Strategic Responses to Antidumping Laws and Legal Interpretations: Producing for Export Markets Using Lawyers and Other Factors of Production*

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Abstract

This paper explores in the context of a stylized model of dumping some possible strategic responses to the use of "cumulation" and "threat of material injury" in dumping investigations. In particular, it is shown that these guidelines for investigations can change the payoff structure of competition abroad and thereby induce reduced competition and optimal – from an individual firm point of view – excess capacity.

I. Introduction

Although "dumping" has never really generated much support among the academic community as a genuine threat to national welfare, both the GATT and national trade laws explicitly acknowledge the practice and provide for various remedies. Increasingly around the world dumping cases are being filed and are finding favor in quasi-judicial forums of government agencies assigned to investigate the complaints and mete out commercial justice. One problem with these investigations is that since the GATT and national

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laws are so vague as to what practically constitutes dumping and "harm," each investigation in itself tends to create new precedent. And, since the rulings are often influenced by a protectionist constituency, each new case tends to relax the definition of dumping and of harm. In an insightful paper, Messerlin [1991] chronicles how *ad hoc* decisions relating to special cases tend to get translated into precedents and then to be legalized.

While research has focussed mostly on how various applications of the dumping laws increasingly favor a protectionist remedy, there is another point to be made. Namely, exporting firms potentially subjected to new dumping rules need not passively accept the new environment. On the contrary, firms should and do monitor the new precedents and so have an opportunity to respond actively. One way in which exporters can respond is by trying to use dumping laws to the disadvantage of their fellow exporters.

Two recent interpretations of dumping laws are especially conducive to eliciting a strategic response on the part of incumbent exporters: "cumulation" and "threat of material injury" or "capacity dumping."

Cumulation has been used in assessing injury from dumped imports and entails aggregating the imports from all firms in each exporting country and also possibly aggregating across countries as well in investigating one complaint. This may well make it more likely that a positive finding of injury will be rendered, and we take this as a starting point. But there is also a potential effect on the exporting firms' behavior perhaps not anticipated by the cumulation ruling. In particular, if the would-be dumping firms are in a position to act as competitive price-searchers – oligopolists – then there arises an opportunity for a firm to use the dumping law to its strategic advantage by pushing up exports to the point where additional exports from a rival would credibly trigger a positive dumping finding and so deter entry. This possibility would arise especially if a firm has a first move advantage in putting its export capacity in place, as say would an incumbent firm in an industry versus a new rival, possibly not even in the same country.

Capacity dumping arises from the "threat of material injury" clause. Messerlin recounts how the Tokyo Antidumping Code was not explicit on what constitutes threatening material injury to an established industry and so invites a dumping remedy sanctioned by Article VI:6b of the GATT. Thus, since 1985, the Committee on Antidumping Practices has provided guidelines

including as factor of threat of injury "sufficient freely disposable export capacity." While not much has explicitly come of the consideration of idle export capacity as a factor in injury determination, the clause is increasingly mentioned in cases and Messerlin reminds us of the chain of events from interpretation to precedent to law in other dumping rulings. In this paper, we assume that capacity dumping indeed results in positive dumping findings and remedies. Again, when this is so it can work to the advantage of incumbents in an exporting country who, cognizant of the ruling, acquire an incentive to act strategically against fellow would-be exporters by putting additional capacity in place to credibly deter competitors now worried about a positive dumping ruling if they try to export. Furthermore, it turns out that, theoretically, it always pays an incumbent exporting firm in this environment to hold some idle capacity and possibly to charge a higher price than would be mandated by a positive dumping finding. Also, in the capacity dumping case, welfare typically increases in the dumping country and deteriorates in the importing country with the law, even if the law is never actually applied.

