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Barriers to Export

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ABSTRACT

A model of entry by a small exporting country into a large country market with an incumbent monopolist is constructed, and export promotion policy is examined. In the presence of strategic entry deterrence by the large country incumbent firm a number of situations can emerge, including the possibility that, in the event of trade liberalization between countries, exports based on cost differences may fail to emerge, and a possiblity that export promotion is world welfare improving. A model of multiple export markets with incomplete information on the part of the government is also considered. There it is shown that a policy of export promotion suffers from adverse selection (inefficient entry to export markets), but that this problem can be mitigated in the presence of incumbent monopolists in the potential export market who can actively deter entry.

1. Introduction

As trade barriers are reduced a dilemma exists in the conduct of trade policy in concentrated industries where entry barriers are an important endogenous determinant of equilibrium market structure. On the one hand the removal of trade barriers should lead to an increase in the degree of competition within the market and this should have positive efficiency effects on the world industry. On the other hand, if the initial industry structure in one country is a high cost incumbent monopolist who is not faced with domestic competition, and is protected from lower cost foreign exports by high trade barriers, then the removal of the trade barriers can cause at least two distinct problems in making a transition to a free trade equilibrium. In anticipation of the removal of the trade barriers the incumbent monopolist can undertake to *raise* entry barriers to potential foreign entrants. The nature of the entry barriers depends upon the market structure. The literature on industrial organization has identified some of these including advertising expenditures, investment in R&D, capacity expansion and a number of others. The important point is that the action by the incumbent firm constitute a *sunk cost* on its part, which means that it faces a *barrier to exit* in the industry. Potential entrants to the industry are at a strategic disadvantage in competing with the incumbent and may be successfully deterred from entering the market.

In the problem at hand the potential entrants are exporters, and the barriers to entry in the foreign market will be referred to as *barriers to export*. In crude terms the initial trade barriers to export have been replaced with entry deterring strategic behaviour on the part of the import competing industry. The problem only occurs if strategic entry deterrence is actually feasible on the part of the incumbent firm. There are two factors

which are likely to make this more likely. The first is the distinction between small and large countries. If the potential exporting country is small and the potential importing country is large, then it is likely, given the relative market sizes, that the size of the potential exporting firms prior to trade liberalization, if they exist at all, will be much smaller than the incumbent firms in the large country. From the theory of strategic entry deterrence this would suggest that the sunk costs of the potential exporters will be small relative to the sunk costs of the protected incumbents. This would yield an obvious strategic advantage to the large country incumbents in the post-liberalization competition. Clearly if both countries are of equal size, or the exporting country is large relative to the potential importer this factor is not likely to be nearly as significant.

The second factor making strategic deterrence of exports more likely, is the existence of genuine *barriers to export* as distinct from barriers to entry in the exporters' home market. There is some evidence of barriers to export in export studies and numerous references to these barriers can be found in the literature on export marketing which is discussed in Harris (1985, chapter 5). They can be defined as *fixed costs* which must be incurred to make sales in the foreign market, beyond those costs necessary to sell in the domestic market. These costs include the transitional costs in setting up a distribution and marketing network in the foreign market. They also include the implicit informational and cultural accommodation costs which any successful (and unsuccessful) exporter must incur. The higher the barriers to export the more protected the domestic incumbents, who by assumption do not face these costs. Barriers to export can outweigh whatever competitive production cost advantage the potential exporter might have.

Both of these factors have implicit dynamic elements in them, and hence

in practice the problem is likely to be most significant during a transition to liberalized trade. In the longer run with reduced trade barriers the one time costs of "barriers to export" ought to be less important from the point of view of the integrated world market. The same can be said of initial differences in market size. From the point of view of the potential exporting and importing country, however, the policy problems in such a situation are non-trivial.

The importing country, by lowering trade barriers, has replaced a (possibly) technically efficient but protected domestic industry with an industry using excessive resources to deter lower lost foreign entry. Not only is the movement to a free trade equilibrium hindered, and hence those gains from free trade foregone, but resources are utilized inefficiently in wasteful entry deterrence activity. Clearly, one policy solution is to exercise a sufficiently good anti-monopolies policy to prevent firms from undertaking this type of entry deterrence. It is noteworthy, however, that most countries rarely engage in implementing domestic anti-trust policy which is intended to reduce entry barriers against imports.

The potential exporting country faces a different problem. If entry into these concentrated foreign export markets is successfully stalled then these industries may not develop at all, or do not expand with the reduction in trade barriers. For a small country the problem is particularly troublesome if in reducing its own trade barriers it is experiencing significant import penetration, but not the anticipated development of the export markets. In the short run this may cause balance of payments difficulties, but in the longer run it could completely eliminate the prospect for developing those export industries at all. Sufficient pessimism on these matters could erode substantially the economic case for trade

3

liberalization in a small country. In larger exporting countries, while the problem is not likely to be as severe, it is clear qualitatively the effects work in the same direction. The locational implications of this analysis for footloose industry is particularly troublesome. If the fixed costs associated with exporting can be reduced by locating in the large country market, the barriers to entry can be possibly overcome, but only by foreign direct investment in the large country market.

In this paper one particular policy response to this type of transitional problem is explored — assistance to potential exporters entering a concentrated foreign market. It will be shown that under certain circumstances such assistance can be welfare improving from both the national and world point of view. It must be admitted at the outset, however, that the type of government intervention in the model presupposes policymakers have information which is quite good.

