than a national merger.

with small cost differences (mergers which “primarily concentrate on market power” in their terms). In contrast bilateral tariff cuts will increase the profitability of mergers with larger cost differences (mergers which “primarily reduce costs”). They also consider two types of cross-border mergers, each involving a domestic firm and a lower cost foreign firm. In a type I merger, the foreign firm transfers its technology to its domestic partner, and each market is served by the relevant local plant. As might be expected, both bilateral and unilateral tariff cuts reduce the incentives for this “tariff-jumping” merger. In a type II merger, which is also the type considered in this paper, the higher cost domestic firm is simply shutdown. For this form of merger the results from both unilateral and bilateral tariff cuts are qualitatively the same as for a purely domestic merger.

This paper extends the Long and Vousden results by considering the implications of tariff changes for both the profitability and welfare consequences of mergers, in an integrated international market. We employ a simple model of the market for a single homogeneous product, in which firms are Cournot competitors and differ in their levels of efficiency. Demand is linear and firms have constant marginal costs. Unspecified barriers to entry allow the existence of economic profits in equilibrium. This structure allows for relatively simple solutions, where the effects of discrete changes in the number of firms (mergers) on profits and welfare can be considered. The impact of a small tariff change on these effects can then be derived.

Both the profitability and the welfare effects of mergers are influenced by trade policy. With linear demand, a tariff raises the domestic price received by domestic firms, and reduces the domestic price received by foreign firms. These price changes affect equilibrium firm profits and hence the incentives to merge. The results below show that tariff increases generally reduce the incentives for mergers involving relatively inefficient firms in the tariff-imposing country, but increase the incentives for mergers involving relatively inefficient firms in the foreign country, at the margin. Tariffs also tend to make mergers more socially desirable at the margin, at least for the tariff imposing country.

We begin by considering a closed economy, in Section II, in order to illustrate the conditions for the merger to be privately profitable and socially desirable, before introducing the complexities of international exchange. When more than one country is involved, the conditions derived for the closed economy apply only at the aggregate (world) level. Section III considers the effects of a tariff by the home country on the profitability of

mergers between firms in the same country (national mergers) and in different countries (international mergers), when the world market is integrated. The final section presents a summary and conclusions.

II The Closed Economy⁷

Consider an economy in which a small number ($n \geq 3$) of firms produce a homogeneous product. Each firm (j) has constant unit costs (c_j) and no fixed costs. Unit costs differ across firms, and firms are ordered so that $k > j$ implies $c_k > c_j$. Competition in this market is assumed to be Cournot. Total demand is given by

$$D = A - p \quad (1)$$

where A is a positive constant, and p is price. Firm j therefore chooses its output (x_j) to $\max p_j = [p - c_j] \cdot x_j$, taking $dp/dx_j = -1$. Solving the first order conditions for optimal firm output, summing these to obtain total output (X), and then substituting in (1), gives the equilibrium values:

$$p = \frac{A + C}{n + 1}; x_j = p - c_j; p_j = [p - c_j]^2 = x_j^2 \quad (2)$$

where $C = \sum_{j=1}^n c_j$. Total benefits (W) from this market are the sum of consumer surplus (CS) and firms' profits (Π)

$$W = CS + \sum_j p_j = \frac{D^2}{2} + \sum_{j=1}^n x_j^2 \quad (3)$$

When two firms in this market (k and j) "merge", they become a single decision making unit. Given that the merger itself has no effect on the technology of the participants, cost minimisation by the new merged firm implies the abandonment of firm k 's (relatively inefficient) technology, and the new market equilibrium is simply that which obtains with the closure of firm k ⁸. Total output falls, the market price rises, the profits of the remaining firms rise and consumer surplus falls⁹. Consumers lose from the merger, and non-participating producers gain. The incentive to merge is the additional profits that may accrue to the merged firm as a result of the higher price.

⁷ The model in this section is discussed in more detail in Falvey (1998).

⁸ Note that by assuming a fixed number of firms we intend to preclude the divisionalisation process whereby firms may gain by splitting into separate identical production decision making units. Were divisionalisation possible, the merged firm might then increase its total profits by operating as two or more units, particularly if all had access to the technology of the more efficient partner. See Ziss (2001). In common with much of the literature in this area, we take the initial number of firms and their technologies as given.

⁹ Farrell and Shapiro (1990) provide the conditions for output to fall under more general assumptions.

To illustrate, consider the effects of a merger between firm 1 (that with the most efficient technology) and firm n (that with the least efficient). The shift to the new post-merger equilibrium (where variables are denoted by sub- or super-script m , and with $\Delta p = p_m - p$ etc.) has

$$\Delta p = \frac{x_n}{n}; \quad \Delta x_j = \frac{x_n}{n}, j = 1, \dots, n-1; \quad \Delta D = \Delta X = -\frac{x_n}{n} \quad (4)$$

The closure of firm n results in an increase in the output of each of the remaining firms. Given our assumptions of linearity and constant marginal costs, their outputs rise by the same absolute amount, which is one n th of the closing firm's original output. Since only $n-1$ firms remain, total output falls (by x_n/n), and price rises (also by x_n/n).

The change in profits of continuing firm j is the increased profits on its original output plus the profits from its increased output

$$\Delta p_j = \Delta p \cdot x_j + [p_m - c_j] \frac{x_n}{n}$$

which can be rearranged to give

$$\Delta p_j = \Delta p \cdot x_j^m + [p - c_n] \frac{x_n}{n} + [c_n - c_j] \frac{x_n}{n}$$

In this expression the first two terms are transfers (from consumers and profits from the closing firm respectively). The third term is the increased profit resulting from the greater efficiency of this firm relative to the closing firm, and only this term represents a social gain. Substituting from (4)

$$\Delta p_j = \frac{x_n}{n} [2x_j + \frac{x_n}{n}] = 2 \cdot \Delta p \cdot \bar{x}_j > 0 \quad (5)$$

where $\bar{y} = [y + y^m]/2$ denotes the average of the pre- and post-merger values of any variable y .