While the model developed below is highly stylized, the results do seem to generalize in a natural way. One theme that deserves emphasis is the recurring result that various dumping rulings and interpretations such as the two investigated here can have important effects even if no dumping case is ever actually brought. Indeed, the effects of such dumping laws can be to reduce competition abroad and diminish the incentive to export at the lowest prices possible. This notion that even apparently unused rules and seemingly non-binding constraints can alter market outcomes has been noted before in the dumping context by Gruenspecht [1988], wherein foreign firms are induced to abandon the profitable strategy of selling below cost temporarily to gain experience, which then changes the payoff structure of competition.

II. The Model

The model follows Dixit [1979, 1980] and Spence [1977], but is modified to address "strategic investment" including discrepancies between capacity and capacity utilization. Staiger and Wolak [1992] also explore the role of dumping and antidumping laws in capacity decisions, but there the focus is

on demand uncertainty and a foreign monopolist who might dump to defray the cost of holding excess capacity when demand is slack in its own market. Tirole [1990] provides an integrative survey of some of the models and related issues, and we will loosely adopt his notation as well as, later, some of his specific functional forms.

Now suppose initially that there are only two countries – Home (H) and Foreign (F) – and that H firms are oligopolistic exporters into the F market. Since our interest is on the effects of F's dumping laws and rulings on H firms' strategic interactions, we will simply assume that the H firms face a residual (inverse) demand function in F given by $p=p(q)$, where q is the sum of H firms' exports denoted q_i for each firm i. We might think of these firms, for example, as Czech steel firms exporting to the EC, or as EC steel exporters to the U.S. We will ignore home sales to the home market altogether.

In H, firms in the industry are identical and produce according to a cost function given by $c(q_i, K_i)$, where K_i denotes capacity available for production. There are the constraints that, choosing units appropriately, $q_i \leq K_i$ and that capacity itself must be "bought" or "built." We suppose that c is nondecreasing (typically increasing and convex beyond some point) in q_i and nondecreasing (typically increasing) in K_i, at least beyond some costminimizing choice of K_i. Also, $\delta^2 c / \delta q_i \delta K_i < 0$.

Firms are assumed to maximize profits. The choice variables are q_i and K_i. The choices are observable and information is complete, so there are no signaling problems as in Hartigan [1993] wherein anti-dumping laws can change the nature of competition when a foreign firm uses price in the first period in order to signal that it is a low cost firm – even if it is not – aiming to induce exit from the market by a home firm. However, the complication arises that H firms – or at least their lawyers – monitor the dumping laws and legal interpretations in F and try to use these to their advantage, or at least to their competitors' disadvantage. Thus, the assertion is that H firms need not react passively to the various dumping actions but may want to anticipate rulings and use them strategically to gain an advantage against other H exporters. This anticipation of rulings and their strategic use by H firms is somewhat reminiscent of Anderson's [1992] "domino dumping" model wherein firms optimally dump in order to gain future allocated market share in anticipation of a voluntary export restraint.

Now the potential effect on H firms of dumping rulings in F depends crucially on the H firms' conviction that the various rulings will be consistently applied, which we assume, and on the strategic environment in H. We will explore several cases with and without a "first move advantage" in establishing capacity.

In much of the dumping literature – *e.g.*, Webb [1992] and references therein – "dumping" is simply modelled as the constraint that H export prices in F cannot be less than those goods' prices in H. The legal remedy is either an "undertaking" by H firms to raise prices to an "acceptable" level or the imposition of duties geared to the margin of dumping. Of course, in fact, it is widely held among economists that these findings of "selling below fair value" are biased toward a positive finding and so often result in some remedy that forces the H firms to raise export prices sooner or later. There is an insightful discussion of this phenomenon in the papers in Boltuck and Litan [1991] and in Tharakan [1991], as well as Bovard [1991].