Finally I would like to relate this literature to the strategic trade policy literature.[1] Much of that literature, beginning with Brander and Spencer (1985), is concerned with the use of export promotion in two country — two firm duopoly models. Export subsidies have been shown to be welfare improving under some assumptions as they shift rents from the foreign to the domestic firms by raising the market share of the subsidized firm. This paper is really quite different than the problem looked at in that literature as it is concerned with the indivisible and lumpy *entry decision*, rather than the sales decision per se. Secondly, the paper is concerned with situations when the incumbent firms in the import competing sector have a first mover advantage in setting up strategic entry barriers, in light of anticipated

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[1]See the surveys of Harris (1989) and Venables (1985) covering the developments in strategic trade theory and policy.

4

foreign potential entry. The focus of this paper is therefore on potential as opposed to actual competition in export markets, and how this conditions the effectiveness and welfare effects of export promotion policies. The paper is closest in spirit to that of Dixit and Kyle (1985), but differs from their paper in that it places emphasis on the role of strategic entry deterrence by incumbent import competing monopolists, and incomplete information on the part of the export promotion agency.

The rest of the paper is as follows. Section 2 lays out a basic model of entry barriers and international competition used throughout the paper. In this section the incumbent's response to a reduction in trade barriers is detailed. The remainder of the paper deals with export assistance, conditional upon the removal of barriers to imports. In section 3 the problem of promoting export penetration into a single foreign market with full information is examined. The basic issue of "credible" government policy is highlighted in this section. In section 4 the analysis is extended to the case in which the government must operate with incomplete information, and must design a policy applicable to many markets, not just one. In the final section the results are summarized and some discussion of the literature is given.

2. A Model of Barriers to Entry

The model developed in this section is an adaptation to an international context of the entry barriers model for a closed economy developed by Avinash Dixit and exposited in his 1982 paper. I wish to emphasize that this is only one of many entry barriers models which could be used. The Dixit model is chosen because it is widely known, and simple in structure. The analysis throughout is partial equilibrium; this is not to deny the importance of

general equilibrium, but rather to stress that the basic questions are related to intra-industry structure and trade, and strategic policy at the industry level.

The model deals with two countries, home and foreign. The home country is the potential exporter and foreign the potential importer. consider a single market in foreign in which there exists, initially, an incumbent monopolist. The relevant (inverse) demand curve for this monopolist is $D^0(Q)$. The monopolist has a cost function of the form

$$(1) \qquad C^*(q,k) = c^*(q,k) + r^*k.$$

c^* denotes the foreign variable costs of producing output q, given k; r^* is the per-unit cost of "capacity" in the Dixit model, with k denoting the level of capacity. If the firm is cost minimizing k will satisfy

$$(2) \qquad c_k^*(q,k) + r^* = 0.$$

The initial situation in this market is assumed to satisfy two conditions. First, the level of tariff protection is such that exporters from Home cannot enter and make a positive profit, assuming the incumbent monopolist behaves as if potential entrants did not exist. Second, for reasons of scale economies or indivisibilities in Foreign, F^*, the fixed costs to entry from Foreign, is sufficiently large for a domestic potential entrant, that the incumbent can also choose to ignore domestic entrants. The incumbent therefore simply solves the monopoly problem

$$(3) \qquad \max_{q,k} D^0(q)q - c^*(q,k) - r^*k.$$

We assume there is a single potential entrant from Home into the Foreign market. The costs of production for the entrant are $c(\cdot)$ and r, with F denoting the *fixed cost to entry* into Foreign's market. If this firm is already in production in the home market, F would include only those fixed

costs specific to exporting. If the firm does not now produce for the home market F would also include the fixed costs of setting up production. To keep the analysis simple $D^0(\cdot)$ will be the demand curve for Foreign buyers of the good only. Thus we assume Foreign does not export to Home, and the Home firm can practice price discrimination between the Home and Foreign market.

The initial equilibrium is depicted in Figure 1. Subscripts F and H refer to Foreign and Home respectively. The incumbent monopolist produces at $q^m = OM$ and chooses k so $c_k^*(q^m, k) + r^* = 0$. The curve ψ^0 is the entrant's Cournot-Nash reaction curve $\psi_1(k^m)$ is the Cournot-Nash reaction curve of the incumbent conditional upon having sunk capacity $k = k^m$. If entry were to occur the equilibrium would be set at A. By assumption profits to the entrant, $\pi^0(k_F^m)$, as a function of the incumbent's capacity must be negative at A; i.e.,

$$\pi^0\left(k_F^m\right) \equiv \max_{q,k} \; q(1-t)D^0\left[q_1(A)+q\right] - c(q,k) - rk - F$$

where t is Foreign's ad valorem tariff rate with $\pi^0\left(k_F^m\right) < 0$, with superscript i=0 denoting tariffs and i=1 denoting free trade. By virtue of the assumptions made the monopolist can produce at the monopolistic output and choose capacity in a cost minimizing way.

With reduction in tariffs the demand curve facing the Home entrant shifts out. As a result ψ_H^0 shifts to ψ_H^1 and profits at the post-entry equilibrium point A', $\pi_H^1(k^m)$ are positive. Furthermore were entry to be *accommodated* by the incumbent, the long-run equilibrium point would be X in Figure 1, with the incumbent giving up market share to Home's exporter and reducing capacity.