This merger will have been profitable for the participants only if the increase in profits to firm 1 exceed the lost profits of the closed firm. Substituting from (5), this *Gain* (G) is

$$G = \Delta p_1 - p_n = 2 \cdot \Delta p \cdot [\bar{x}_1 - x_n \frac{n}{2}] = 2 \cdot \Delta p \cdot [x_1 - x_n g(n)] > 0 \quad (6)$$

where $g(n) = \frac{n}{2} - \frac{1}{2n} > 1$. Equation (6) provides a condition on relative firm sizes (or relative shares of output) for a profitable merger

$$\frac{x_1}{x_n} > g(n) \quad (7)$$

Given x_n , the larger is the number of firms the smaller the increase in output for the partner (and every other) firm and the smaller the price increase. Hence the larger the required initial output of the partner if the merger is to yield a net gain. We therefore expect mergers to involve large and small firms; the largest and the smallest firms in particular¹⁰.

The change in aggregate welfare (ΔW) as a result of this merger can be derived from equations (3) and (4). The change in consumer surplus has two components, both negative

$$\Delta CS = -\Delta p \cdot D_m + \Delta p \cdot \frac{\Delta D}{2}$$

The first term is the *transfer* from consumers to firms as a result of the price rise, and the second term is the consumption *deadweight loss*. Substituting from (4)

$$\Delta CS = -\frac{x_n}{n} [D_m + \frac{x_n}{2n}] = -\Delta p \cdot \bar{D} < 0 \quad (8)$$

The larger is x_n the larger the consumer surplus loss. The change in total profits is

$$\Delta \Pi = G + \sum_{j=2}^{n-1} \Delta p_j$$

A positive net gain to the merging firms is sufficient for total profits to increase (since $\Delta \pi_j > 0$; $j = 2, \dots, n-1$). The overall change in profits has three components

$$\Delta \Pi = \Delta p \cdot X_m + \sum_{j=1}^{n-1} \frac{x_n}{n} [c_n - c_j] + [p - c_n] \Delta X$$

The first two terms (the *transfer* from consumers and the *efficiency gain* from redistributing output to lower cost firms), are both positive. The final term is the *lost profit* on the discontinued output. Substituting from (4) allows us to write

¹⁰ Given x_n , $\frac{\partial G}{\partial x_1} = \frac{2x_n}{n} > 0$, so that the optimal merger partner for the least efficient firm is the largest

firm. But given x_1 , $\frac{\partial G}{\partial x_n} = \frac{1}{n} \cdot [x_1 - 2x_n \cdot g(n)]$, and $\frac{d^2 G}{dx_n^2} = -\frac{4 \cdot g(n)}{n} < 0$, so the optimal merger partner

for the largest firm has an output of $\frac{x_1}{2 \cdot g(n)}$. Thus a sufficient condition for a merger to involve the largest

and smallest firms is that $x_n \geq \frac{x_1}{2 \cdot g(n)}$, or $\frac{x_1}{x_n} \leq n - \frac{1}{n}$.

$$\Delta\Pi = \frac{x_n}{n} X_m + \frac{x_n}{n} [X - nx_n] - x_n \left[\frac{x_n}{n} \right] = \Delta p \{ 2\bar{X} - x_n [1 + n] \} \quad (9)$$

The change in total welfare is then

$$\Delta W = \Delta p [X_m - D_m] + \Delta p \frac{\Delta D}{2} + [p - c_n] \Delta X + \frac{x_n}{n} [X - nx_n]$$

The first term (the net transfer) is zero, the second term (the consumption deadweight loss) is negative, as is the third term (the lost profits). Only the final term (the efficiency gain) is positive.

These are the general welfare effects to be considered when deciding whether to allow the merger to proceed. In the specific model used here, substitution from (8) and (9) gives

$$\Delta W = \Delta p \{ \bar{X} - x_n [1 + n] \} = \Delta p \cdot [X - x_n b(n)], \quad (10)$$

where $b(n) = 1 + n + \frac{1}{2n}$. Equation (10) provides a competition authority with a simple condition for welfare improvement that depends only on the share of the closing firm and the number of firms – i.e.

$$\Delta W \begin{cases} > \\ < \end{cases} \text{ as } \begin{cases} x_n < \\ X > \end{cases} \frac{1}{b(n)} \quad (11)^{11}$$

As Lahiri and Ono (1988) have pointed out, the elimination of a minor firm has two opposing effects on welfare in an oligopoly with different technologies. It improves average efficiency, yet at the same time creates a more oligopolistic market structure. But provided the market share of the minor firm is not too large, net welfare can increase as a consequence of its closure.

III An Integrated World Market

We now suppose the world market is composed of two countries (home and foreign), both similar to the closed economy considered above, and where foreign variables are denoted with an asterisk. Since our objective is to investigate the effects of trade interventions on the profitability and welfare consequences of mergers at the margin, we construct the

¹¹ Alternatively, one can follow Farrell and Shapiro (1990) and focus on the impact of the merger on the welfare of non-participants (consumers and other firms). Letting subscript o denote these outsiders, then

$$\Delta W_o = \Delta CS + \sum_{j=2}^{n-1} \Delta p_j = \frac{x_n}{N} \{ X_o - [x_1 + x_n] + [2n - 3] \frac{x_n}{2n} \}.$$

Assuming that the merger benefits the participants, then, as Farrell and Shapiro's results imply, a *sufficient* condition for total welfare to increase is that the initial output of the participants ($x_1 + x_n$) be less than the initial output of the non-participants (X_o).

market equilibrium assuming a small specific tariff of t per unit is imposed by the home country, which would be an importer in free trade.

