The anticipated profits from entry by an established firm into a new market will depend on how incumbents in that market are expected to respond. One possibility, suggested by cases and the literature, is that an incumbent may respond with “retaliatory entry” into the first entrant’s “home” market. The model presented here describes conditions under which this can be a credible threat that deters the first entry. When the conditions are such that it is not credible, the paper shows how firms can provide credibility through the establishment of toe-hold investments in other markets.

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I. INTRODUCTION

Under what circumstances will a firm (call it “firm A”) be deterred from entering a new market (e.g. a foreign market) for the principal reason that it fears that this entry will induce an incumbent (“firm B”) in that market to respond by entering into firm A’s home market? Put another way, when is the threat of “retaliatory entry” a credible one that may influence entry decisions? While much of the law and economics literatures on incumbents’ responses to new entry have focussed on predatory pricing and other responses within the very market subject to entry, the strategy and international business literatures have recognized that, in some cases, the incumbent’s retaliation may come in a different market.

It is not obvious, however, why such threats should be credible. After all, if B’s entry into A’s market is not profitable before A’s entry into B’s market, why is it profitable after? Previous work (Chen and Ross [2007]) on models in which firms produce for multiple oligopolistic markets from a single facility that generates rising marginal costs suggested a possible answer. In these models, when a firm produces more output to serve one market – say the foreign market, it does two things: (i) it increases its marginal costs of serving its home market; and (ii) by taking sales away from its rival in the new market, it pushes that rival down the rival’s own marginal cost curve, lowering the costs to that rival of expanding output to enter another market. These effects – weakening itself at home while strengthening its rival – combine to increase the probability that the rival will want to retaliate by entering into the first firm’s home market. As a result, firms may hold back from initial entry into another firm’s market only because the retaliation would make the entry strategy unprofitable.

Once we recognize that retaliatory entry can be a credible and sufficient threat, under
certain conditions, to deter the initial entry, it is natural to ask if those conditions can be created when they are not naturally occurring. That is, can firms take actions to make retaliatory entry credible when it might not otherwise be? In our view, this may be one of purposes of toe-hold entry; entry on a small scale that may not even be profitable in its own right, but which may serve a strategic purpose. Here we model this role of toe-hold entry as a limited entry that serves to make retaliatory entry credible, either through pre-investment in the sunk fixed costs necessary to move into a new market or through small scale entry that reduces the subsequent marginal costs of expansion.

Past work on Retaliatory Entry and Strategic Toe-Holds

Retaliatory entry has been considered in the strategy literature. For example Porter [1980, pp. 84-85] cites as examples battles between Folgers and Maxwell House in regional coffee markets and Caterpillar and Deere in the earthmoving and farm equipment industries. Karnani and Wernerfelt [1985] use the term “multiple point competition” to describe situations in which firms compete against each other in multiple markets and consider the kinds of strategies available to a firm that has been “attacked” in one of its markets. In some cases, the term “reciprocal entry” is used to describe cases in which firms enter each other’s market. The economics literature on multinational enterprises has also recognized that a move to penetrate a foreign market might lead firms in those markets to “reciprocate” (Veugelers [1995] and Graham [1998]).

Of course, it could be that firm A’s move represented a defection from a repeated-game cooperative equilibrium, and B’s response is part of a reversion to a non-cooperative equilibrium. Indeed, this is the line of reasoning used by Veugelers [1995] and Graham [1998] (see also Van Witteloostuijn [1993]). This paper offers an answer that does not rely on repeated
play in a supergame that can apply if the markets are linked by rising marginal costs of a shared facility.4

Formal models of toe-hold entry are hard to find and none that we are aware of have focussed on the issues that concern us here.5 The strategy literature has, however, recognized that to make a threat of rapid retaliatory entry credible, a firm may have to establish limited “foothold” operations in the other’s market. While Karnani and Wernerfelt [1985] argue that, in such a case, retaliation would take the form of a rapid expansion of the foothold operation, they do not offer a formal model to demonstrate the credibility of this threat (see also van Wegberg and van Witteloostuijn [1992]). On the empirical side, Gimeno [1999] studies the effects of multimarket contact in U.S. airline markets when firms hold smaller positions in their rivals’ important markets. He finds that holding even small shares of a rival’s important market can deter that rival from aggressive competitive behavior in your important market.