The reaction of the incumbent to the announced *future* reduction in Foreign's trade barriers will not generally take the form of accommodation.
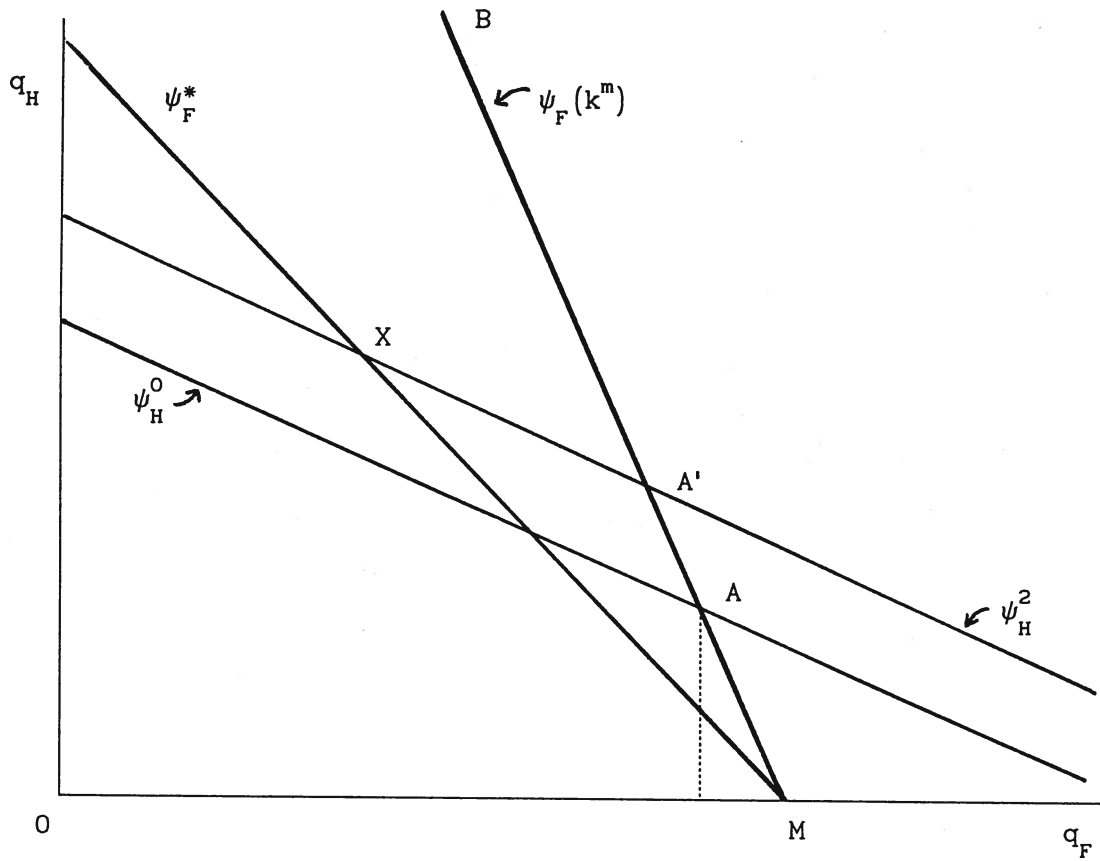
Figure 1

Pre- and Post-Liberalization Equilibrium with Accommodation

Following Dixit's analysis the incumbent may increase k_F, beyond k^m, to $\hat{k}_F$ such that at the intersection of ψ_H and $\psi_F(\hat{k}_F)$, point A" in Figure 2, profits to H are just zero, $\pi_H^1(k_1) = 0$. The curve FA"D is the post entry reaction curve of 1 given k_1 equal to $\hat{k}_1$. Entry is deterred and profits to the incumbent are given by

(4) $\qquad m(\hat{k}_F) \equiv \max_q qD(q) - c^*(q, \hat{k}_F) - r^*\hat{k}_F$.

Let π^* and m^* denote profits to the entrant and incumbent respectively, at the accommodation point X in the absence of protection. Clearly $\pi^* \geq \pi(k_F^m)$. However if

(5) $\qquad m(\hat{k}_F) > m^*$,

Then deterrence will be chosen over accommodation by the incumbent and the potential export market will not be realized for Home. Output and capacity in Foreign's market equals OD.