The particular interest of this paper, then, is to investigate H firms' views and reactions to the sorts of rulings in F which will both *i*) result in a positive dumping finding and remedy such as a duty or an undertaking, and ii) are under the control of H firm decision makers in the sense that H firms can or cannot trigger the application of the rulings by their actions. The generic form of export prices confronting H firms is therefore given by something like $p = p(q;$ legal rulings and interpretations in $F)$. For example, Webb [1992] and others have investigated the consequences of the constraint $p(q) \geq p_H(q_H)$ where p_H and q_H denote price and sales in H for a firm exporting to F. Some interesting conclusions that emerge include that in a Stackelberg environment, the dumping law country's firm can use the anti-dumping law to curb competition even from non-dumpers. There, and in closely related papers on strategic trade policy as surveyed in Vousden [1990], the focus is especially on strategic reactions between a home and a foreign firm or by exporters in different countries separately affected by dumping rulings. Here the focus is especially on strategic competition among firms within a given exporter nation or among exporters all subjected to the consequences of a given ruling. (This is because of the focus on "cumulation.") Therefore the anti-dumping constraint on H firms will be taken to be some minimum price, P, which may limit H exports to F and is

set dependent on the economic and legal environment in F.

Two rulings are of particular interest – "cumulation" and "capacity dumping." In the first case the anti-dumping constraint takes the usual form of a price floor $P \leq p(q)$. But now the constraint applies to all firms, even potential new entrants, and so firms react strategically *within H*, which matters particularly if there is any first move advantage.

In the second case – "capacity dumping" – the anti-dumping constraint is further modified to include capacity in place, not just exports, as relevant information in setting the dumping margin and hence to set P. That is, the constraint takes on a form such as $P(K) \leq p(q)$ where K is the sum of H firms' capacity which is used as evidence of potential harm – so-called "threat of harm" – in determining the dumping finding and eventual margin or, more likely, required undertaking.
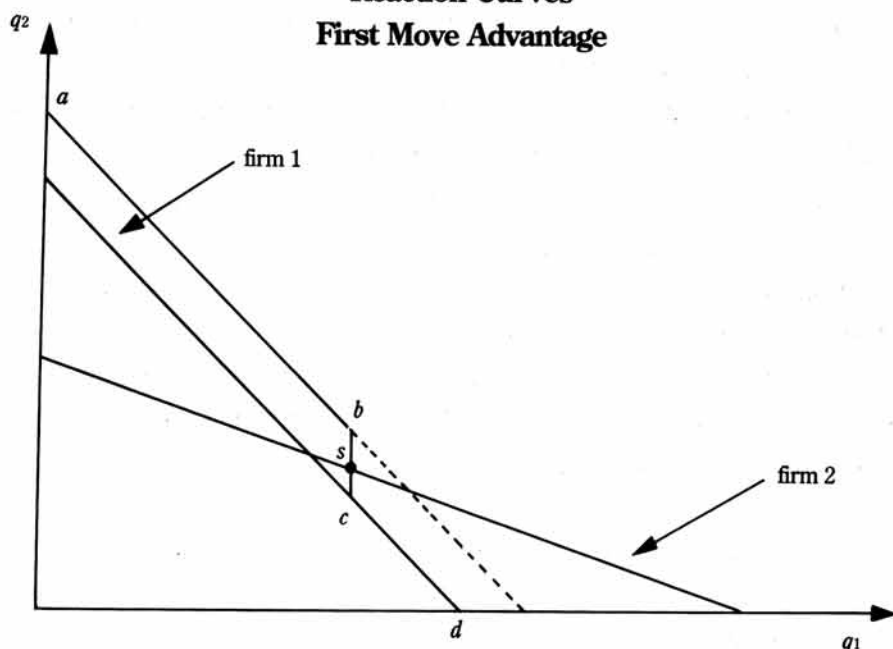
III. Equilibrium and a Textbook Example

In order to make some of the possible repercussions of these dumping rulings clear, we begin with a standard model of Cournot duopoly among H exporters using the structure outlined above. We assume that there are only sales to the foreign market and that any actions by foreign firms – aside from dumping policy induced price floors or quantity restrictions – are ignored. Assume first as a reference point that capital and output decisions are made with no first move advantage. As usual, the equilibrium occurs at the intersection of firms' reaction curves as in Figure 1.

