1. Introduction

For most developed countries, "opening up" of the economy has meant the reduction of non-prohibitive tariffs and the easing or abolition of quantitative restrictions. For many developing countries and economies in transition, however, it often requires the relaxation of autarkic policies such as the outright *prohibition* of imports or foreign investment in particular sectors.[1] The conventional wisdom in economics is that this kind of reform is highly desirable and long overdue. Its virtues are easy to demonstrate in a standard competitive model, and the case becomes even stronger if the domestic industry is imperfectly competitive, for then trade liberalization serves as a surrogate anti-trust policy, with competitively-supplied imports imposing a price ceiling on the domestic industry. Such imports improve welfare even if they take only a small share of the market, and in certain cases, the mere threat of imports suffices to discipline the domestic industry without any actual imports taking place. Any tariff or quota only raises the price ceiling, allowing the domestic industry to exercise its market power more effectively, resulting in the usual deadweight loss. In this setting, domestic imperfect competition does not alter the welfare ranking obtained under perfect competition: free trade is better than restricted trade, which is better than autarky. On the other hand, if the foreign industry is oligopolistic, the theory of strategic trade policy that emerged in the 1980s established that free trade is dominated by an optimal tariff that shifts some of the foreign rent to the home country. However, as I argue in the course of surveying the literature in the next few paragraphs, free trade or restricted trade have been compared with autarky only in international oligopoly models that are unsuitable for developing countries, or in very special cases of models that are more suitable. This paper develops a model which permits such a comparison in a framework that is more general and acceptable, with some surprising results.

Most of the early international oligopoly models featured firms in different countries penetrating each other's markets on the opening of trade, making these models (e.g. Dixit 1984) immediately irrelevant to most developing countries, whose firms do not typically possess market power in export markets. Those models that allowed free entry also ruled out integer constraints, resulting in a convenient zero-profit closure (Brander and Krugman 1983;

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[1] Some developed countries also restrict foreign investment in sectors such as domestic air transportation, banking and broadcasting.

Venables 1985). For countries whose domestic markets are small relative to fixed costs of entry, this too is poor modelling strategy. The combination of these two assumptions yielded a strong pro-trade result, since free trade in this setting induces more firms to enter in response to export opportunities, and the zero-profit condition ensures that greater competition forces them to move down their average cost curves. The resulting price decline benefits domestic consumers in both countries, despite seemingly pointless cross-hauling of identical products.

With a given number of firms, welfare comparisons between trade and autarky become ambiguous. In Dixit (1984), the comparison arose indirectly in examining the effects of mergers, represented by a reduction in the number of firms in a homogeneous-product Cournot oligopoly. The price rise consequent on a foreign merger adversely affects domestic consumers but confers free-rider benefits on domestic firms. Dixit showed that this trade-off resulted in a U-shaped relationship between domestic welfare and the number of foreign firms. With linear demand, the trough of the U was shown to be at a 50% foreign share of the home market. If foreign mergers reduce the import share below this level, a further reduction in the number of foreign firms would improve welfare, and taken to its logical conclusion, this means that autarky is better than free trade. The issue was posed directly, allowing for product differentiation, by Levy and Nolan (1992) in a model in which home and foreign firms compete only in the home market -- a setting which is more appropriate for developing countries. They showed that if foreign costs are not too much lower than domestic, then protecting a domestic monopoly under autarky is superior to allowing a single foreign firm to compete with the domestic firm in a Cournot duopoly under free trade. That is, foreign entry is welfare-reducing. Richardson (1998) has recently worked out the real implications of Dixit's insight in a Cournot model with many firms, symmetric costs, and linear demand, but competition again confined to the home market. He derives the critical level of foreign entry not as the trough of the U (which should be more accurately described as a J), but rather the number of foreign firms required for its right-hand branch to rise to the autarky level at which the left-hand branch begins. Under free trade, any foreign entry less than this critical level--which could be substantial--is welfare-reducing relative to autarky. Finally, in two very recent papers that allow for asymmetric and non-constant costs as well as general demand in the same domestic market setting (but without referring to the earlier literature), Denicolo and Garella (1999) show that a little foreign entry reduces

welfare, while Reitzes and Grawe (1999) obtain the general features of U-shaped relationship. The last five papers go to the other extreme from the free-entry models in maintaining a fixed number of firms, thus ruling out the possibility of rationalization of the domestic industry through exit, which can be a major source of welfare gains.