The reduction in trade barriers has resulted in greater output and hence lower prices in the Foreign market, as OD exceeds OM. Output is lower however at D, than at the accommodation point X. The other problem is that D may be characterized by inefficient production, in that k_F is not in general cost-minimizing. This follows since the level of k_F which deters entry at equilibrium point A", is not guaranteed to minimize cost for actual output produced, equal to OD. If $\partial^2 c(q, k)/\partial q\partial k < 0$, in general it can be shown that the level of k chosen at point D is in excess of the cost-minimizing level of k. It is possible the net welfare effect on the Foreign country of reducing the trade barriers is actually negative if the cost inefficiency of entry deterrence is sufficiently great. Welfare to Foreign at D will be lower than at X where lower cost foreign imports replace the high cost output of the incumbent.
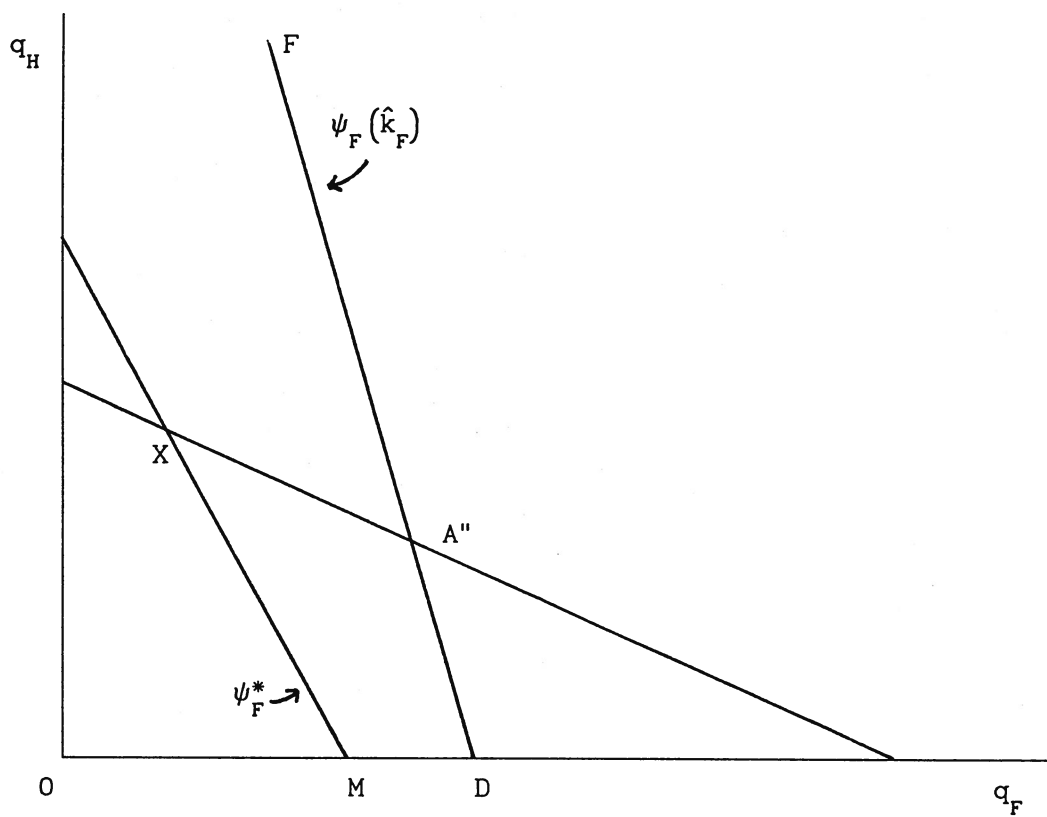
Figure 2

Free Trade Equilibrium with Foreign Entry Deterrence

3. Export Promotion in a Single Market

In this section the attention shifts to the interests of the potential exporting country (Home) and the policy problem of promoting exports subsequent to a reduction in trade barriers by Foreign, but in the face of successful entry deterrence by the incumbent firm in the Foreign market. In this partial equilibrium framework the social returns to Home from successfully entering the Foreign market, *were entry accommodated*, are given by π^*. The problem from Home's point of view is how to get the incumbent to accommodate entry. This raises the issue of subsidizing exports.

If exports are subsidized it is not unreasonable to expect this will affect the incumbent's decision to accommodate. One can imagine the Home government making a threat to subsidize exports sufficiently which would force the incumbent to accommodate. The principal issue is whether such a threat is 'rational' on the part of the Home government, and hence credible. I shall define 'rational' to mean in the sense of maximizing Home's economic welfare; in this context this is measured simply by producer surplus on export sales less subsidy costs. The issue of 'credible' export promotion is quite important and will be returned to later in this section.

In this section attention is focused on a single export market in which sales are potentially privately, and hence socially, profitable to Home. There are three major players each with full information: the incumbent, the potential entrant from Home, and the Home government. We start by considering a Nash game between the incumbent and Home government, with entrant playing as a follower given the strategies chosen by the other two players. The implicit timing underlying this choice is that subsidy policy and entry-deterring investment must be chosen *before* entry to the export market is decided upon.

11

The particular type of export subsidy examined is a *maximum contingent loss subsidy*. This takes the form of a statement by government that it will subsidize losses in the export market, *contingent upon losses occurring*, but will subsidize them only to some maximum level. Should losses exceed this maximum the subsidy will be zero. Let L denote ex post losses contingent upon entry to the export market. Let S denote actual subsidies paid, and S* the critical subsidy maximum. The subsidy policy function has the form given in Figure 3.

Given a subsidy policy of this form, *successful* entry deterrence by the incumbent requires that k_F be chosen so that

(6) $\qquad \pi\left(\pi_F\right) + S^* \le 0.$

Let $k(S^*)$ denote the solution to (6) with equality. *Profitable* entry deterrence requires that

(7) $\qquad m[k(S^*)] > m^*.$

In general we presume that $\pi(\cdot)$ and $m(\cdot)$ are decreasing functions of k, the level of capacity "sunk" by the incumbent. Let $\bar{k}$ satisfy $m(\bar{k}) = m^*$, and $\bar{S}$ satisfy $\pi(\bar{k}) + \bar{S} = 0$. For all $S^* \ge \bar{S}$, the incumbent could not profitably deter entry, as $k(S^*) > \bar{k}$, and hence $m[k(S^*)] < m^*$. The Home government, by threatening a sufficiently large contingent loss subsidy to its export firm, forces the incumbent Foreign monopolist to accommodate entry.