Now for concreteness and since we are only focussing on what is possible, suppose that the import demand curve in F is linear and given by $p = a - b(q_1 + q_2)$. Suppose also that the cost of putting capital in place is c_0 per unit, that the marginal cost of producing is c per unit, assumed constant, and that capacity and quantity units are chosen such that maximum output is constrained by $q_i \leq K_i$. Each firm seeks to maximize profits given by $\pi_i = q_i(a - b(q_1 + q_2) - c_0 - c)$. In this example, when firms choose capital and output simultaneously – and choosing units so that $a - c_0 - c = 1$ and $b = 1$ – reaction curves are given by

$$R_i = (1 - q_j)/2 \ , i \neq j.$$

Figure 1
Reaction Curves
First Move Advantage

Solving explicitly yields $q_1 = q_2 = 1/3$. There is no excess capacity – $K_1 = K_2 = 1/3$ – and profits are $(1 - 1/3 - 1/3)/3 = 1/9$ for each firm.

Suppose next that one firm has a credible first move advantage which allows it to act as a Stackelberg leader. As in Tirole's [1990] presentation of Dixit [1980], this advantage is assumed to derive from one firm being able to put its capital in place in the first period and then both firms producing and competing in the second period by putting additional capital in place as is profitable. The effect of this is to give firm 1 the possibility of credibly threatening to expand output to the Stackelberg equilibrium point since the capital required to do this is already in place in period 2 and so marginal production costs are just c, not $c + c_0$ as confront firm 2 in period 2. This gives rise to the "two-part" reaction curve for firm 1 as in Dixit and in Figure 1 here as *abcd*. Equilibrium is at S where firm 1's isoprofit curve is tangent to the firm 2 reaction curve.

In the specific example used above, the Stackelberg equilibrium is as usual derived by firm 1 inserting firm 2's reaction response into the profit function to maximize with respect to q_1, $\pi_1 = q_1(1 - q_1 - (1 - q_1)/2)$. At the maximum, $q_1 = 1/2$ and $q_2 = 1/4$. Profit are given by $\pi_1 = 1/8$ and $\pi_2 = 1/16$.

IV. The Effects of Some New Dumping Rulings

We now modify the model in order to accommodate various dumping rulings. While strong results are available with the specific base model above, with which we begin, these results turn out to generalize in a natural way.
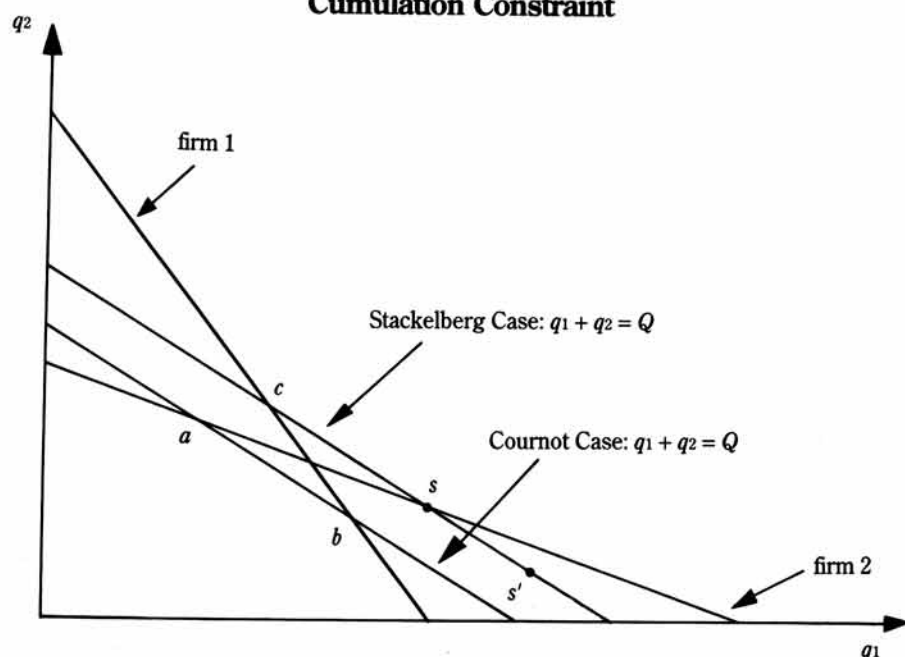
A. Cumulation