Most of these authors (and many others) also recognize that in the presence of foreign imperfect competition, a tariff is superior to free trade, but do not compare the welfare level attainable with such a tariff to that under autarky. The strategic trade literature does show how free entry and exit can in certain circumstances modify the gains from a tariff that perturbs an existing free trade equilibrium (see Markusen and Venables, 1988), but does not make the comparison with autarky. It also assumes that entry costs are not sunk, so that exit and entry are symmetric. However, in sectors that have been protected by an autarkic trade regime, equipment is typically obsolete and badly maintained, so that a significant part of the fixed cost is likely to be sunk. The profit level that triggers exit is then less than that which induces entry, and welfare calculations must also be modified appropriately. Also, protected oligopolies are typically characterized by managerial slack and strong unions, so the firms' private variable costs are likely to be higher than the social opportunity costs of the resources they employ. The analysis in this paper takes account of these features. It applies both to entry by foreign firms supplying the home market through exports, and to direct foreign investment in the home country; the only difference is the possibility of a tariff on imports.

The results derived below go beyond the earlier literature in several ways. First, in Section 2, I obtain the general features of the U-shaped relationship more cleanly than the earlier authors, in a manner that does not depend on the Cournot behavioral conjecture assumed by them, and highlights the underlying intuition. This result can be applied to both the polar cases of a fixed and an endogenous number of firms. In Section 3, I then employ a Cournot model with linear demand, but with many firms (unlike Levy and Nolan) and asymmetric costs (unlike Richardson). I also allow for Cournot conjectures by the foreign firms, unlike Denicolo and Garella, who have them passively supplying any amount upto the import restriction imposed by the home country, and Reitzes and Grawe, who similarly assume that foreign output is exogenously given, limited in their case by a technological constraint. To begin with, unlike any of these authors, I allow for exit by domestic firms when they are unable to cover their fixed costs, in order to capture any possible benefits from

rationalization. Here I show that if domestic firms are subject to a zero-profit condition, foreign entry has no impact on welfare until the entire domestic industry is shut down. Staying with the linear/Cournot formulation, I then use the idea of sunk costs to allow the domestic firms to survive in the face of foreign entry, and derive a simple formula which shows, regardless of cost asymmetries, that foreign firms must capture at least 80% of the home market for unrestricted foreign entry to be superior to autarky. Finally, I show that an optimal tariff in this model reverses these pessimistic results, so that foreign entry always *increases* domestic welfare. The paper concludes in Section 4 by pointing to supportive empirical evidence, and with some reflections on the significance of these findings for trade and investment liberalization, as well as for domestic and international competition policy. Although the primary concern of this paper is with foreign entry, I also show in the conclusion how my results qualify significantly the original findings by Dixit on the impact of foreign mergers.

2. A General Model

Assume an oligopoly of n identical home firms and n^* identical foreign firms, each of which supplies respectively q and q^* units of a homogeneous product to the home market. Total supply is thus $Q \equiv nq + n^* q^*$. Domestic firms have cost functions $C(q) = F + c(q)$. Inverse demand is given by $P = P(Q)$, generated by a quasi-linear utility function that permits the standard measure of consumer surplus. Social welfare in the home country is the sum of producer and consumer surplus:

$$
W = \int_0^Q P(s)ds - P(Q)Q + n\left[P(Q)q - C(q)\right]
$$

$$
= \int_0^Q P(s)ds - P(Q)n^* q^* - nC(q) \tag{1}
$$

where the price and quantity variables are also functions of the number of firms. Foreign entry costs are assumed to be met by the foreign firms, so they do not figure in the domestic welfare calculation. Consider an autarky equilibrium, with two possible variants. First, in the

presence of fixed costs and the absence of an integer constraint, free entry results in a zero profit equilibrium for home firms. Suppose trade is now opened up, and foreign firms can enter profitably because they have lower fixed costs. Clearly, if the home firms were already making zero profits, some of them must exit. In the second variant, the domestic oligopoly makes profits in the autarky equilibrium. In either case, the marginal impact of foreign entry is given by

$$\frac{dW}{dn^*} = P(Q)\left[\frac{dn}{dn^*}q + n\frac{\partial q}{\partial n^*} + q^* + n^*\frac{\partial q^*}{\partial n^*}\right] - \left[Pq^* + n^*q^*\frac{\partial P}{\partial n^*} + n^*P\frac{\partial q^*}{\partial n^*}\right] - \left[\frac{dn}{dn^*}C + nC'(q)\frac{\partial q}{\partial n^*}\right]$$