For given subsidy parameter S*, the incumbent's Nash best response is given by the line $\hat{k}XYZ$ in Figure 4. Recall that (dropping the F subscript),

$\hat{k}$: incumbents' choice of capacity when faced with zero-subsidy exports from Home;

$\bar{k}$: critical capacity level beyond which accommodation is preferable;

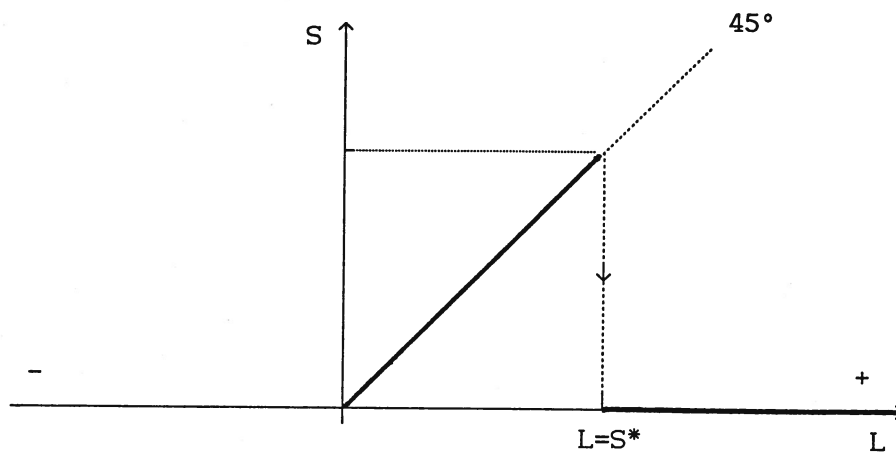k^*: level of capacity in accommodation equilibrium.

Figure 3

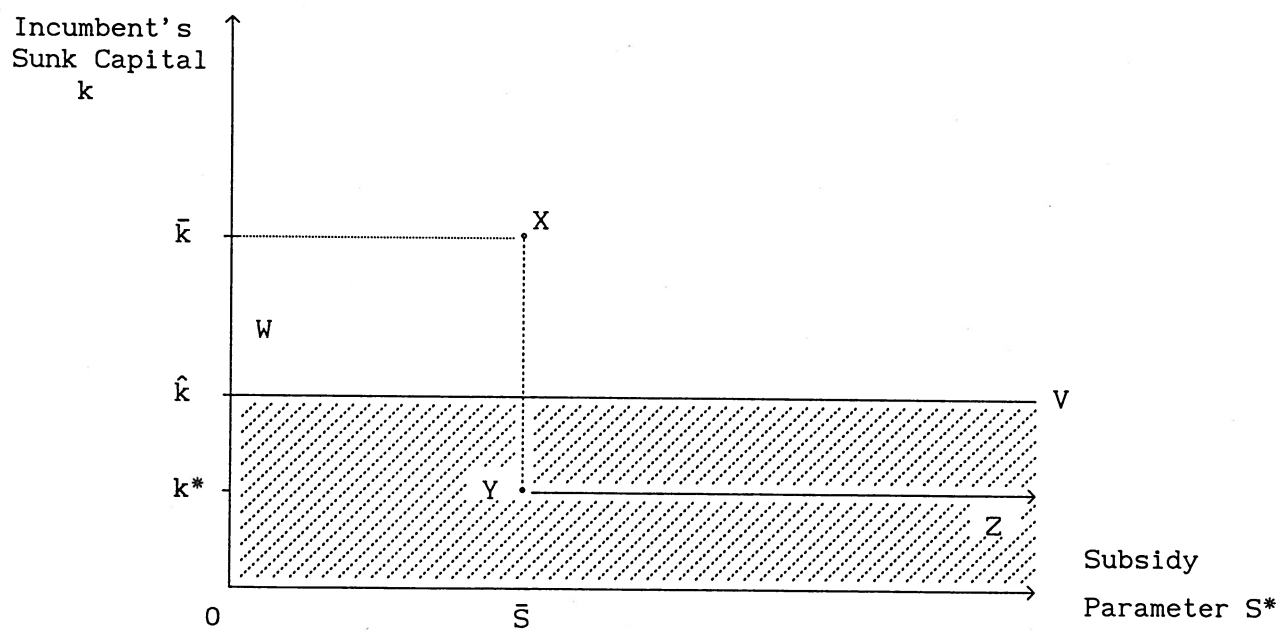Maximum Contingent Loss Subsidies

Figure 4

Foreign Monopolist-Home Government Nash Equilibrium

For S* between 0 and $\bar{S}$, entry deterring investment rises continuously until at the critical value S, the incumbent is indifferent between accommodating the deterring imports into his home market. For S* > $\bar{S}$ entry is accommodated; and k = k*.

The government's objective is to choose S* to maximize $\pi(k)$. Producer surplus equals $\pi(k)$ + S, so Home welfare is measured by $\pi(k)$ + S - S = $\pi(k)$, or net economic profit in the export market. If k is given the best (Nash) response of government is trivial. Fir k ≥ $\hat{k}$, $\pi(k)$ < 0, so the best response is to set the subsidy *parameter* S* = 0. Any positive subsidy would encourage entry when it was socially inefficient. For k ∈ $(\hat{k}, k*]$, $\pi(k)$ > 0, so *entry will occur and will be profitable independent of whatever subsidy level is announced*. As entry is profitable contingent loss subsidies are not paid. The best response on the part of the Home government for k < $\hat{k}$ is multi-valued. In figure 4 it includes the entire hatched-area below the line $\hat{k}$V. For k ≥ $\hat{k}$, the Home best response is the vertical axis with S* = 0.

In the Nash game there are two pure strategy equilibrium outcomes in this game.[2] One equilibrium point is W in which no subsidy is offered and entry is deterred. It is worth noting that this is precisely the same equilibrium that occurs if the incumbent is a Stackleberg player against a Home government follower.

The other set of equilibrium points consists of the line YZ. The equilibrium outcome is accommodated by the incumbent, with *threatened* subsidy by Home government of S* ≥ $\bar{S}$, but actual subsidies paid being zero. This Nash equilibrium is identical to the Stackleberg equilibrium in which the Home government leads.