II. RETALIATORY ENTRY

Suppose initially each of market 1 and market 2 is served by a monopolist, denoted by firm A and firm B, respectively. We might imagine that the markets had previously been separated by tariff and other barriers to trade in the past, but that these barriers had been reduced to the point that entry into foreign markets may now be profitable.

Suppose, then, that each of the two monopolists is contemplating the possibility of invading the other market and/or the possibility of its market being invaded. To be more specific, the two firms play the following three-stage game. At stage 1, firm A decides whether to enter market 2. At stage 2, firm B, after observing firm A’s choice, decides whether to enter
market 1. At stage 3 they engage in Cournot quantity competition in markets where they are both present. Let $\pi_j^m$ be firm j’s profits when each firm is a monopolist in its home market, $\pi_j^{dk}$ firm j’s profits when market k is served by both firms but the other market remains served by the monopolist (duopoly in market k only), and $\pi_j^{db}$ firm j’s profits when both markets are served by both firms (duopoly in both markets).

We use two variations of this model to illustrate the possibility of retaliatory entry. In the first variation, a firm has to incur a fixed cost of entry in order to enter the other market. In the second variation, the firm does not have to incur entry cost but the sizes of the two markets are different. We will show that fear over retaliatory entry can deter A from entering B’s market.

To conserve on space, the proofs of all propositions and some of the technical details are omitted. Details are available in an earlier working paper version (Chen and Ross [2005]).

II(i). Fixed Entry Cost

Suppose firm j (j = A, B) has to incur an entry cost $F_j$ if it enters the other market. We make a distinction between $F_A$ and $F_B$ to reflect the different cost levels of setting up a business in different countries. To make the analysis interesting, we consider the situation where $\pi_A^{d2} - F_A > \pi_A^m$. We refer to this as assumption (A1). That is, in the absence of fear over retaliatory entry, firm A would enter market 2. We make two additional assumptions, which relate to the shapes of the demand and cost curves. First, as assumption (A2), we assume that it is more profitable for each firm to be a monopolist in one market than for it to be a duopolist in both markets: $\pi_j^m > \pi_j^{db}$ (j = A, B).

Finally, as assumption (A3), we assume that firm B’s incremental profit from entering
market 1 in the case where firm A does not enter market 2 is lower than in the case where firm A does enter market 2: \( \pi_{B}^{d1} - \pi_{B}^{m} < \pi_{B}^{db} - \pi_{B}^{d2} \). This assumption is justified by the fact that firms face rising marginal costs of serving the two markets. If firms had constant marginal cost, there would be no linkage across the two markets and, consequently, a firm’s incremental profits from entering a new market would be independent of the market structure in its own market. That is, we would have \( \pi_{B}^{d1} - \pi_{B}^{m} = \pi_{B}^{db} - \pi_{B}^{d2} \). With rising marginal costs, however, a firm that faces competition in its own market will produce less output and therefore have lower marginal costs as it enters its new market. This makes it a stronger entrant. At the same time, when its rival is already operating in both markets the rival will have a higher rate of output and correspondingly higher marginal costs, weakening its position when the entrant arrives.

With these assumptions made, we can establish how the nature of the equilibrium will depend on the fixed cost to B of entering market 1, \( F_{B} \):

**Proposition 1.** Under the assumptions on profit levels given by (A1)-(A3) above, the equilibrium entry decisions by firms A and B depend on the value of \( F_{B} \), as follows:

(i) If \( F_{B} > \pi_{B}^{db} - \pi_{B}^{d2} \), firm A sells in both market 1 and market 2 while firm B remains in market 2 only.