Following Mankiw and Whinston (1986), the partial derivative in the first term in (2) represents the "business-stealing effect" of entry, which they assume to be negative for any kind of oligopolistic interaction. Consider the middle term. The expression in square brackets is the profit of a representative domestic firm, which is equal to zero under a zero-profit condition. If on the other hand domestic profits are positive because of an integer constraint or because some part of F is sunk, then foreign entry cuts into domestic rents, and $dn/dn^* = 0$. In either case, the middle term vanishes. If we then evaluate (2) at n^*q^* very close to zero to represent the impact of marginal foreign entry, we see that it is negative in the presence of a business-stealing effect. If social costs are less than private costs, the negative impact is even stronger, as can be seen by attaching a coefficient $s < 1$ to $C(q)$ in (1) and hence to the C' term in (2). For non-marginal foreign entry, the last term in (2) (which can be regarded as a terms-of-trade effect) should offset this negative impact, since we would expect $P/n^* < 0$. As foreign entry proceeds, this term carries greater weight, while the falling price makes the first term smaller in absolute value. For substantial foreign penetration, this should eventually change the sign of (2) from negative to positive. This analysis provides the general framework for the U-shaped relationship between welfare and the number of foreign entrants, which earlier authors obtained for particular cases. It can be summed up as

PROPOSITION 1: In the presence of a business-stealing effect, foreign entry first reduces domestic welfare from the autarky level and then increases it, whether or not it causes the exit of domestic firms, regardless of cost asymmetries and the mode of oligopolistic competition.

It should however be noted that the business-stealing effect of entry, reasonable though it appears, *cannot* be assumed a priori. Seade (1980) showed that for very convex demand curves, entry could have a perverse effect, *increasing* output per firm, but confirming the findings of earlier authors, he also showed that total industry output would necessarily increase, and hence the price must fall. In that case, $\partial q / \partial n^* > 0$ in (2), and foreign entry does not have an initially negative impact on welfare. The earlier models in the oligopoly trade literature did not recognize this possibility since they either assumed linear demand, or imposed an unnecessarily strict stability condition on demand which effectively precluded the

perverse case. Although I also proceed in the next section with linear demand, I do introduce an important new qualification to the business-stealing effect (and hence to Proposition 1) by showing that it plays out differently if domestic firms are forced to exit.

3. A Cournot Model With Linear Demand and Constant Costs

Consider the widely-used special case in which firms interact as a Cournot oligopoly, with the domestic market characterized by linear inverse demand

$$P = a - b\left(nq + n^*q^*\right) \tag{3}$$

Using this specification, Richardson (1998) obtains an expression for social welfare and shows that, for any given number of domestic firms, welfare first decreases and then increases as n^* increases from zero. This J-shaped relationship is derived under free trade and assuming identical home and foreign firms. Richardson suggests (but does not prove) that lower foreign costs may modify but not reverse his result on welfare-reducing foreign entry, and also that a tariff can claw back some of the profits that foreign firms shift away from domestic firms. I develop a more general model that allows for fixed costs, domestic exit, international cost asymmetries, as well as an optimal tariff, with some unexpected results.

Denote the (constant) domestic and foreign marginal costs as c and c^*, with $a > \max(c, c^*)$. The home government can impose a specific tariff t on imports. Entry costs limit the number of domestic incumbents to n. Profit maximization by n domestic and n^* foreign firms under Cournot conjectures can be shown to yield the following equilibrium (provided all firms are covering their fixed costs):

$$q = \frac{\left(n^* + 1\right)(a - c) - n^*\left(a - c^* - t\right)}{b\left(n + n^* + 1\right)} \tag{4}$$

$$q^* = \frac{(n + 1)\left(a - c^* - t\right) - n(a - c)}{b\left(n + n^* + 1\right)} \tag{5}$$

$$P = \frac{a + nc + n^*\left(c^* + t\right)}{n + n^* + 1} \tag{6}$$

Using these expressions, I now analyze three different scenarios.

3.1: Free trade, endogenous number of domestic firms

Setting $t = 0$ in the above expressions, consider first the case where free entry and exit by domestic firms results in average-cost pricing, so that

$$P = \frac{F}{q} + c \tag{7}$$

Suppose now that foreign firms have a cost advantage that allows them to break into a zero-profit autarky equilibrium once trade is thrown open. This necessarily forces some of the domestic firms to exit. Substituting from (4) into (7) gives two equations, (6) and (7), in two unknowns, n and P, for an exogenously given number of foreign firms n^*. Solving these equations for n gives the number of domestic firms that survive for any given number of foreign entrants:

$$n^e = \frac{a - c - n^* \left(c - c^* \right)}{\sqrt{bF}} - \left(n^* + 1 \right) \tag{8}$$