Cumulation is the ruling prevalent especially and increasingly in the EC that while only a single firm or nation may be "guilty" of dumping, the investigation and ultimate decision must take account of all exporters and even *potential* exporters in a nation or even across nations. Well documented discussions of this point in the United States can be found in almost any United States International Trade Commission investigation such as, for a recent example, USITC [1993, p., I-7]. Thus, in our framework, for *both* producers in H the dumping constraint becomes $P \le p(q_1 + q_2)$ which links firms to each other through the dumping law even though it is "the other firm" that is the subject of the dumping investigation. Accordingly, the dumping constraint enters into the rivalry between H firms.

Now just how much this constraint matters depends on the competitive environment in H. Suppose first that the game is simply symmetric and Cournot. Then the firms' reaction curves do not shift but there is the additional constraint that $q_1 + q_2 \le Q$, where $P = p(Q)$ is the dumping constraint imposed. If initially $q_1 + q_2 \le Q$, the ruling makes no difference, although we will soon show that such seemingly harmless restrictions can matter under other circumstances. Of course, assuming that $q_1 + q_2 > Q$, the constrained reaction curves now coincide over a range given by ab in Figure 2. Equilibrium is indeterminate but a natural solution is $q_1 = q_1 = Q/2$.

However, rulings such as "cumulation" begin to matter crucially when the game is no longer symmetric. Suppose that, as above, firm 1 now has a first move advantage, perhaps because it is able to put its productive capital in place a period earlier than can firm 2. (Firm 1 may be the incumbent and firm 2 a potential rival, for example.) In this case, seemingly innocuous rulings can matter in important ways.

In order to see this, consider the example above where firm 1 acts as a

Figure 2
Reaction Curves
Cumulation Constraint

Stackelberg leader. Recall that the equilibrium is at $q_1 = 1/2$, $q_2 = 1/4$, with profits $\pi_1 = 1/8$ and $\pi_2 = 1/16$. (Price in F would be $P = 1/4$). Now suppose that the F government makes known that any export price below current levels, $p(q_1 + q_2) = 1/4$, is unacceptable and would result in a dumping investigation and presumably a positive finding. Thus, $q_1 + q_2$ cannot exceed $Q = 3/4$, the current export level. This action does more than preserve the *status quo*, however, and now causes a strategic response somewhat as in a limit pricing entry deterrence model. This sort of response appears in the literature stemming from Bain [1949] and is surveyed in Milgrom and Roberts [1982] and especially in Tirole [1990]. Firm 1 now seeks to choose q_1 to maximize profits $\pi_1 = q_1(1 - q_1 - q_2)$ subject to the knowledge that $q_2 \leq Q - q_1$ because of the cumulation interpretation. (As above we choose parameter units so that $a - c_0 - c = b = 1$.) Thus the potential dumping investigation along with the cumulation interpretation allows firm 1 to move beyond its Stackelberg output knowing that firm 2 will respond by exactly reducing its output by the same amount. Therefore, profits are given by $\pi_1 = q_1(1 - q_1 - (Q - q_1)) = q_1(1 - Q)$. This is increasing in q_1 up to the con-

straint so that the optimal strategy is $q_1 = Q = 3/4$. Price, and so welfare, stays the same in H and F. However, firm 2 now drops out of exporting in equilibrium and profits for firm 1 become $\pi_1 = 3/16$, a 50% increase.