(ii) If \( \pi_{B}^{d1} - \pi_{B}^{m} < F_{B} < \pi_{B}^{db} - \pi_{B}^{d2} \), firm A and firm B stay out of each other’s markets.

(iii) If \( F_{B} < \pi_{B}^{d1} - \pi_{B}^{m} \), firm A and firm B enter each other’s markets.

Thus, we see that if the conditions in (ii) hold, firm A will decide not to enter into firm B’s market, not because it is not profitable on its own, but because it will induce firm B to (rationally) enter into A’s market with the net result that firm A’s total profits are lower.
II(ii). Different Market Sizes

A second variant of the above model can be used to show that fear over retaliatory entry can prevent entry even in the absence of entry costs. Suppose, instead of entry costs, the “sizes” of markets 1 and 2 are different. To be more specific, suppose the inverse demand functions are $P_i = S_i P(X_i)$ for $i = 1$ and 2. On the production side, firm j’s (j = A, B) total cost function is $C_j = C(X_j)$ where $X_j$ is the total output of firm j. We assume that $C' > 0$ and $C'' > 0$. Therefore, each firm faces a rising marginal cost curve.

We continue to use superscripts m, dk and db to denote equilibria where there is a monopoly in each market, there is duopoly in market k but monopoly in the other market, and duopoly in both markets, respectively. Starting from the initial situation where each firm is a monopolist in its own market, $S_2 P(x_{b2}^m)$ represents firm A’s marginal revenue from selling the first unit in market 2 and $C'(x_{A1}^m)$ is the marginal cost of selling this unit. Since $S_1 P(x_{A1}^m) + x_{A1}^m S_1 P'(x_{A1}^m) = C'(x_{A1}^m)$, we assume

$$S_1 P(x_{A1}^m) + x_{A1}^m S_1 P'(x_{A1}^m) < S_2 P(x_{b2}^m)$$

(1)

to ensure that firm A would enter market 2 in the absence of fear over retaliatory entry. As in the first variant, we also assume that $\pi_A^m > \pi_A^{db}$, that is, firm A’s profits are higher being a monopolist in a single market than being a duopolist in both markets. If this latter assumption were not true, firm A would not be deterred by the concern over retaliatory entry and would thus want to enter market 2 independent of firm B’s reaction.

In this framework, firms’ entry decisions depend critically on the relative market size, $S_1/S_2$, as the following proposition shows.
Proposition 2. There exist three critical values L, M, and Q, with L < M < Q, such that the equilibrium entry decisions by firms A and B depend on the value of $S_1/S_2$ as follows:

(i) If $S_1/S_2 < L$, firm A sells in both market 1 and 2 while firm B remains in market 2 only.

(ii) If $L < S_1/S_2 < M$, firm A and firm B stay out of each other’s market. A necessary condition for this situation to occur is that $S_1 < S_2$.

(iii) If $Q > S_1/S_2 > M$, firm A and firm B enter each other’s market.

The values of L, M and Q are given by:

$$L = \frac{P(x_{A1}^m + x_{B2}^m) + x_{B2}^m P'(x_{A2}^m + x_{B2}^m)}{P(x_{A1}^m)}; \quad M = \frac{P(x_{B2}^m) + x_{B2}^m P'(x_{B2}^m)}{P(x_{A1}^m)}; \quad Q = \frac{P(x_{B2}^m)}{P(x_{A1}^m) + x_{A1}^m P'(x_{A1}^m)}.$$ 

Propositions 1 and 2 illustrate two factors, fixed entry costs and the relative market sizes, that help determine whether there exists an equilibrium in which fear over retaliatory entry stops firm A from entering market 2. One factor relates to the cost of entry, the other to the benefits. In the first case, that of differing entry costs, these costs have to be low enough for firm B to make the threat of retaliatory entry credible. But they cannot be so low that would allow firm B to initiate an unprovoked invasion of market 1. Similarly, in the case of market sizes, market 1 must be sufficiently large to make retaliatory entry profitable for firm B. But it cannot be so large that firm B will want to enter market 1 independent of what firm A does.
III. Toe-Hold Entry