Substituting back into (6) gives the price consistent with both Cournot equilibrium and a zero-profit condition for the home firms:

$$P^e = c + \sqrt{bF} \tag{9}$$

That is, provided some domestic firms survive, the price remains a constant markup over their marginal costs, regardless of the number of foreign entrants. To understand why, note from (8) that

$$\frac{dn^e}{dn^*} = \frac{c^* - c}{\sqrt{bF}} - 1 \tag{10}$$

which can be shown to be negative for any positive foreign presence. If home and foreign costs are equal, we have one-for-one displacement of home firms by foreign entrants. More interestingly, foreign entry displaces more (less) than an equal number of home firms if and only if c^* is less (greater) than c, and it can be shown that this too results in an "Archimedean" displacement of an equal *volume* of domestic output. It is this that maintains market supply at the same level and hence a constant price. Here, business-stealing takes place through the displacement of incumbent firms, rather than a reduction in their individual output levels.

With domestic firms continuing to earn zero profits, foreign entry does not result in any change in producer surplus, and with no change in the price, there is no change in consumer surplus either. This gives us

PROPOSITION 2: In the linear/Cournot case, if domestic firms are subject to a zero-profit condition, domestic welfare is unaffected by foreign entry as long as some domestic firms survive.[2]

The resulting situation is obviously not a typical zero-profit equilibrium, since with no change in the price, foreign firms continue to earn profits and hence continue to enter. In principle, this continues until the domestic industry has been driven out, since any price that is consistent with zero profits for the domestic firms yields positive profits to foreign entrants with lower costs.[3] Welfare improves only after all home firms have exited and further foreign entry reduces market concentration, allowing the price to descend to the lower level justified by the entrants' lower costs. (8) and (9) describe a hybrid of the standard oligopoly equilibrium with a fixed number of firms and one with an endogenous number based on a zero-profit condition. The concluding section of this paper offers possible interpretations of this situation, where only a few foreign firms enter despite rents remaining available, so that

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[2] It can be shown that if social costs are lower than private costs, then welfare actually decreases with foreign entry until the domestic industry is shut down.

[3] A zero-profit equilibrium for *both* home and foreign producers allowed both types to survive in the early international oligopoly models because the opening up of trade enlarged the market via export opportunities, which are absent here.

some domestic firms survive.[4] Foreign rents of course do not figure in the welfare calculation. The analysis of the effect of entry on output and price applies equally to domestic entry, say in the form of firms with privileged access to a new technology. The profit of such firms will however be part of welfare, and Proposition 2 will not hold for domestic entry.

3.2: Free trade, fixed number of domestic firms

I now assume that domestic fixed costs are entirely sunk, so that $F = 0$ from the perspective of the incumbent domestic firms as well as social welfare, while positive entry costs prevent further domestic entry. Although this is as extreme as the zero-profit closure, it is probably closer to the situation protected sectors find themselves in when first exposed to foreign competition, as I suggested in the Introduction. Foreign entry costs are assumed to be lower, and with domestic entry costs entirely sunk, foreign entry does not displace home firms as long as $P > c$. Here the original business-stealing effect returns: from (4) and (5), it can be shown that $\partial q / \partial n^* < 0 \, if \, q^* > 0$. With linear demand and constant costs, the welfare function (1) now takes the form

$$W = \left[a - b\left(nq + n^*q^*\right)^2 / 2\right] - cnq - (P - t)n^*q^*$$

(11)

where output levels also depend on t. First, setting $t=0$, we can substitute (4), (5) and (6) into (11) to yield a cumbersome expression for $W(n^*)$:

$$W(n^*) = \frac{(n^*)^2 \left[2n(c - c^*)^2 + (a - c^*)^2\right] + 2nn^*(a - c)(a - 2c + c^*) + n(a - c)^2(n + 2)}{2b(n + n^* + 1)}$$

(12)

The derivatives of (12) are also cumbersome but can be tamed by evaluating at $n^*=0$:

$$\frac{\partial W}{\partial n^*}\bigg|_{n^*=0} = \frac{-n(a - c)\left[n(c - c^*) + a - c^*\right]}{b(n + 1)^3} \quad < 0$$

(13)

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[4] The usual treatment of this kind of dualistic market structure features a price-taking "competitive fringe" of zero-profit firms. Here, in contrast, the price is determined by the cost conditions of the zero-profit firms, although both they and the rent-earning oligopolists act as Cournot competitors.

Foreign entry will be viable only if $q^* > 0$ in equilibrium. It can be shown from (5) that this implies that the expression in square brackets in (13) is positive, and hence (13) is negative: foreign entry must initially reduce welfare under free trade. Also,

$$\frac{\partial^2 W}{\partial n^* \partial c^*}\bigg|_{n^*=0} = \frac{n(a-c)}{b(n+1)} > 0 \tag{14}$$

showing that lower foreign costs, which would yield greater gains from trade if foreign supply were competitive, result in a sharper initial drop in welfare in the present case.