Clearly the dumping ruling, although seemingly redundant since no restriction on current total quantity was required, has given firm 1 a strategic advantage. The source of the advantage is intuitively clear and again reminiscent of the limit pricing literature. In the absence of some constraint on total exports, firm 1 can exploit its first move advantage only to the extent of finding the optimal point along firm 2's reaction curve. However, the dumping restriction effectively gives that reaction curve a vertical segment at Q. Anything that firm 1 does not export below Q will be exported by firm 2 anyway and firm 1 will simply lose the revenues. So long as price covers marginal cost – in this case $(1 - Q) > 0$ – firm 1 will always find it profitable to displace firm 2 exports with its own.

More generally, while it always pays firm 1 to expand output beyond the Stackelberg point, this expansion need not totally displace firm 2 exports. If marginal production costs are rising, firm 1 may stop short of supplying the entire export market. Nonetheless, since marginal revenue exceeds marginal cost initially, firm 1 will at least displace some portion of firm 2 exports. This can be seen geometrically in Figure 2 where the dumping constraint $q_1 + q_2 = Q$ cuts the firm 2 reaction curve from above at the initial Stackelberg equilibrium point S. This is guaranteed so long as costs are constant or increasing since the slope of the dumping constraint is –1 while the slope of the firm 2 reaction curve is algebraically smaller than this. (See Webb [1992, p. 440].) Thus, firm 1 will optimally expand output to the new tangency point, say, S'.

B. Capacity Dumping

Recently there has been an increasing tendency for investigating agencies to take into a account in injury determination the *potential* to export as measured by idle capacity in the alleged dumping country. In a similar spirit, the language of the NAFTA regarding safeguard remedies also alludes to "potential export capacity." The strategic issue that arises here concerns whether a firm has an incentive to build optimally unused capacity in order

to take advantage of the "capacity dumping" rulings and thereby deter potential entry by competitors. Or, reminiscent of the EC steel industry, it could pay exporters not to remove idle capacity even with the knowledge that it can never be used.

In order to expose the possible repercussions of such interpretations concerning dumping, we suppose that the dumping margin or required undertaking is an increasing function of capacity. In our model we write, as above, $P = P(K)$ where $K = K_1 + K_2$, total industry capacity. Then, recall that the constraint is given by $P(K) \le p(q)$, We will assume that $P(K)$ is monotonic so that when some P is set by policy this also sets some K so that the constraint becomes, in capacities, $K_1 + K_2 \le K$, where now K is taken to be the particular value of capacity which cannot be exceeded by H firms in the aggregate because it can never be used. As before, we simply assume that everyone knows in advance that any export capacity in excess of this amount K will not be tolerated by the dumping investigators in F.

We begin with the two exporting firms, constant cost, linear import demand model and then generalize in light of the lengthy literature on entry deterrence and excess capacity. As earlier, each firm seeks to maximize profits subject to the capacity constraint $q_i \le K_i$, and but now q_i and K_i may not coincide if idle capacity is held. If there is no first move advantage, the situation reverts to the previous Cournot-Nash solution since there is no incentive to build excess capacity because there is no demand uncertainty. While there is again a range of potential equilibria, the natural solution in capacities is $K/2$ assuming that the dumping constraint is binding.

The more interesting case occurs when firm 1 is the Stackelberg leader by virtue of being able to put its capital in place first and then competing with fellow would-be exporter firm 2. In the absence of a dumping law, the equilibrium is as above with $q_1 = 1/2$ and $q_2 = 1/4$. There is no incentive for firm 1 to build extra capacity because the threat to use it would be as idle as the capacity. Thus $q_1 = K_1$ and $q_2 = K_2$. Profits, recall, are $\pi_1 = 1/8$ and $\pi_2 = 1/16$ with price $p = 1/4$.