The theoretical framework here is an extension of the one that we used to study retaliatory entry in section II. Suppose, again, that initially firm A and firm B are monopolists in market 1 and market 2 respectively. For example, we consider the same situation where firm A is interested in invading market 2. Our focus here is on the question of whether firm B can use toe-hold entry to forestall the invasion by firm A. With this in mind, we add an additional stage, called stage 0, to the three-stage game in section II. At stage 0, firm B decides whether to invest in toe-hold entry into market 1. The rest of the game is the same as that in section II. That is, at stage 1 firm A decides whether to enter market 2; at stage 2 firm B decides whether to enter market 1 on a full scale; and at stage 3 the two firms sell their output.

As in section II, we will consider two variants of this model, the differences turning on how toe-hold entry affects the costs of the full-scale entry that might follow. In the first variant, we assume that toe-hold entry reduces the fixed cost of full-scale entry. The second variant assumes that toe-hold entry reduces the variable cost of serving the new market.

III(i). Toe-Hold Entry Reduces Fixed Cost

Suppose firm j (j = A, B) has to incur a fixed sunk cost $F_j$ if it enters the other market. In this case, toe-hold entry by firm B means that firm B pays at stage 0 a portion of the fixed entry cost, $T$ where $T < F_B$. Here toe-hold means that firm B establishes a commercial presence but does not (yet) sell any units in the market. Firm B will sell a positive quantity only if it chooses full-scale entry. We will continue to focus on profit levels that satisfy assumptions (A1)-(A3).

If firm B does not invest in a toe-hold at stage 0, the subgame from stage 1 onward is
identical to the game studied in section II.1. From Proposition 1, we know that the two firms would stay out of each other’s market if \( \pi_B^{d_1} - \pi_B^m < F_B < \pi_B^{db} - \pi_B^{d_2} \), and they would enter each other’s market if \( F_B < \pi_B^{d_1} - \pi_B^m \). In both cases, giving firm B the additional option of investing in toe-hold entry will not change these equilibria in any way. In the former case, firm B does not need a toe-hold to make the threat of retaliation credible. In the latter case, firm B will want to enter market 1 even without a toe-hold; establishing toe-hold entry at stage 0 would simply make firm B’s incentives to enter market 1 at stage 2 stronger.

Where a toe-hold entry can make a difference to the equilibrium is in the case \( F_B > \pi_B^{db} - \pi_B^{d_2} \). Part (i) of Proposition 1 implies that without a toe-hold entry, firm B is not able to prevent firm A from enter market 2. But as the following proposition shows, the option of investing in toe-hold entry may give firm B an additional instrument to deter firm A’s entry.

**Proposition 3.** Under the assumptions on profit levels given by (A1)-(A3) above, if \( F_B > \pi_B^{db} - \pi_B^{d_2} \) but \( F_B < (\pi_B^{db} - \pi_B^{d_2}) + (\pi_B^m - \pi_B^{d_2}) \), the subgame perfect equilibrium is one where firm B establishes a toe-hold entry by paying \( T = F_B - (\pi_B^{db} - \pi_B^{d_2}) \) and firms A and B remain monopolists in their respective markets.

Under the conditions outlined in Proposition 3, firm B is able to deter entry by firm A into market 2 by pre-paying a portion of its own fixed entry cost at stage 0. Here the toe-hold entry makes the threat of future retaliatory entry by firm B into firm A’s market credible; without it, retaliation would not have been credible given the large entry cost \( F_B \).
III(ii). Toe-Hold Entry Reduces Marginal Cost

In this second variant, we suppose that, instead of a fixed entry cost, firm B has to incur a per unit retail cost when it sells in a new market, denoted by $R_B$. Toe-hold entry takes the form of pre-shipment of output by firm B to market 1, and pre-shipment reduces the per unit retail cost.