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[2]There will also exist (generically) a mixed strategy equilibrium in this game. We restrict attention, however, to the pure strategy equilibrium.

In summary we have the basic result that

1. *The full information pure strategy Nash equilibrium in the subsidy deterrence game is non-unique. There are two distinct equilibrium outcomes.*

2. *Each Nash outcome corresponds precisely to the Stackleberg outcome when one of the players is allowed to be the leader.*

This relatively simple model, yielding fairly stark results suggests that strategic outcome will be quite sensitive to assumptions as to who can move first. In many cases it may seem reasonable to give the government as the larger player the first-mover advantage. If this is the case then it seems that threatened subsidy of losses may be a highly effective policy. It is useful though to step back and think about such a policy from different perspectives. The next section will deal with the issue of incomplete information. Two problems with this type of subsidy policy come to mind. First, suppose subsidies must be paid independent of whether losses occur or not, conditional only upon entry. Second, how credible are alternative subsidy policies when subsidy is paid only ex post (i.e. after entry) and all capital is sunk?

4. Non Loss-Contingent Subsidies

If a lump-sum subsidy is granted to a firm, conditional upon entering the export market then of course the subsidy is actually paid irrespective of whether losses occur or not. If the government has the first move then announcing an actual subsidy of $S = \bar{S}$ will result in the entry accommodating equilibrium. Producer surplus to Home's exporter will equal $\pi^* + \bar{S}$ and from the distributional point of view this might be highly undesirable. If one were to model the rent-seeking behaviour of potential exporters the

15

efficiency losses from exporters attempting to get at $\pi^* + \bar{S}$ could outweigh the welfare gain of π^*. Ignoring rent seeking the efficiency problem with type of subsidy is that in markets where social returns are low, i.e., π^* is low or negative, one is in danger with less than full information of picking up a lot of "losers" or encouraging socially unprofitable entry into export markets. This point will be taken up in a subsequent section.

5. Is Subsidy Post-Entry "Credible"?

There are two ways to look at subsidy. One way is to think of government precommitting itself to some form of policy, which makes subsequent change in policy impossible. The other notion, familiar from the literature on 'perfect equilibria', is to require that subsidy be rational at the moment in time at which it is paid. If subsidy is paid *post-entry* to a Home exporter, but prior to production, the question arises as to whether certain subsidy strategies are 'credible' in the sense of leading to non-decreasing welfare (producer surplus — subsidy cost) for Home. In this section two basic results are established.

For given k_F, the subsidy is lump-sum, i.e., it does not affect the production decisions of either the incumbent or the exporter in the post entry game, then Home welfare measured by $\pi(k_F)$ is unaffected, no matter what the size of the subsidy. Therefore

any lump-sum subsidy policy is post-entry credible in the weak sense that it is neither Home-welfare decreasing or increasing.

Production subsidies raise a different set of issues since the equilibrium outcome is actually dependent upon the subsidy. Let s denote the rate of subsidy on all costs (post-entry) to the Home entrant. For given q_F its response will be to choose (q_H, k_H) to maximize

16

(8) $V_H = q_H D(q_F + q_H) - (1-s)c(q_H, k_H) - rk_H.$

The incumbent post-entry, with k_F given, chooses q_F to maximize

(9) $q_F D(q_F + q_H) - c^*(q_F, k_F).$

Solving the Cournot-Nash outcome yields all endogenous variables $\{q_F, q_H, k_H\}$ as functions of s and k_F. From Home's perspective post-entry k_F is given. The question becomes whether Home subsidy improves Home welfare. Let Home welfare be denoted by

(10) $w(s, k_H) = q_H^e D[q_H^e + q_F^e] - c(q_H^e, k_H^e) - rk_H^e$

where the superscript e denotes all variables are taken as equilibrium functions of (s_F, k_H). By the envelope theorem

(11) $\dfrac{\partial \pi}{\partial s} = q_H^e D'(q_F^e + q_H^e)\dfrac{\partial q_F^e}{\partial s} - sc_q(q_H^e, k_H^e)\dfrac{\partial q_H^e}{\partial s}.$

The terms $\partial q_F^e / \partial s$ and $\partial q_H^e / \partial s$ is conducted by performing a comparative statics exercise on the post-entry Cournot-Nash equilibrium. The sign of (11) is ambiguous for s positive as $\partial q_H^e / \partial s \geq 0$ and $\partial q_F^e / \partial s \leq 0$. If s = 0 and $\partial q_F^e / \partial s < 0$, then a marginal production subsidy to the Home firm is Home welfare improving for the usual Brander-Spencer (1984) rent shifting reasons. However, for any positive subsidy rate, even as low as 0.05 to 0.10, the possibility that (11) is negative is greatly enhanced. There are two reasons for this. First, given k_F is a sunk investment, the responsiveness of q_F^e to s could be small, since this would correspond to a movement along the short-run marginal cost curve of the foreign firm. On the other hand $\partial q_H^e / \partial s$ corresponds to a movement along a long-run marginal cost curve of the Home firm. If technology is similar in both firms, as long-run marginal cost is more elastic than short-run marginal cost, there is a reasonable presumption

that[3]

(12) $\qquad \left| \partial q_F^e / \partial s \right| \ < \ \left| \partial q_H^e / \partial s \right|.$

Let $m = q_H/Q$ denote the import share of the Foreign market captured by Home, and ε the price elasticity of Foreign market demand (in absolute value). Using equation (12) and the first-order condition for Home of

$$P(1-m/\varepsilon) \ = \ (1-s)c_q\left(q_H, k_H\right),$$

it follows that

(13) $\qquad \dfrac{\partial w}{\partial s} \leq \dfrac{m}{(1-s)} \ \dfrac{P}{\varepsilon} \ \dfrac{\partial q_H^e}{\partial s} \ \left[(1-s) \ - \ s\left(\dfrac{\varepsilon}{m} - 1\right) \right].$

Using equation (13) we have the proposition

A sufficient condition, under condition (12), for an incremental increase in production subsidies to be Home welfare non-increasing is that the elasticity of demand in the Foreign market exceed the ratio of Home's share of Foreign's market to the ad valorem subsidy rate, or $\varepsilon \geq m/s$.