We assume an *integrated world market*, where there are no transport costs and costless arbitrage between markets is possible. Arbitrage activities will occur if the deviation in prices in the two markets ever exceeds the relevant tariff (i.e. if $p > p^*+t$, or $p^* > p$). Changing a tariff will then affect the equilibrium in both markets.

The determination of the market equilibrium is modelled as a two-stage game. In the first stage, firms determine their sales in each market, taking each others' sales as given. In the second stage, arbitrage activity occurs if the first stage decisions generate a price differential between the two markets that exceeds the relevant tariff. The activities of profit-seeking private arbitrageurs will generate a volume of arbitrage (R) which ensures that $p - p^* \leq t$.

Let h_j, f_j (h_j^*, f_j^*) denote the sales of home (foreign) firm j in the home and foreign markets respectively, and let n and n^* be the numbers of home and foreign firms. Market clearing in the second stage then requires that

$$p = A - [H + H^*] - R; \quad p^* = A^* - [F + F^*] + R \quad (12)$$

where $H = \sum_{j=1}^n h_j$ etc. The non-profitability of further arbitrage in equilibrium (i.e. $p = p^*+t$)

implies that

$$R = \frac{A - A^* + [F + F^*] - [H + H^*] - t}{2} \quad (13)$$

In the first stage, the j th home firm's optimisation problem, taking account of the possibility of arbitrage activity in the second stage, is:

$$\max_{h_j, f_j} p_j = [p - c_j] \cdot h_j + [p^* - c_j] \cdot f_j$$

where p , p^* and R are as determined by (12) and (13). Each firm takes the outputs of other firms as given, but recognises the implications of its own choices for (future) arbitrage activity. The first order conditions for this problem are:

$$h_j \geq 0; \frac{\partial p_j}{\partial h_j} \leq 0; h_j \cdot \frac{\partial p_j}{\partial h_j} = 0 \quad \text{and} \quad f_j \geq 0; \frac{\partial p_j}{\partial f_j} \leq 0; f_j \cdot \frac{\partial p_j}{\partial f_j} = 0 \quad (14)$$

As long as the tariff is below that which eliminates arbitrage we have:

$$\frac{\partial p_j}{\partial h_j} = [p - c_j] - \left[\frac{h_j + f_j}{2}\right]; \quad \text{and} \quad \frac{\partial p_j}{\partial f_j} = [p^* - c_j] - \left[\frac{h_j + f_j}{2}\right]$$

Since $p = p^* + t > p^*$, the solution to (14) is $h_j = 2.[p - c_j], f_j = 0$, with $\pi_j = \frac{h_j^2}{2}$.

The corresponding optimisation problem for the j th foreign firm

$$\max_{h_j^*, f_j^*} \rho_j^* = [p - t - c_j^*]h_j^* + [p^* - c_j^*]f_j^*$$

yields equivalent first order conditions, with

$$\frac{\partial \rho_j^*}{\partial h_j^*} = [p - t - c_j^*] - \left[\frac{h_j^* + f_j^*}{2}\right]; \quad \text{and} \quad \frac{\partial \rho_j^*}{\partial f_j^*} = [p^* - c_j^*] - \left[\frac{h_j^* + f_j^*}{2}\right]$$

Since $p - t = p^*$ these two conditions are identical, giving solution

$$h_j^* + f_j^* = x_j^* = 2.[p^* - c_j^*], \quad \text{and} \quad \pi_j^* = \frac{[x_j^*]^2}{2}.$$

Thus profit maximisation yields an equilibrium which has home firms selling only in the home market, while foreign firms are indifferent as to where they sell (in the absence of transport costs), and the equilibrium prices are

$$p = p_0 + \frac{[2n^* + 1]}{2[N + 1]}t; \quad p^* = p_0 - \frac{[2n + 1]}{2[N + 1]}t \quad (15)$$

where $p_0 = \frac{A + A^* + 2[C + C^*]}{2[N + 1]}$ is the free trade price in both markets, and $N = n + n^*$ is the total number of firms¹².

We now consider mergers involving the closure of home or foreign firms n and n^* respectively. The consequent changes in prices in the two markets are given by:

$$\Delta p(n) = \Delta p^*(n) = \frac{h_n}{2N}; \quad \text{and} \quad \Delta p(n^*) = \Delta p^*(n^*) = \frac{x_n^*}{2N}$$

The changes in profits of the (non-closing) j th firm in each market are

$$\Delta \rho_j = 2\Delta p.[h_j + \Delta p]; \quad \Delta \rho_j^* = 2\Delta p^*.[x_j^* + \Delta p^*]$$

¹² We are assuming that t is not so large as to drive any foreign firm from the home market. The home country will be a net importer in free trade if $[2n^* + 1].[A + 2C] > [2n + 1].[A^* + 2C^*]$. Imports under the tariff are

$M_0 - \frac{[2n + 1][2n^* + 1]}{2.[N + 1]}t$, where M_0 denotes (net) imports under free trade.