We think of these pre-shipped units as a simple way to model the opening up of distribution channels in the other market. Pre-shipped units are sold at stage 3 along with any additional units that firm B wants to sell. Let $q_B$ denote the number of units that firm B pre-ships to market 1 at stage 0. We assume that $R_B$ is related to $q_B$ in the following way:

\[
R_B = R(q_B) = \begin{cases} \alpha - \beta q_B & \text{for } q_B \in [0, (\alpha - r)/\beta] \\ r & \text{for } q_B > (\alpha - r)/\beta \end{cases}
\]

where $\alpha > r > 0$ and $\beta > 0$. Thus, with this toe-hold technology firm B can bring its retail cost in market 1 down to as low as $r$. We have adopted this very simple approach as a modelling device to capture the idea that, as a firm establishes a larger toe-hold in a market (by broadening its distribution network perhaps) up to a point it may reduce the variable costs of selling into that new market. The rest of the model is the same as that in section II(ii).

Chen and Ross [2005] contains a full analysis of this model. Here we will only summarize the main findings. It turns out that the equilibrium depends on the relative market size, as measured by $S_1/S_2$, and the values of $\alpha$ and $\beta$. In particular, investment in a toe-hold entry by firm B successfully deters firm A from entering into market 2 under the following circumstance: (i) market 1 is small relative to market 2 (i.e., $S_1/S_2 < M$) so that, in the absence of strategic considerations, firm A would want to enter market 2 and firm B would not want to enter...
market 1, but market 1 cannot be too small (i.e., $S_1/S_2 > L$) to make retaliatory entry (with the assistance of toe-hold investment) by firm B unprofitable; and (ii) firm B’s retail cost in market 1 is high without pre-shipment (i.e., $\alpha$ is large enough), but decreases rapidly with pre-shipment (i.e., $\beta$ is large enough).

III(iii). Retaliatory and Toe-Hold Entry: A Comparison

The above analysis illustrates the relationship between retaliatory entry and toe-hold entry. The toe-hold strategy can be valuable when it makes such a threat credible, deterring entry in cases in which entry would otherwise have occurred. For the case in which toe-hold entry reduces only the fixed cost of entry, the discussion above demonstrates that the magnitude of firm B’s fixed cost of entry into market 1 ($F_B$) plays a large role in determining the nature of the equilibrium. The various possibilities are illustrated in Figure 1. Recall that we assumed throughout that $F_A$ is low enough that, absent any concerns over retaliation, firm A would enter market 2. If B’s fixed cost of entering market 1 is very low (i.e. less than $\pi_B^{d1} - \pi_B^m$), firm B will always want to enter market 1, therefore A has no reason not to enter market 2 and both firms will sell in both markets. This is region I in Figure 1. In region II, $F_B$ is large enough that B will not enter unless A has entered first, with the result that firm A chooses not to enter. Thus, in this range, retaliatory entry is a credible and effective threat on its own. If $F_B$ is in the range between $[\pi_B^{db} - \pi_B^{d2}]$ and $[(\pi_B^{db} - \pi_B^{d2}) + (\pi_B^m - \pi_B^{d2})]$, labelled region III, the fixed costs of entry are too large to make retaliatory entry credible with no toe-hold. However, they are small enough that B can make the threat credible by pre-spending enough of those fixed costs establishing a toe-hold. Of course, this additional strategic advantage of toe-hold entry
comes at a cost. In our models, the toe-hold investment, whether in the form of a portion of fixed entry cost or a pre-shipment, does not generate additional profits for firm B. The investment is profitable only because it deters entry. Finally, for even larger levels of $F_B$, region IV, the fixed costs of B’s entry are so large that it cannot profitably make retaliation credible, therefore it does not establish a toe-hold. In this region, firm A enters market 2 but B does not enter market 1.