Further, it can be shown that after falling initially from the autarky level, $W(n^*)$ begins to rise again as the terms of trade effect of additional entry begins to outweigh the business stealing effect, giving a J-shaped relationship between welfare and the number of foreign firms. This is because later foreign entrants increasingly steal business from earlier ones, rather than entirely from domestic incumbents. We can calculate the critical number of foreign entrants that is necessary to restore the autarky level of welfare by solving $W(n^*) = W(0)$ for n^*. This is

$$\tilde{n}^* = \frac{2n(n+1)(a-c) + a - c^*}{2n^2(c-c^*) + 3n(c-c^*)} \tag{15}$$

For symmetric home and foreign firms ($c = c^*$), this becomes simply $2n(n+1)$, which was derived by Richardson but misprinted as $2n(n-1)$ in his paper. This highlights the significance of welfare-reducing foreign entry quite clearly: for example, with five domestic firms in the market, the entry of upto *sixty* identical foreign firms reduces welfare relative to autarky!

With asymmetric firms, we must be careful about corner solutions. For $c^* < c$, (4) shows that a combination of low enough c^* and large enough n^* can drive out the domestic firms. By solving (4) for $q = 0$, it is possible to find the number of foreign entrants $\hat{n}^*$ at which this happens, and to show algebraically that it is invariably greater than $\tilde{n}^*$ in (15). More directly and intuitively, domestic firms exit when foreign entry has driven the price down to the level of their average cost, which must be lower than the price they were charging under autarky. Welfare at this corner solution must therefore be higher than at the

"opposite" corner under autarky. Thus, $W(0) = W(\tilde{n}^*) < W(\hat{n}^*)$, and therefore by (13) and the continuity of the $W(n^*)$ function, we must have $\tilde{n}^* < \hat{n}^*$. With price depressed to the domestic cost level, we are back in the world of Proposition 2, and further foreign entry leaves welfare unchanged until the domestic industry shuts down. The lower curve in Figure 1 illustrates the welfare impact of different levels of foreign entry relative to autarky.[5]

If, on the other hand, $c^* > c$, foreign entry will cease once the price has been depressed to the level of foreign costs. Noting from (15) that $\tilde{n}^*$ is positively related to c^*, this can truncate the J-shaped relationship at $n^* < \tilde{n}^*$ and leave welfare below the autarky level, with no prospects for further entry. In either case, welfare-reducing foreign entry remains a force to be reckoned with for a discrete number of entrants, and not just marginal entry as in Section 2.

With foreign firms enjoying a cost advantage, (14) showed that welfare initially declines more rapidly with foreign entry as compared to the symmetric case, but the Figure shows that it also recovers more rapidly to the autarky level: with five domestic firms, only seven foreign entrants instead of sixty are now required to regain and exceed the autarky level of welfare. However, with asymmetric costs, the *number* of foreign entrants required to restore the autarky level of welfare is of limited significance in its own right. More crucial is the foreign market share required for this outcome. This is

$$\tilde{m} \equiv \frac{\tilde{n}^* q^*(\tilde{n}^*)}{\tilde{n}^* q^*(\tilde{n}^*) + nq(\tilde{n}^*)} \tag{16}$$

Substituting from (4), (5) and (15) gives an unexpectedly simple result, which is independent of demand and cost parameters, provided of course that these are consistent with an interior solution:

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[5] The Figure is drawn by simulating the model for a=10, b=1, c=2, c^*=1, and n=5. This gives critical values of $\tilde{n}^* = 6.49$ and $\hat{n}^* = 8$.

$$\tilde{m} = \frac{2n+2}{2n+3} \tag{17}$$

This takes a value of 0.8 for $n = 1$, and rises asymptotically to unity as n increases, giving us:

PROPOSITION 3: In the linear/Cournot model with a fixed number of domestic firms, entry by oligopolistic foreign firms under free trade decreases welfare relative to autarky unless they capture at least 80% of the market.[6]