The impact of a change in the tariff on the gains from the merger and on the merger's welfare effects can then be calculated. There are four possible mergers to consider, and in each case the gains from the merger and its welfare effects in the two countries can be factorised so as to isolate a term involving the change in price – i.e.

$$G(\cdot) = 2\Delta p(\cdot)g(\cdot); \Delta W(\cdot) = \Delta p(\cdot)I(\cdot) \text{ and } \Delta W^*(\cdot) = \Delta p^*(\cdot)I^*(\cdot) \quad (16)$$

Although the impact of the tariff change is often ambiguous overall, its impact at the margin can be derived using (16), and

$$\frac{d\Delta p(n)}{dt} = \frac{d\Delta p^*(n)}{dt} = \frac{1}{N} \frac{dp}{dt} > 0; \frac{d\Delta p(n^*)}{dt} = \frac{d\Delta p^*(n^*)}{dt} = \frac{1}{N} \frac{dp^*}{dt} < 0 \quad (17)$$

A higher tariff means a higher output for home firm n and a lower output for foreign firm n^* in the pre-merger equilibrium. This implies that a merger that closes firm n (n^*) will lead to larger (smaller) price increases¹³.

[A] *A National Merger in the Importing Country.*

In an integrated world market, the gains from a merger between home firms are $G(1, n) = 2\Delta p(n)g(1, n)$, where $g(1, n) = [h_1 - h_n g(N)]$ which, not surprisingly, has the same format as the corresponding expression for this merger in the closed economy (see equation (6)). Then

$$\frac{dG(1, n)}{dt} = 2 \cdot \left\{ \gamma(1, n) \cdot \frac{d\Delta p(n)}{dt} + \Delta p(n) \cdot \frac{d\gamma(1, n)}{dt} \right\} \quad (18A)$$

with $\frac{d\Delta p(n)}{dt} > 0$ from (17), and $\frac{d\gamma(1, n)}{dt} < 0$ ¹⁴. While the sign of (18A) is indeterminate in general, it is negative where the merger was initially unprofitable ($g(1, n) \leq 0$). Because the tariff generates the same increase in output of both merger participants, what would have been a marginally profitable merger prior to the tariff increase becomes unprofitable subsequently.

¹³ Our assumptions of linear demand and a specific tariff considerably simplify the analysis that follows. Collie (1998) shows that a specific or ad valorem tariff has an (indirect) demand induced rationalisation effect on production as it moves the industry up its demand curve thereby making demand flatter (steeper) if demand is concave (convex). This affects both domestic and foreign firms, with output of the j th firm increasing by more than the average if demand is concave (convex) and it is larger (smaller) than average. Ad valorem tariffs also have a direct rationalisation effect by making the foreign firms' perceived demand curves flatter. This does not affect domestic firms.

¹⁴ $\frac{d\gamma(1, n)}{dt} = [1 - g(N)] \cdot \frac{dp}{dt} < 0$.

The effects of a merger between two domestic firms on welfare in the home (tariff-imposing) country are given by

$$\Delta W = -\Delta p(n) \cdot \bar{D} + \left\{ \sum_{j=1}^{n-1} \Delta p_j - p_n \right\} + t \cdot \Delta[D - H] \quad (19A)$$

The three terms on the right are respectively, the changes in consumer surplus (a loss); the change in aggregate home profits (a gain for a profitable merger); and the change in tariff revenue (a gain since imports increase). To investigate the impact of a tariff increase on this welfare change, it is useful to consider each of these terms individually.

A tariff increase has two opposing effects on the change in consumer surplus. By increasing the domestic price, the tariff raises the output of the closing firm, and hence increases the magnitude of the price rise that follows the merger. However, the same tariff-induced price increase reduces the consumption base to which the merger-induced price increase is applied. In this case, the consumer surplus loss increases on balance, since

$$\frac{d[\Delta p(n) \cdot \bar{D}]}{dt} = \frac{1}{N} \left\{ D - \frac{h_n}{2} \left[1 + \frac{1}{N} \right] \right\} \cdot \frac{dp}{dt} > 0.$$

The effects of a tariff increase on the change in aggregate profits to domestic firms following the merger is best considered in two steps. First, the effect on the profit change of non-closing firm j is given by

$$\frac{d[\Delta p_j]}{dt} = \frac{d[2\Delta p(n) \cdot h_j]}{dt} = \frac{1}{N} \left\{ h_j + h_n \left[1 + \frac{1}{N} \right] \right\} \cdot \frac{dp}{dt} > 0.$$

A higher tariff generates a larger profit increase for this firm because it raises both the merger-induced price increase and the average output of the firm. The corresponding effect on the initial profits of the closing firm is given by

$$\frac{dp_n}{dt} = h_n \cdot \frac{dp}{dt} > 0.$$

Combining these expressions we have

$$\frac{d\Delta\Pi}{dt} = \frac{1}{N} \left\{ H - \frac{[n^* + 1] \cdot [N + 1]}{N} h_n \right\} \cdot \frac{dp}{dt}$$

whose sign is ambiguous in general. The tariff increase raises the profit gains of the non-participants, however, since

$$\frac{d\Delta\Pi}{dt} = \frac{dG(1, n)}{dt} + \sum_{j=2}^{n-1} \frac{d\Delta p_j}{dt} = \frac{dG(1, n)}{dt} + \frac{1}{N} \left[H - h_1 + \frac{h_n}{N} \right] \cdot \frac{dp}{dt}.$$

A merger which closes the least efficient home firm reduces both domestic consumption and production of this product, but the latter more than the former, so that imports, and hence tariff revenue, increase. This is shown by

$$t.\Delta[D - H] = t.\Delta p(n).[2n^* + 1] > 0$$

An increase in the tariff rate then raises this revenue gain from the merger by increasing both t and $\Delta p(n)$.