Now suppose that in addition to the cumulation rulings, there is also a consideration of industry capacity in the dumping investigation. (In the United States, for example, the law charging the United States International Trade Commission commissioners with investigative authority states that

the Commission "shall" cumulate for present injury analysis and "may" cumulate for threat analysis.) In particular, it is assumed known by all that in equilibrium necessarily $K_1 + K_1 \leq K$. Now if firm 1 knows this and can put its capacity in place first, then it will choose K_1 and q_1 in order to solve

maximize $\quad pq_1 - cq_1 - c_0 K_1$

subject to $\quad q_2 = max((1 - q_1)/2, K - K_1)$

$\qquad\qquad q_1 \leq K_1$

where demand price is given by $p = a - b(q_1 + q_2)$. Notice that firm 2 has no incentive to build excess capacity so that q_2 is chosen as a Stackelberg follower, but subject to the capacity dumping constraint rewritten as $K_2 = K - K_1$, which is in firm 1's control up to the F mandated level K.
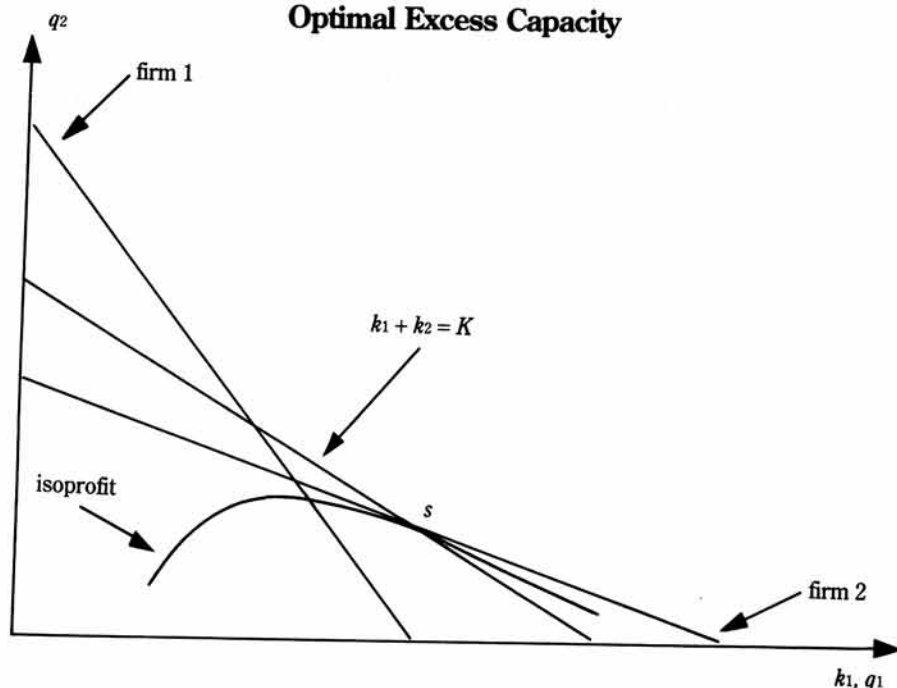
Now, as before, the interesting issue is whether seemingly redundant constraints imposed as dumping rulings can have real economic effects in the exporting and importing countries. In order to see that this is indeed so, suppose once again that the capacity dumping constraint, with cumulation, is just equal to the unconstrained Stackelberg case – i.e., $q_1 + q_2 = K_1 + K_2 = 3/4$. But clearly the original equilibrium $q_1 = K_1 = 1/2$ and $q_2 = K_2 = 1/4$ no longer obtains since simply the cumulation rule, as we have already seen, alters the equilibrium to $q_1 = 3/4$, $q_2 = 0$. We know then that firm 1 will build $K_1 = 3/4$. So the issue is whether or not it pays firm 1 to go ahead now and actually use that much capacity.