3.3: Optimal tariff, fixed number of domestic firms

I now relax the assumption of free trade. Borrowing from Bhattacharjea (1995), the optimal tariff that maximizes (11) for any given market structure[7] can be derived as:

$$t^* = \frac{(a-c^*)(2n+1) - n(n-n^*)(c^*-c)}{n^* + 2(n+1)^2} \tag{18}$$

As usual in the strategic trade literature, the home government must commit to this tariff before the firms decide on their outputs. This means that the tariff must be adjusted as firms enter but before they supply the market. (It can be shown that $dt^*/dn^* < 0$, so the tariff must be steadily reduced). Alternatively, and slightly more realistically, the government in this world of full information can compute the number of foreign firms that will eventually enter and impose the corresponding tariff, and the firms in turn enter taking this tariff as given. Substituting (18) back into (4), (5), and (6), then substituting these in turn into (11), and finally differentiating (11) with respect to n^* yields

$$\frac{\partial W(t^*)}{\partial n^*} = \frac{\left[a - c + (c-c^*)(n+1)^2\right]}{b\left[n^* + 2(n+1)^2\right]^2} > 0 \tag{19}$$

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[6] It is possible to show that if social costs are less than private costs, this critical level of foreign entry is even higher.

[7] It is well known that with domestic oligopoly, a combination of domestic production subsidy and tariff is first-best. However, building on observations by earlier authors, Bhattacharjea (1995) advances several reasons why the domestic subsidy is infeasible in this context. The entry subsidy for foreign firms, which Denicolo and Garella (1999) suggest as a remedy for insufficient foreign entry, is likely to be even more impractical on political grounds.

In contrast to the J-shaped relationship derived under free trade, we now have

PROPOSITION 4: In the linear/Cournot model with a fixed number of domestic firms, if the government imposes an optimal tariff conditioned on the equilibrium market structure, welfare is strictly increasing (although at a decreasing rate) in the number of foreign firms.

The upper curve in Figure 1 illustrates how the welfare impact of foreign entry is modified by the tariff. A tariff is therefore not only optimal for a given oligopolistic market structure, as demonstrated many years ago in the strategic trade literature, it is also a guarantee against welfare-decreasing foreign entry, at least in the linear/Cournot model. However, this should not be taken too seriously as a policy prescription, for several reasons. First, optimal tariffs of this kind are very hard to calculate even for a given number of firms; calibrating one to an evolving or potential market structure would be virtually impossible. Second, Bhattacharjea (1995) showed in a similar model that it is likely to induce excessive *domestic* entry. Third, the tariff remedy against welfare-decreasing foreign entry is ruled out if it takes the form of DFI,[8] and finally the tariff may itself result in inefficient tariff-jumping investment by the foreign firms.

This last possibility can be spelt out in a little more detail. Since all foreign firms are identical, if it is profitable for one to jump the tariff, it is profitable for all. If the number of firms and their costs remain unchanged after relocation inside the domestic tariff area, the outcome is identical to that derived under free trade. (The "free trade" scenario is analogous to one where no discriminatory tax is allowed on the sales of foreign firms, regardless of their location). For any given number of firms, the consequences of tariff-jumping DFI can be then be seen as a drop from the upper curve in Figure 1 to the lower one.

4. Summary, Evidence and Conclusions

The two bodies of theoretical literature on which this paper has drawn--strategic trade policy and inefficient entry--have both evolved over two decades, and remain notoriously

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[8] The interesting suggestion by Levy and Nolan (1992) that in the case of DFI the effect of a tariff can be replicated by a discriminatory sales tax on the foreign firm's output would run into "national treatment" provisions in international agreements.

difficult to implement empirically. While several calibrated models based on heroic assumptions and outside estimates of costs and demand elasticities have come up with estimates for optimal tariffs and subsidies for various high-profile industries, only very recently Berry and Waldfogel (1999, on radio broadcasting) could claim to be the first to attempt an empirical assessment of inefficient entry. It would be rash to pretend that a model like the one developed in this paper can be applied empirically. There is, however, accumulating evidence on the various ingredients that went into the making of the model. On the crucial business-stealing effect of foreign entry, Head and Ries (1999) show that, contrary to earlier assessments, liberalized imports into Canada as a result of NAFTA had a negative impact on output per plant; while Aitken and Harrison (1999) show that direct foreign investment had a similar negative impact on domestic firms in Venezuela, with no evidence of positive productivity spillovers to compensate for this. (These authors were concerned with firm scale and productivity rather than the empirically more elusive concept of welfare used here). The importance of sunk costs and the divergence between social and private costs, which played an important role in my analysis, are supported by the econometric evidence of Harrison and Hansen (1999), who argue that substantial trade liberalization had unexpectedly little impact on sectoral output and employment in Mexico and Morocco because the burden of adjustment was borne by rents accruing to labour and capital respectively.