This condition is quite easily satisfied for a wide range of plausible parameter values given a positive subsidy rate, $s > 0$. For example, if the elasticity of demand is 2.0 and Home's share of Foreign's market is 0.20, then all subsidy rates in excess of ten percent, are welfare decreasing. In principle one could calculate an optimal production subsidy, but it is in any case likely to be quite small. Given the absence of information typically available in these situations, the best policy may well be not to subsidize production costs. This result suggests quite strongly that the use of

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[3]This is straightforward to show in the case of linear demand and quadratic costs with increasing marginal cost. More generally it can be established provided $D''(Q)$ is not 'too large' and C_{qq} is positive.

production subsidies as an attempt to overcome export market entry barriers suffers from quite an acute credibility problem. The Home government attempting to induce accommodation on the part of the incumbent by threatening to subsidize the production costs post-entry, may have difficulty making the threat believable unless it can somehow genuinely precommit on the subsidy.

6. Export Promotion with Incomplete Information and Multiple Markets

The full information single market problem is, of course, a long way from the real world trade policies problem of dealing with export promotion. In this section we consider the design of a government subsidy policy which must be applicable to a large number of export markets with incomplete information on the part of the government. The government is assumed not to know the demand/cost characteristics of any single market, but is is assumed to know the statistical distribution of these characteristics. Within each market, however, the incumbent and potential exporter have full private information about each other. By assumption, from Home's point of view there are markets in which, given accommodation by the incumbent, a profitable export opportunity exists. There are other markets in which entry would only induce social losses to Home, with or without accommodation. The fundamental difficulty with a subsidy policy under incomplete information is that it may be inevitable that certain 'losers' are induced to enter through subsidy. The main result of this section is that for at least one set of reasonable assumptions it is possible to design a contingent loss subsidy policy which essentially induces the 'first-best' outcome from Home's point of view. It turns out that an equivalent result is obtained for non-contingent loss subsidies, provided the subsidy is applied *only to the fixed costs of entry*

to the export market. This type of scheme of course means that the government must, ex post, be able to identify fixed costs of entry to export markets from production costs for each firm. This creates a fairly obvious sort of incentive problem in that firms claiming subsidy will bias the manner in which they report costs. Nevertheless, the result is quite strong regarding the potential usefulness of contingent loss subsidies. The model of this section is one-dimensional with each market being described by a single parameter: the level of entry costs to the export market.

The model is a generalization of that presented in the last section. There are many markets, each identical with the exception of the parameter F, the fixed costs to entry in the export market by Home's entrant. The function G(F) is the cumulative distribution function describing the population of potential export markets. G(·) is assumed to be continuous and have support in the interval $[a,b]$. Let $\pi(k) \equiv A(k) - F$, with the function A(·) measuring profits before deduction of entry costs, and

(14) $V(F) = A^* - F, \quad A^* = A(k^*),$

i.e., the profitability of entry conditional on accommodation in "market" F with k* being the common 'accommodation capital stock' of the Foreign firms. It is assumed there are both good and bad export markets; i.e., there exists an F_c, $a < F_c < b$, with $A^* - F_c = 0$. The set of markets on the interval $(F_c,b]$ are losers were entry to occur. The initial situation prior to subsidy is presented in figure 5a. We start with an initial situation such that in the absence of export promotion export entry by Home does not occur in any market. Over an interval $[a,F_d]$ entry is actively deterred by the incumbent, in the sense that the unconstrained monopoly output is not sustainable and hence k_F is chosen to deter entry. Over the interval $[F_d,b]$
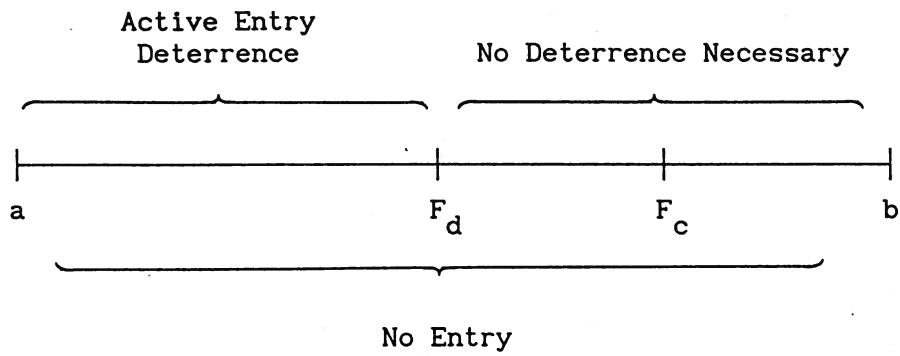
Active Entry
Deterrence   No Deterrence Necessary

a F_d F_c b

No Entry

Figure 5a

Entry Accommodated   Active and/or Passive
                                 Entry Deterrence