IV. Conclusions

The models presented above formalize two ideas that have been circulating in the international business and strategy literatures for some time. First, when its own market is threatened by entry, an incumbent may choose to retaliate by entering another market in which its new rival already operates. The model of retaliatory entry in section II showed how such threats of retaliation could in fact be credible, with the implication that the first entry may be deterred. The key element in the model creating credibility was the incorporation of a rising marginal cost curve from some part of the production process that served all markets. Rising marginal costs imply that, in entering a new market, a firm weakens itself and strengthens its rival.

Second, when the costs of entering a new market are too great to make retaliatory entry a credible threat and thereby deter the first entry, firms may have incentives to establish toe-hold positions in other markets. These toe-holds, though costly themselves, may reduce the costs of expansion enough to restore the credibility of the retaliatory entry threat. Thus, we have illustrated that toe-holds in foreign markets may serve a strategic purpose even if they never grow and are not, by themselves, profitable operations.
REFERENCES


Figure 1. Equilibria for Various Levels of Firm B’s Fixed Entry Cost
1. Porter [1980, p. 84]: “When one firm initiates a move in one area and a competitor responds in a different area with one that affects the initiating firm, the situation can be called a cross-parry.”

2. Karnani and Wernerfelt [1985] also provide some additional examples, including the battle between Michelin and Goodyear in the North American and European tire markets around 1970 and that between BIC and Gillette in the disposable pen and razor markets.

3. Some work in the contestable markets literature, while primarily focussed on the conditions under which the prospects for hit-and-run entry can hold prices to competitive levels, has considered questions related to those take up here. For example, Cairns and Mahabir [1988] and van Wegberg and van Witteloostuijn [1992] recognize that a move by a firm to enter a “foreign” market might open up its “home” market to entry by other firms, including possibly reciprocal entry by firms from the foreign market.

4. This work builds on the important insights on multimarket competition developed in the influential paper by Bulow, Geanakoplos and Klemperer [1985] (hereafter “BGK”). BGK saw that play in one market could have implications for payoffs and subsequent play in other markets. Our purpose here is to embed a particular source of the market linkage (rising marginal costs) into a model to understand when retaliatory entry can be made a credible threat. BGK [1985, p 505] anticipated this possibility which they illustrated with a simple numerical example. In Chen and Ross [2007] we employed a model with rising marginal costs linking two markets to study the implications of multimarket contact. In that paper, we suggested that a similar model could be helpful in understanding retaliatory entry and our purpose here is to provide that formal analysis – as well as to extend it to study toe-hold entry.

5. Malueg and Schwartz [1991] introduce a model of toe-hold entry with a different purpose. In their single-market model, the entrant secures a temporary toe-hold in order to influence the future investment decisions of the incumbent, in effect encouraging the incumbent to expand less rapidly, leaving more room in the market for the entrant in later periods.

6. In fact, it is not necessary that competition be of the Cournot-type, though we will model competition in this way when we work with a more specific model. Our key results depend on the signs of differences in profit levels across different market structures and these may well be generated by different types of competition (e.g. Bertrand competition with differentiated products).

7. A recent study by World Bank [2006] highlights the dramatic difference in the costs of doing business across countries. For example, it takes two days to start a business in Australia, but it takes 203 days to do the same in Haiti; and the official fees to set up a business range from 0.0% (Denmark) to 1,442% (Zimbabwe) of per capita income [World Bank 2006, p 11].
8. Both assumptions are satisfied for the case where the two markets have the same linear demand function and firms have quadratic cost functions. See Chen and Ross [2005] for details.

9. Thus, higher levels of $S_i$ rotate the demand curve around its intercept on the horizontal axis. This approach provides a tractable way to introduce market size heterogeneity into this model.

10. To get a sense of what these terms are, recognize that if the markets were the same size each of $L$, $M$ and $Q$ would represent the ratio of the marginal revenue a firm would get selling one more unit in its own market to the revenue it would get selling that unit in the other market. For example, in $L$ the numerator is the marginal revenue firm B would realize from selling one more unit in a duopolized market 2 and the denominator what it would earn if it chose to sell one unit in the previously monopolized market 1 (which is actually just the market price in market 1).