The net impact of a tariff increase on the welfare effects of this merger can be found by combining these individual terms. Since the consumer surplus loss is larger, aggregate profits may rise or fall, and the revenue gain increases, the overall outcome is ambiguous in general. One can say more at the margin, however. Equation (19A) can be rewritten in a form more comparable to the closed economy expression derived above

$$\Delta W(1, n) = -\Delta p(n).[\bar{D} - \bar{H}] + \Delta p(n).\{\bar{H} - [1 + N].h_n\} + t.\Delta[D - H]$$

This expression highlights additional welfare effects present in the trade restricted open economy. The second term corresponds to the welfare (efficiency) effect in the closed economy (see equation (10)). The first term on the right captures the terms-of-trade loss of the importing home country (since the merger raises the cost of imports), while the final term is the tariff revenue effect as before. The first and third terms (which are zero in the closed economy), indicate two additional elements to the welfare analysis of mergers that arise in an open economy.

This equation can be rearranged as

$$\Delta W(1, n) = \Delta p(n).I(1, n) \tag{20A}$$

$$\text{Then } \frac{d\Delta W(1, n)}{dt} = I(1, n).\frac{d\Delta p(n)}{dt} + \Delta p(n).\frac{dI(1, n)}{dt} \tag{21A}$$

where $\frac{d\Delta p(n)}{dt} > 0$, and $\frac{dI(1, n)}{dt} > 0$. If this merger would have a non-negative effect on welfare at one tariff level (i.e. $I(1, n) \geq 0$), it will have a positive effect on welfare at a higher tariff level. The range of mergers that are likely to be approved expands with a higher tariff.

We can perform a similar welfare analysis for the exporting country. This merger involving two home firms gives¹⁵

$$\Delta W^*(1, n) = -\Delta p^*(n) \cdot \bar{D}^* + \sum_{j=1}^n \Delta \pi_j^* = \Delta p^*(n) \cdot [\bar{X}^* - \bar{D}^*] + \Delta p^*(n) \cdot \bar{X}^* > 0 \quad (23A)$$

Foreign firms gain, and foreign consumers lose as a result of the merger, but because this country is a net exporter the terms of trade gain ensures a net gain overall for any small tariff. A foreign competition authority with national welfare as its criterion would not oppose this merger¹⁶.

We are now in a position to consider the effects of trade liberalisation on the incentives for this merger. Given that this merger was either unprofitable or disallowed in the initial equilibrium, will a tariff cut make it more likely to be proposed and approved? There are two initial conditions to consider:

(AU) The merger was marginally unprofitable to the participants (i.e. $G(1, n) \approx 0$). From (18A) above trade liberalisation may then make the merger profitable and hence proposed by the participants. Initially $\Delta W(1, n)$ may have had either sign, and the impact of a tariff cut on the home welfare effect is ambiguous in general, as noted above. However, at the margin (where $\Delta W(1, n) \approx 0$) a tariff cut will have a negative impact and in this sense makes approval by the home competition authority less likely. Although the foreign competition authority may have a very limited role in what is a purely domestic merger in a non-exporting country, it would not oppose this merger.

(AD) The merger was profitable to participants, but marginally disallowed by the home competition authority (i.e. $G(1, n) \geq 0$ and $\Delta W(1, n) \approx 0$). While the tariff cut may increase or reduce the gain from the merger, it will not turn a profitable merger unprofitable¹⁷. Its impact on the welfare effect of the merger is negative at the margin, as noted in the previous case, so that a small tariff reduction makes approval by the home competition authority even less likely. The foreign competition authority would approve the merger at all tariff levels.

¹⁵ Using $\Delta p_j^* = 2 \cdot \Delta p^* \cdot \bar{x}_j$ and $\Delta p = \Delta p^* = \frac{h_n}{2N}$.

¹⁶ The impact of a home tariff increase on this foreign welfare gain is ambiguous in general, but it remains a gain.

¹⁷ Sign $G(1, n) = \text{sign } \gamma(1, n)$, and $\frac{d\gamma(1, n)}{dt} < 0$.

[B] An International Merger that closes an Importing Country Firm¹⁸

For this merger $g(1^*, n) = [x_1^* - h_n g(N)]$, and $\frac{dg(1^*, n)}{dt} < 0$ ¹⁹. Then

$$\frac{dG(1^*, n)}{dt} = 2 \cdot \left\{ \gamma(1^*, n) \cdot \frac{d\Delta p(n)}{dt} + \Delta p(n) \cdot \frac{\gamma(1^*, n)}{dt} \right\} \quad (18B)$$

which is again negative for an initially unprofitable merger (where $g(1^*, n) \leq 0$). In this case the home tariff increase raises the output (and profits) of the closing firm and reduces the output (and profits) of its potential partner. Taking this with the outcome in case A, we conclude that a tariff (increase) reduces the profitability of all marginal mergers involving the least efficient domestic firm.

The effects on home welfare of this merger follow directly from the case just considered, since

$$\Delta W(1^*, n) = \Delta W(1, n) + p_n + e = \Delta W(1, n) + \Delta p(n) \cdot N h_n + e > \Delta W(1, n) \quad (19B)$$

where $p_n + e$, ($e \geq 0$) is the compensation paid by the foreign partner to the owners of the closing home firm. If the home competition authority would approve merger (1, n), it would approve merger (1*, n). The competition authority in the importing country is more likely to approve an international than a national merger that closes a national firm (the domestic market effects are the same, but the international merger involves a transfer gain). Following the procedure used above, one can write

$$\Delta W(1^*, n) = \Delta p(n) \cdot I(1^*, n) + e \quad (20B)$$

where $I(1^*, n) = I(1, n) + N h_n$, and $\frac{dI(1^*, n)}{dt} > 0$. Again, if the merger had been on the borderline of approval before the tariff increase, it would be approved after the tariff is raised.