At the level of theory, an obvious question that arises here is why there should be limited foreign entry, even if there are still rents to be earned. This can be answered at several levels. One approach is to regard all the results as representing a transitional scenario in an economy which has recently been opened up, so that foreign firms are just beginning to enter. A second approach, familiar from the strategic trade literature, is to confine the applicability of the model to industries where high firm-level fixed costs (or access to patented technology) limit the number of producers globally.[9] The recent trend towards cross-border mega-mergers is reducing the number of competitors in other industries, while transport and marketing costs may further limit the number that supply a particular country's

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[9] An interpretation based on research and development is perhaps the only one consistent with the setting in section 3.1, in which domestic firms continue to make only normal profits while foreign entrants earn rents. High sunk costs of technology development (and patent protection) both limit the number of entrants and also reduce their marginal costs so that they can profitably break into the zero-profit equilibrium established by domestic firms using an older technology which is freely available.

market. A third approach is to think of entry as direct foreign investment (DFI), with the number of entrants limited either by high plant-specific fixed costs relative to the size of the host country market, or the licensing of foreign firms that some developing countries still require even after they have opened up.

Again at the level of theory, as I pointed out at the beginning, the strategic trade literature established that a tariff is generally superior to free trade under international oligopoly, but did not make comparisons with autarky except in special cases. I have demonstrated much more generally the possibility of welfare-decreasing foreign entry and consequently of autarky being superior to free trade. I have also shown that a tariff gives an outcome that is superior to both free trade and autarky. Both results alter the ranking which is the conventional wisdom in economics, based on competitive models. Admittedly, the last three Propositions were obtained in a linear/Cournot framework, but this is the workhorse of both the industrial organization and strategic trade literatures. Although one would expect product differentiation to moderate the business-stealing effect of foreign entry, as well as to provide an additional source of welfare gains in the form of greater variety, the problem does not go away. Levy and Nolan (1992) as well as Denicolo and Garella (1999), using differentiated-product Cournot duopoly, Jensen and Krishna (1996), using monopolistic competition with preferences exhibiting Dixit-Stiglitz "love of variety", and also Richardson (1998), in a discrete-choice Logit model, show that limited foreign entry can reduce welfare.

What then are the practical lessons to be learned from this paper? Many reformers welcome foreign competition believing that it will force a pampered imperfectly-competitive domestic industry to shape up without shipping out or yielding much of its market to the foreign firms. Unfortunately, Proposition 1 shows that under fairly general conditions, limited foreign entry reduces welfare relative to autarky, while Proposition 2 shows that even allowing for rationalization of the domestic industry through exit, welfare does not improve until it shuts down altogether. Without domestic exit, and with a fixed number of domestic firms earning rents, the J-curve and Proposition 3 show that reformers must contend with the prospect of a reduction in welfare unless domestic firms surrender a very large share of their home market. Even if the welfare reduction is seen as a short-run phenomenon, pending the entry of more foreign firms or the exit of domestic firms (some fixed costs may be sunk only

in the short run), the results show, like the more famous J-curve which describes the effects of a devaluation, that things get worse before they get better.

Autarky is hardly an option in today's world. However, the optimal tariff formula used in Proposition 4, while important for completing the welfare ranking of free trade, restricted trade and autarky, cannot form the basis of an alternative policy prescription, for reasons given at the end of the last section. Probably the basic lesson of this paper for trade policy, then, is one of scepticism rather than activism: one should not expect too much from opening up hitherto protected sectors if the market structure will remain oligopolistic. Trade liberalization is not a good substitute for domestic competition policy in this situation, and "market discipline" (to use a phrase due to Levinsohn 1993) can be excessive. This is, of course, an example of the theory of the second-best.

Instead, this paper reinforces the case for an *international* competition policy to regulate cross-border mergers, export cartels (which are exempted by the competition laws of most countries), and restrictive business practices. Return to the J-shaped relationship between welfare and the number of foreign firms, but (following Dixit 1984) read it in the reverse direction. If foreign mergers and export cartels can be treated as a reduction in the effective number of foreign firms, this can actually reduce home welfare below the autarky level, as the free-rider benefits that greater concentration confers on domestic firms who are not party to the merger is insufficient to compensate for the loss it inflicts on domestic consumers. Recall that Dixit had suggested the crucial level of foreign merger was the one corresponding to the foreign market share at which welfare reaches the trough of the J, whereas it is actually the higher level $\tilde{m}$ identified here. Also, Dixit analyzed the welfare effect of foreign mergers by examining the sign of the derivative $\partial W / \partial n^*$. The problem with this is that a horizontal merger is generally not profitable for the firms themselves, due to the free-rider problem and the expansion of output by "outsider" firms, unless it either brings about a cost reduction, or unless a substantial proportion of the firms in an industry internalize the externality by merging.[10] These considerations have some bite in the present