                                 F_c
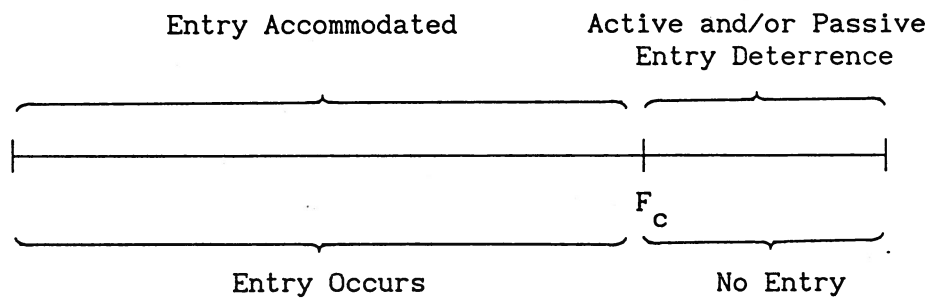
Entry Occurs   No Entry

Figure 5b

21

no entry occurs, but the incumbent behaves as an unconstrained monopolist. A *successful* subsidy policy for Home is one which succeeds in shifting outcomes to that presented in Figure 5b. If the indicated pattern of accommodation and entry can be realized, all potential profitable export markets will be realized and all non-profitable export markets will be avoided. The key to constructing a successful subsidy policy is to exploit the incumbent's incentive to deter and accommodate under different circumstances.

Recall that m* is the payoff to accommodation to the incumbent, and m(k) the payoff if k succeeds in deterring entry; m(k) is strictly decreasing in k so define $\hat{k}$ such that

(15) $m(\hat{k}) = m^*$.

A(k), also decreasing in k, is the payoff gross of entry costs to entering the export market when the incumbent sets her sunk capital at level k. Define $\hat{F}$ so that

(16) $A(\hat{k}) = \hat{F}$.

By construction, for all markets with fixed costs $F < \hat{F}$, entry will be accommodated by the incumbent, and for all $F \geq \hat{F}$ entry will be deterred by the incumbent. Choose a contingent-loss subsidy parameter, $\hat{S}$, so that

(17) $F_c - \hat{S} = \hat{F}$.

Hence the maximum subsidy is chosen so that the *socially* critical market $F = F_c$ becomes the dividing line between those market which are accommodated and those that are deterred by the incumbents. Given a maximum subsidy of $\hat{S}$, the pattern of entry is exactly that desired in figure 5b, and furthermore, since V(F) > 0 for all $F < F_c$, there is no actual subsidy paid. Summarizing

*With incomplete information on private costs of entry to the export
market, a single parameter contingent-loss export subsidy scheme
sustains the first-best outcome for Home.*

To compute the maximum loss parameter $\hat{S}$ in the CLS scheme the government must know $\hat{F}$ and F_c. While it is difficult to know these parameters exactly the problem is much less than individually identifying the characteristics of each market. If $\hat{S}$ is set too low then the set of export markets which are established will be smaller than the first-best set. If $\hat{S}$ is set too high entry will occur in markets which are not profitable export markets for Home.

If subsidies are paid on the basis of costs incurred rather than losses reported, it is possible to still sustain the first-best outcome provided only the fixed entry costs are subsidized. Suppose an ad valorem subsidy of s is allowed on all fixed costs of entry, and s is chosen such that

$$(18) \qquad (1-s)F_c = \hat{F}.$$

From previous analysis it should be clear that for all $F < F_c$ entry is accommodated and vice-versa, for $F \geq F_c$. Again no subsidies are actually paid since all markets which are accommodated are profitable export markets.

7. Conclusion

A relatively simple model of barriers to export and export promotion in an oligopolistic situation has been presented. While it would be premature to draw policy-relevant conclusions from one highly stylized model, the analysis points to some interesting features of export promotion policies by small countries during a period of transition to liberalized trade. During such a transition, potential exporters attempting to enter the large-country foreign market may face active entry deterring action by import-competing, large-country firms. This makes the prospects for exports by the small country less likely, even though such exports could be rationalized on a comparative advantage basis. In such a situation, the small country may "promote" exports in an attempt to overcome the entry/export barriers. In the models presented, sensible export promotion had three characteristics. First, subsidy should be targeted explicitly at those fixed costs which are specific to the act of entering the export market. Second, subsidies based on production or sales in the foreign market, in many circumstances, may lead to a deterioration in the subsidizing countries' welfare. Finally, in promoting entry to export markets in the presence of incomplete information there is the problem that inefficient exporting may actually be encouraged. In one model it was demonstrated that this problem is mitigated to the extent that import-competing incumbents with superior private information on potential entrants actively deter entry. A major qualification to all the results presented is that retaliation by the importing-country government is assumed not to occur. This may be justified in those circumstances where entry deterring behaviour by import-competing incumbents is actually injurious to the importing countries' welfare.

The major difference between this paper and those of Brander and Spencer (1983) and Dixit and Kyle (1985), who also look at export promotion, is the focus on the firm's entry decision as distinct from the sales decision. The Dixit and Kyle paper is closest in spirit to this one, but it does not treat the problem of incomplete information on the part of the government, and focuses on the symmetric large country case. Designing policy to induce appropriate entry to new export markets for small industrial economies is inherently difficult, but not impossible. Furthermore, policies by governments assisting firms to break into new export markets can be easily understood, if the status quo leads to outcomes in which these markets fail to become established because of entry-deterring activity by large firms in the importing country.

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