In the foreign country, the merger-induced change in welfare is smaller by the compensation paid to the closing home firm – i.e.

$$\Delta W^*(1^*, n) = \Delta W^*(1, n) - [p_n + e] \quad (23B)$$

which can be rewritten to highlight the effects on non-participants, as

¹⁸ Our assumption of a small tariff implies that $c_1^* + t < c_n$, so that there is no “tariff jumping” argument for maintaining production at the importing partner plant.

¹⁹ Since $\frac{dp}{dt} > 0$; $\frac{dp^*}{dt} < 0$ and $\frac{d\gamma(1^*, n)}{dt} = \frac{dp^*}{dt} - g(N) \cdot \frac{dp}{dt} < 0$.

$$\Delta W^*(1^*, n) = \Delta p^*(n) \cdot I_o^*(1^*, n) + G(1^*, n)$$

where $I_o^*(1^*, n) = [\bar{X}^* - \bar{D}^*] + [\bar{X}^* - 2\bar{x}_1^*]$ and $\frac{dI_o^*(1^*, n)}{dt} < 0$. A merger that is profitable to the participants will also be welfare increasing for the exporting country, provided its non-participating firms are not too small (i.e. $2\bar{X}_o^* > \bar{D}^*$, where X_o^* is the total output of the other foreign firms).

Turning to the impact of trade liberalisation on the likelihood of mergers, we first note that with an international merger, both competition authorities must approve if the merger is to go ahead. Again we have two cases to consider.

(BU) The merger was initially unprofitable to the potential participants ($G(1^*, n) \leq 0$). Then trade liberalisation may make the merger profitable, (from (18B)). As noted, this merger is more likely to be approved by the home competition authority than the corresponding national merger, but again the tariff cut has a negative impact on the home welfare effect at the margin (where $\Delta W(1^*, n) \approx 0$ initially). The foreign competition authority is likely to approve a proposed merger, since the benefits to foreign non-participants are likely to be positive and are increased by a home tariff cut at the margin (where $I_o^*(1^*, n) \approx 0$).

(BD) The merger was profitable to participants, but was disallowed by the home competition authority. Again the tariff cut will not turn the merger unprofitable²⁰, and its impact on home welfare is ambiguous in general. But at the margin ($\Delta W(1^*, n) \approx 0$), $\frac{d\Delta W(1^*, n)}{dt} > 0$, so that a small tariff cut makes approval by the home competition authority less likely.

[C] *An International Merger that closes an Exporting Country Firm*

We have shown that a tariff cut raised the profitability of mergers that close the least efficient firm in the importing country. It turns out that the opposite conclusion applies to mergers involving the least efficient foreign firm. A merger between it and the most efficient home firm has $G(1, n^*) = 2\Delta p(n^*) \cdot g(1, n^*)$, where $g(1, n^*) = [h_1 - x_n^* g(N)]$. Then

²⁰ Sign $G(1^*, n) = \text{sign}[x_1^* - h_n g(N)]$, and a tariff cut increases x_1^* but reduces h_n .

$$\frac{dG(1, n^*)}{dt} = 2 \cdot \left\{ \gamma(1, n^*) \frac{d\Delta p(n^*)}{dt} + \Delta p(n^*) \frac{d\gamma(1, n^*)}{dt} \right\} \quad (18C)$$

with $\frac{d\Delta p(n^*)}{dt} < 0$ from (17), and $\frac{d\gamma(1, n^*)}{dt} > 0$ ²¹. Any merger profitable at one tariff level is also profitable at higher tariff levels²², and a tariff increase raises the profitability of any initially unprofitable merger by increasing the continuing home firm's output and profits and reducing the closing foreign firm's output and profits, prior to the merger.

The effects of this merger on home welfare are given by

$$\Delta W(1, n^*) = -\Delta p(n^*) \cdot \bar{D} + \sum_{j=1}^n \Delta p_j + t \cdot \Delta[D - H] - [p_n^* + e^*] \quad (19C)$$

which reduces to

$$\Delta W(1, n^*) = -\Delta p(n^*) \cdot [\bar{D} - \bar{H}] + \Delta p(n^*) \cdot \{\bar{H} - Nx_n^*\} + t \cdot \Delta[D - H] - e^*$$

with interpretations as before. The signs of some components, and the effects of the tariff change on them differ, however. In this case a higher tariff reduces the price increase generated by the merger (since it reduces the initial output of the closing foreign firm), and the merger reduces imports and hence tariff revenue²³. While the implications of a tariff change for the welfare effects of this merger continue to be ambiguous in general, (19C) can be rewritten to focus on changes at the margin as

$$\Delta W(1, n^*) = \Delta p(n^*) \cdot I(1, n^*) - e^* \quad (20C)$$

Then

$$\frac{d\Delta W(1, n^*)}{dt} = I(1, n^*) \frac{d\Delta p(n^*)}{dt} + \Delta p(n^*) \frac{dI(1, n^*)}{dt} \quad (21C)$$

where $\frac{dI(1, n^*)}{dt} > 0$. A merger that raises welfare at one tariff level also raises welfare at higher tariff levels²⁴. Since (21C) is positive if the merger is initially welfare reducing

²¹ $\frac{d\gamma(1, n^*)}{dt} = \frac{dp}{dt} - 2g(N) \frac{dp^*}{dt} > 0$.