The addition of the capacity dumping consideration, it turns out, makes a further difference. This can be seen by writing price in firm 1's problem above as $p = a - b(q_1 + K - K_1)$ – since we know that $q_2 = K - K_1$ will always bind – and deriving the first order conditions

$$a - 2bq_1 - b(K - K_1) - c - c_0 \geq 0$$
$$bq_1 - c_0 \geq 0$$

where we omit the complementary slackness conditions. The first condition says that the production decision is set according to marginal revenue – the first three terms – equals marginal cost. Notice that marginal revenue decreases in q_1 and K_1 jointly as capacity is built for actual production (by the amount $- 2bq_1 + bK_1 = -bq_1$) but increases in K_1 alone as capacity is built not for export but solely to deprive firm 2 of exports. The second condition

Figure 3
Optimal Excess Capacity

says that the capacity decision is made according to whether the contribution to marginal revenues through keeping firm 2 from being able to legally build capacity to export more and so lower price by b for all firm 1 sales $q_1 - bq_1$ – exceeds the cost of building firm 1 capacity – c_0. In the linear model here, if this is positive then firm 1 preempts all firm 2 capacity by setting $K_1 = K$. Then the first condition simply looks like the monopoly pricing rule and would hold with equality since we assume that initially K is set by the F government at the Stackelberg capacity level. Also, since the Stackelberg output level is greater than the monopoly lever, we know that $q_1 < K_1$ – *i.e.*, firm 1 builds optimally unused capacity. For example, using the numbers above, if $K = 3/4$, then $K_1 = K$ but $q_1 = 1/2$. Thus firm 1 holds idle capacity $K_1 - q_1 = 1/4$.

More generally, if capacity building costs, c_0, are increasing in K_1 or if demand is nonlinear, then the possibility arises that firm 1 will not totally preempt firm 2 capacity. Nonetheless, it will typically pay firm 1 to build some idle capacity at least. This is because at the optimal production point, marginal revenue equals marginal cost inclusive of both capacity cost and operating cost. Therefore, marginal revenue lost by letting firm 2 produce

and export must exceed the marginal cost of building unused capacity. Geometrically, as in Figure 3, firm 1 can always move to a higher isoprofit curve at the marginal cost of c_0. But the exact equilibrium, which will entail idle capacity, may allow some positive q_2 if c_0 rises at the margin.

Unlike cumulation alone, the addition of capacity dumping now has welfare implications beyond the distribution of profits between exporting firms. In H, welfare actually improves even with idle capacity. This is evident in the linear, constant cost model. There the total capacity built is, by construction, the same as without the dumping constraints, but the monopoly price and quantity are being set. Therefore, while there is idle capacity, it is capacity which would have been built anyway but with a deleterious effect on profits if used to actually produce. In F welfare costs are increased since p will be higher – in fact, even above the required undertaking of P.

V. Extensions and Some Concluding Concerns

The main point of the stylized models presented in this paper is that legal or quasi-legal and precedent setting interpretations of dumping laws do not happen in a vacuum. Firms are likely to actively, not passively, react to the new legal environment by trying to take advantage of it. In the case of two growing interpretations investigated here – cumulation and capacity dumping – even seemingly redundant applications of the rulings turn out to change the competitive environment among firms in the alleged dumping country. Furthermore, the legal interpretations can lead to optimally unused capacity that increases welfare in the dumping country.

These dumping interpretations seem to be spreading in breadth and scope as is clear from reading USITC reports and from thoughtful studies such as Messerlin [1991]. The extensions of the analysis here are straightforward and suggestive of some concern. To the extent that exporters are located in different countries, cumulation on a global basis would result in firms with a first move advantage preempting the production of other firms. Also, firms in some countries would have an incentive to build capacity and optimally hold it idle if capacity dumping is added to the cumulation interpretation.

The main concern surrounding such rulings is clearly related to potential

new entrants, especially firms in developing countries as comparative advantage shifts to them. Dumping laws can be used to somewhat protect senescent industries from a new round of competitors. Interpretations of those laws extending to cumulation and capacity dumping only serve to protect the incumbent competitors from a newer round of competitors to the extent that these incumbent exporters anticipate future entrants and adjust their capacity decisions accordingly. Welfare costs of dumping laws thus increase and may fall substantially on potential new entrants in emerging economies.

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