ALTERNATIVE ENTRY PATHS: THE BUILD OR BUY DECISION

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I. INTRODUCTION

The economic literature on entry and entry deterrence has focused on the addition of capital by a new competitor in an industry (see Gilbert, 1989, for a review), although an alternative and commonplace mode of entry is through the acquisition of the assets of existing firms. Yip (1982a) found that one-third of 90 observed entry events in 31 markets over the period 1972–1979 occurred through acquisition of existing firms' assets. In a sample of 138 foreign entry events into the United States examined by Caves and Mehra (1986), 58% were acquisitions. Acquisitions accounted for 70% of the 3,788 entry events by 33 companies over the period 1950–1986 reported by Porter (1987). Belli (1983) concluded that 84% of foreign direct investment in U.S. manufacturing during 1970–1982 was for the acquisition of existing assets. Clearly, acquisition is frequently a preferred alternative path (in the sense of Caves and Porter, 1977) for market entry.[1]

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1. Rasmussen (1988) considers how acquisition affects entry incentives in an extension of the Dixit (1980) model of entry deterrence. He argues that a firm may choose to enter an industry with the objective of being acquired, and this option can thwart an incumbent's attempt to deter entry. However, unlike the focus of this paper, Rasmussen does not examine the consequences for industry structure and performance of the

Potential entrants have diverse motives for choosing acquisition as the preferred path to gain a foothold in a new market. These include the exploitation of complementary assets (Teece, 1980; Bradley et al., 1983), diversification objectives (Rumelt, 1982), delay and other barriers associated with new investment (Chatterjee, 1896; Opter, 1989; Scheffman and Spiller, 1990), and capital market imperfections (Asquith et al., 1983; Ruback, 1983). Yet another factor in the entry decision is the exercise of strategic behavior. This paper applies a bargaining perspective to show why a potential entrant facing a "build or buy" decision might choose the latter even when direct entry may be profitable, and there are no asset complementarities that can be exploited by merger. In a concentrated industry, a firm that offers a serious *de novo* entry threat has bargaining leverage that can be used to secure advantageous terms for a buy out of an existing competitor. This paper explores the conditions that favor entry by acquisition rather than by direct entry and describes the consequences for the evolution of industrial structure.

The build or buy decision has significant implications for market structure and performance. Merger law has long distinguished between entry by direct investment and entry by acquisition of existing firms' assets. The Federal Trade Commission denied an attempt by Procter & Gamble (P&G) to acquire the Clorox Corporation, arguing that P&G was a potential direct entrant in the market for household bleach and that acquisition would eliminate P&G as a competitor (Federal Trade Commission v. Proctor & Gamble Co., 386 U.S. 568, 1967). The Merger Guidelines of the U.S. Department of Justice (1984) cite the elimination of a potential competitor as possible grounds for challenging a proposed merger.

Costly tactics such as poison pills and shark repellents used to defend against aggressive takeovers have been scrutinized for their effects on shareholder value.[2] Shleifer and Vishny (1986) argue that these defensive tactics can be consistent with value maximization because they enable strong firms to delay a takeover long enough to

alternatives of direct entry and entry by acquisition. A recent model of acquisition with asymmetric information is in McCardle and Viswanathan (1991).

2. The term *poison pill,* according to Shleifer and Vishny (1988), refers to a class of defenses that are costly to the target firm, but make a takeover less likely by diluting a bidder's equity holdings, revoking the bidder's voting rights or forcing unwanted assumption of financial obligations if the target is acquired. *Shark repellent* is any tactic that makes a takeover more difficult or less desirable, including activities that lower the value of the firm (such as the payment of greenmail or an increase in pension fund obligations) or increase the firm's debt (thus making it more difficult for a cash-constrained raider to finance the takeover).

allow other potential acquirers to collect information and enter a higher bid. The analysis presented here suggests another way in which defensive tactics can increase the value of a firm. By repelling a potential acquirer, the firm can direct the acquirer to another established firm and gain from the elimination of a potential competitor.

Section 2 considers the case of a single entrant and shows that in a Nash-Cournot oligopoly with constant and symmetric marginal costs, acquisition is always desirable if the industry is a monopoly or if the number of established firms is one less than the free-entry number. Acquisition is more likely to be the preferred entry path in industries that are natural oligopolies with only a few firms (specifically, less than six). Direct entry is disadvantaged in such industries by large sunk costs of entry and by a large negative impact of another competitor on industry profits. These results are supported by empirical evidence on the choice of entry modes reported in Caves and Mehra (1986) and Baldwin and Gorecki (1983). Caves and Mehra (1986) conclude, *inter alia,* that entry by acquisition is more likely when the target industry is concentrated.[3] Baldwin and Gorecki (1983) find that entry by acquisition is more likely in profitable industries.[4]

Section 3 extends the model to a market with multiple entrants and multiple acquisition candidates. The dynamics of market structure are examined in an industry model where potential entrants arrive sequentially. Each potential entrant can decide whether to acquire an existing firm or to enter directly. The possibility of subsequent entry limits the gains from acquisition. Acquisition allows an entrant and the acquired firm to share the benefits of a market that is less concentrated than it would have been if entry of a new competitor had occurred. Subsequent entry limits the duration of these benefits. Nonetheless, even with subsequent entry, acquisition can remain the preferred entry path into concentrated markets.