²² Sign $G(1, n^*) = \text{sign} \cdot \gamma(1, n^*)$, and $\frac{d\gamma(1, n^*)}{dt} > 0$.

²³ $\Delta[D - H] = -\Delta p(n^*) \cdot [2n + 1] < 0$

²⁴ Sign $\Delta W(1, n^*) = \text{sign} I(1, n^*)$, and $\frac{dI(1, n^*)}{dt} > 0$.

(i.e. $I(1, n^*) \leq 0$), a merger that is marginal at one tariff level, will have a positive effect on welfare at a higher tariff level.

The effects of this merger on foreign welfare are

$$\Delta W^*(1, n^*) = -\Delta p^*(n^*) \cdot \bar{D}^* + \sum_{j=1}^{n^*} \Delta p_j^* - p_n^* + [p_n^* + e] = \Delta p^*(n^*) \cdot I^*(1, n^*) + e \quad (23C)$$

where $I^*(1, n^*) = [\bar{X}^* - \bar{D}^*] + [\bar{X}^* - x_n^*] > 0$, and $\frac{dI^*(1, n^*)}{dt} < 0$. Again the foreign country gains from this merger because it is a net exporter and its terms of trade improve, and because of the transfer to the closing firm. Using

$$\frac{d\Delta W^*(1, n^*)}{dt} = I^*(1, n^*) \cdot \frac{d\Delta p^*(n^*)}{dt} + \Delta p^*(n^*) \cdot \frac{dI^*(1, n^*)}{dt}$$

we see that a home tariff increase unambiguously reduces the foreign welfare gain from this merger, because it reduces the price increase, initial exports and the transfer.

Turning to the effects of trade liberalisation on the likelihood of merger, our two cases are.

(CU) The merger is initially unprofitable. From (18C), trade liberalisation by the home country will reduce the profitability of this merger, and hence it is unlikely to be proposed.

(CD) The merger is profitable but initially disallowed by the home competition authority. Even if the merger remains profitable after the tariff cut, the latter makes its impact on home welfare more negative and hence less likely to be permitted.

[D] A National Merger in the Exporting Country.

In this case $G(1^*, n^*) = 2\Delta p(n^*) \cdot g(1^*, n^*)$, where $g(1^*, n^*) = x_1^* - x_n^* \cdot g(N)$ and

$$\frac{dg(1^*, n^*)}{dt} = 2[1 - g(N)] \frac{dp^*}{dt} > 0, \text{ since the outputs of both participants fall by the same}$$

amount. An initially profitable merger will remain profitable at a higher home tariff²⁵.

Further

$$\frac{dG(1^*, n^*)}{dt} = 2 \cdot \left\{ \gamma(1^*, n^*) \frac{d\Delta p(n^*)}{dt} + \Delta p(n^*) \frac{d\gamma(1^*, n^*)}{dt} \right\} \quad (18D)$$

²⁵ Sign $G(1^*, n^*) = \text{sign } \gamma(1^*, n^*)$, and $\frac{d\gamma(1^*, n^*)}{dt} > 0$.

which is positive for an initially unprofitable merger ($g(1^*, n^*) \leq 0$). We conclude that a home tariff (increase) raises the profitability of mergers involving the least efficient foreign firm, at the margin.

Unfortunately in this case we are limited in the conclusions that we can draw concerning the welfare effects of the merger, and the impact of a change in the home tariff on them. The effects on home welfare are given by

$$\Delta W(1^*, n^*) = -\Delta p(n^*) \cdot \bar{D} + \sum_{j=1}^n \Delta p_j + t \cdot \Delta[D - H] = \Delta p(n^*) \cdot I(1^*, n^*) \quad (19D)$$

where $I(1^*, n^*) = -[\bar{D} - \bar{H}] + \bar{H} - t \cdot [2n + 1]$. The merger raises home profits, but worsens the home terms of trade and reduces tariff revenue. A sufficient condition for home welfare to fall is that imports have the major share of the home market on average (i.e. $\bar{D} - \bar{H} \geq \bar{H}$)²⁶. Similarly $\frac{dI(1^*, n^*)}{dt}$ can be positive or negative depending on the relative number of firms²⁷, and we cannot predict the impact of a tariff increase on the welfare effects of a merger even at the margin. But note that the home competition authority may have only a limited role in deciding on this merger, whose participants are both foreign, particularly since the output of neither participant may be exported.²⁸

The effects of this merger on foreign welfare are given by

$$\Delta W^*(1^*, n^*) = -\Delta p^*(n^*) \cdot \bar{D}^* + \sum_{j=1}^{n^*-1} \Delta p_j^* - p_n^* = \Delta p^*(n^*) \cdot I^*(1^*, n^*) \quad (23C)$$

where $I^*(1^*, n^*) = [\bar{X}^* - \bar{D}^*] + \{\bar{X}^* - [N + 1] \cdot x_n^*\}$. The sign of this effect is also ambiguous. A sufficient condition for a foreign welfare increase is that imports have a major share of the home market on average (as then $\bar{X}^* - \bar{D}^* \geq \bar{H}$ and $H + X \geq [N + 1] \cdot x_n^*$, at least for a

²⁶ Dixit (1983) derives the same condition for the effects of a reduction in the number of identical foreign firms on welfare in the home market. Collie(1997) shows that when an importing country sets its import tariff and production subsidy policies optimally, its welfare always declines as a result of a foreign merger.

²⁷ One can show that $\frac{dI(1^*, n^*)}{dt}$ is negative if $n^* \leq n + 1$, and is positive if $n^* \geq n + 2$.