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[10] See Salant, Switzer and Reynolds (1983), who show in a linear Cournot model that a merger is unprofitable if less than 80% of the firms in the industry merge. In an international trade context, Head and Ries (1997) show that profitable cost-reducing mergers may be approved by regulators because they increase welfare in their home jurisdictions, even though they reduce world welfare.

context: as I have shown, lower foreign costs reduce home welfare even further precisely when the number of foreign firms is very small. Further, since the optimal tariff rate in (18) is inversely related both to the number of foreign firms and to their costs, such mergers will entail higher optimal tariffs, although (19) shows that this can only mitigate the adverse effect of greater foreign concentration, not prevent it.   However, the caveats advanced above regarding the tariff policy apply here as well, while an international competition policy seems remote in light of the sharply divergent views expressed at the WTO Working Group that has been going into this issue since 1997.

The findings of this paper do however suggest some areas where action on the home front is possible in respect of foreign investment. Since "insufficient" foreign entry is more likely in the case of DFI than imports, due to the additional set-up costs that foreign firms have to incur, there may be a case for prohibiting foreign investment in particular sectors, unless it promises to be much more efficient or to yield definite spillover benefits to domestic firms. Industries subject to barriers to entry such as economies of scale and product differentiation are the ones where welfare-reducing entry is likely to be a problem. However, case-by-case approval of foreign investment proposals, apart from breeding corruption, is also likely to limit foreign entry and leave the economy wallowing in the trough of the J-curve. In sectors which are to be opened up to DFI at all, the door should be kept wide open, with an active domestic competition policy to prevent abuse of market power. And it goes without saying that countries should refrain from offering "market power inducements" (such as insulation from domestic and foreign competition, or profit guarantees) to attract DFI.[11]

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[11] See UNCTAD (1997) for evidence of such inducements provided by developing countries.

References

Aitken, B.J. and A.E. Harrison (1999). "Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela". *American Economic Review* 89: 605-18.

Berry, S.T. and J. Waldfogel (1999). "Free Entry and Social Inefficiency in Radio Broadcasting". *Rand Journal of Economics* 30: 397-420.

Bhattacharjea, A. (1995). "Strategic Tariffs and Endogenous Market Structures". *Journal of Development Economics* 47: 287-312.

Brander, J.A. and P.R. Krugman (1983). "A `Reciprocal Dumping' Model of International Trade". *Journal of International Economics* 18: 83-100.

Denicolo, V. and P.G. Garella (1999). "Market-Share Import Restraints in Oligopoly". *Review of International Economics*, 7: 732-43.

Dixit, A. (1984). "Trade Policy for Oligopolistic Industries". *Economic Journal* 94: 1-15.

Harrison, A. and G. Hanson (1999). "Who Gains from Trade Reform? Some Remaining Puzzles". *Journal of Development Economics* 59: 125-154.

Head and Ries (1997). "International Mergers and Welfare under Decentralized Competition Policy". *Canadian Journal of Economics* 30: 1104-23.

_____ and _____ (1999). "Rationalization Effect of Tariff Reductions". *Journal of International Economics* 47: 295-320.

Jensen, P.E. and K. Krishna (1996), "Entry Policy in an Open Economy". *Indian Economic Review* 31: 41-56.

Levinsohn, J. (1993). "Testing the Imports-as-Market Discipline Hypothesis". *Journal of International Economics* 35: 1-22.

Levy, S., and Nolan, S. (1992). "Trade and Investment Policies under Imperfect Competition". *Journal of Development Economics* 37: 31-62.

Mankiw, N.G. and M.D. Whinston (1986). "Free Entry and Social Inefficiency." *Rand Journal of Economics* 17: 48-58.

Markusen, J.R. and A.J. Venables (1988). "Trade Policy with Increasing Returns and Imperfect Competition". *Journal of International Economics* 24: 299-316.

Reitzes, J.D. and O.R. Grawe (1999). "Entry Policy and Entry Subsidies". *Review of International Economics* 7: 715-731.

Richardson, M. (1998). "Foreign Entry and Domestic Welfare." *Weltwirtschaftliches Archiv* 134: 251-261.

Salant, S.W., S. Switzer and R.J. Reynolds (1983). "Losses from Horizontal Merger: The effects of an exogenous change on industry structure on Cournot-Nash equilibrium". *Quarterly Journal of Economics* 98: 185-99.

Seade, J. (1980). "On the Effects of Entry." *Econometrica* 48: 479-89.

UNCTAD (1997). *World Investment Report: Transnational Corporations, Market Structure and Competition Policy*

Venables, A.J. (1985): "Trade and Trade Policy with Imperfect Competition: The Case of Identical Products and Free Entry". *Journal of International Economics* 19: 1-19.