²⁸ Some countries do claim extraterritorial application of their competition laws in these cases. See Falvey and Lloyd (1999).

profitable merger). Again $\frac{dI^*(1^*, n^*)}{dt}$ can be positive or negative, depending on the relative number of firms²⁹.

Turning to the impact of home trade liberalisation on the likelihood of merger, there are again two cases to consider.

(DU) the merger is unprofitable initially. From (18D), trade liberalisation then reduces this profitability even further.

(DD) the merger is profitable to participants, but disallowed by the foreign competition authority (because $I^*(1^*, n^*) \leq 0$). This case can occur if imports have less than the major share of the home market on average. At the margin (where $I^*(1^*, n^*) \approx 0$), the effect of a home tariff cut on the foreign welfare effect depends on the relative numbers of firms in the

two countries. If $n^* \geq n + 2$, then $\frac{dI^*(1^*, n^*)}{dt} < 0$, and a home tariff cut would make this

merger foreign welfare improving at the margin. If $n^* \leq n + 1$, the opposite will hold.

Interestingly $\frac{dI^*(1^*, n^*)}{dt}$ and $\frac{dI(1^*, n^*)}{dt}$ are opposite in sign, so that, in this sense, a tariff

change has opposing implications for the welfare effects of the merger in the two countries.

Thus even if the merger remains profitable after the tariff cut, whether it is more likely to be permitted depends on details of the market structure and the extent to which the competition authorities of the two countries are involved in the approval decision.

The results from these four cases are summarised in Table 1. In general the foreign competition authority is likely to approve any of these mergers, except perhaps that involving two foreign firms, regardless of the home tariff level.

²⁹ One can show that $\frac{dI^*(1^*, n^*)}{dt}$ is positive if $n^* \leq n + 1$, and is negative if $n^* \geq n + 2$. Dixit (1983) finds

that the optimal number of exporting firms for the foreign country is $n^* = n + 1$.

Table 1: Effects of a Tariff Increase on Merger Profitability and Welfare Impact

	Profitability at Margin $G() \approx 0$	Home Welfare at Margin $\Delta W() \approx 0$
A. National Merger of Home Firms (1,n)	Negative	Positive
B. International Merger closing a Home Firm (1*,n)	Negative	Positive
C. International Merger closing a Foreign Firm (1,n*)	Positive	Positive
D. National Merger of Foreign Firms (1*,n*)	Positive	Ambiguous

These outcomes extend Long and Vousden's result that a unilateral home tariff increase reduces the profitability of any marginal mergers that involve closing the relatively inefficient home firm, to an integrated world market. This is a further sense in which the tariff "protects" inefficient home firms, besides raising their outputs and profits. We also show that the home tariff increase raises the profitability of any marginal mergers that involve closing the relatively inefficient foreign firm. The home tariff increase has a positive impact, at the margin, on the welfare effects in the home country of any merger involving a home firm. The home competition authority is therefore more likely to approve these mergers the higher is the tariff. Since such mergers also raise welfare in the foreign country, mergers involving home firms should find approval easier to obtain at a higher tariff. These conclusions are reversed for a tariff cut.

IV Conclusions

This paper set out to investigate the implications of tariff liberalisation for mergers in an open economy. A simple partial equilibrium model of Cournot oligopolists with different technologies was used to illustrate issues. Conditions for a merger to be profitable to participants and socially desirable were derived for a closed economy, in terms of general effects and their particular values in the model. It was noted that these conditions would continue to apply in an open economy viewed at the global level.

The model was then extended to two countries, with the potential for arbitrage integrating the two national markets. If one (the importing) country had a small tariff in place, its firms found it profitable to sell only in their home market, and the firms in the other (exporting) country received the same (net) price wherever they sold. With two countries there were now four mergers to consider, and profitability conditions and welfare effects in the two countries were derived for each. The possibility of international trade introduced opposing terms of trade effects into the calculations of the national competition authorities. Likewise, the tariff introduced a revenue term for the importing country. We could then examine the impact of changing the tariff on the profitability of each merger to its participants, and its welfare effects in each of the two countries.

Tariff liberalisation has two main implications for the *profitability* of potential mergers, at the margin. First, relatively inefficient firms in the formerly protected market now become more attractive merger partners. Second, mergers involving relatively inefficient firms elsewhere become less attractive. Either way trade liberalisation will generate merger related activity.

How are competition authorities likely to respond? Since all profitable mergers involving importing country firms tend to raise welfare in the exporting country, we would not expect them to be blocked by its competition authority. The competition authority in the importing country may decide to block some mergers, however, since the impact of a merger on welfare in that country depends on the balance among its effects on consumer surplus, import-competing firm profits (which is where any efficiency gain will appear) and tariff revenue. All of these terms are affected by a tariff, and we found that tariff liberalisation had a negative impact on the welfare effect of any marginal merger involving an importing country firm. Mergers that would have just won approval prior to the tariff reduction would not be approved after it. While tariff liberalisation may make some mergers more profitable at the margin, the hurdle of approval by the competition authority in the liberalising country is also raised at that margin.

The welfare effects of mergers involving only exporting country firms depend on the importance of imports in the liberalising market. The higher the import penetration the more likely the merger is to increase (reduce) welfare in the exporting (importing) country. The impact of trade liberalisation on these welfare effects depended on the relative number of firms at the margin. If there are more foreign firms than domestic firms (strictly if

$n^* \geq n + 2$), liberalisation by the importing country will have a positive (negative) impact on the welfare effect of the merger in the exporting (importing) country. Whether the merger is more likely to gain approval depends on the degree of involvement of the competition authorities in the two countries.

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