The choice of entry mode is more complex in industries where the free-entry number of firms is large (specifically, six or more for a symmetric Nash-Cournot oligopoly with constant marginal costs). In such industries a single entrant would prefer direct investment unless

3. Caves and Mehra (1986) find acquisition is more likely when the acquiring firm has subsidiaries in other countries. Although they did not expect this result, it is not inconsistent with the theory presented here. More experience may imply a more credible entry threat and, therefore, improve the entrant's bargaining power in an acquisition. See also Yip (1982b).

4. Industry profitability per se is not a sufficient determinant of acquisition. However, acquisition is likely to be the preferred entry mode in this analysis for industries where the free-entry number of firms is small. These are relatively concentrated industries, and high levels of concentration may correlate with high levels of reported profits.

there is a single established firm, or the industry is close in size to the free-entry number of firms. When there is more than one firm in the industry initially, direct entry is the preferred entry path at least until the industry reaches almost the free-entry number of firms. At that point the attractiveness of acquisition depends on the arrival rate of new potential entrants. If potential entrants appear at relatively infrequent intervals, all subsequent entrants will prefer to acquire existing firms. As a consequence, growth of industry capacity can cease at a point where strictly positive profits remain from direct entry. Thus, the opportunity to acquire existing firms can have real effects on the evolution of industry structure and on the ability of potential entry to dissipate industry profits.

These results have important implications for the debate in the strategic competition literature concerning the value of acquisition-oriented competitive strategies (also called portfolio management strategies). Porter (1987) found high rates of turnover in the ownership of acquired firms and concluded that portfolio management generally has not been a successful corporate strategy. However, our results show that acquisition can be profitable even if the acquired firm is likely to be sold, and, therefore, observed turnover rates are not sufficient to gauge the success of portfolio management strategies.

2. THE MODEL WITH A SINGLE ENTRANT

Consider an industry with n established firms and a single potential entrant. Let π_i^n represent the net profit (including any sunk costs) of the ith established firm when there are n firms in the industry. The profit of a new entrant (including costs that would be sunk if the firm entered directly) is π_e^{n+1}.[5] Each firm is controlled by a single owner. This eliminates problems of incentives and free-riding that may accompany takeover attempts with distributed ownership. (See Grossman and Hart, 1980, for a discussion of the consequences of shareholder free-riding in takeover attempts.) Each owner has perfect information about the profit characteristics of every other firm. Although the analysis in this paper extends to any profit functions for which the profits of each firm decline with the number of competitors, the Nash-Cournot case with linear marginal costs will be used as a concrete

5. The superscript indicates the profit that the new entrant would earn with $n + 1$ firms in the industry. If entry results in the exit of a firm, then n would be unchanged, and the entrant would earn π_e^n.

example. Suppose that the total cost of producing x_i units of output in the *ith* firm is $C_i = m_i x_i + s_i$, with $m_1 \geq m_2 \ldots \geq m_n$ and where s_i is sunk for an established firm. The demand schedule facing the industry when n firms operate is $P = a - X^n$, where $X^n \equiv \sum_{i=1}^{n} x_i$. Profits equal gross profits less sunk costs, $\pi_i^n = \phi_i^n - s_i$. If firms behave as Nash-Cournot competitors, equilibrium gross profits when n firms operate are

$$\phi_i^n = \left[\frac{a + M^n}{n + 1} - m_i \right]^2, \tag{1}$$

where $M^n \equiv \sum_{i=1}^{n} m_i$.

There are three stages of economic activity in the build or buy decision. In the first stage the potential entrant decides whether to negotiate with an established firm and, if so, identifies an acquisition target. The entrant may choose at this stage to forego acquisition and to enter the market directly. Conditional on selecting a target, the second stage entails negotiations between the target and the potential entrant. Production occurs in the third stage with the entrant either established through a successful buy out or operating as an additional new competitor in the market.

With no transaction costs, a buy out would be the preferred outcome if the surplus available to the target and the entrant when the target is acquired is larger than the surplus with direct entry. The acquisition surplus is π_e^n. This is the profit that the entrant would earn if it acquired the existing assets of the target firm, and, hence, the number of firms operating in the industry remained at its initial number, n. The surplus with *de novo* entry is $\pi_i^{n+1} + \pi_e^{n+1}$. This is the total industry profit with $n + 1$ operating firms. In addition, for a takeover attempt to be successful, it must be the case that $\pi_e^{n+1} > 0$, unless $\pi_e^n > \pi_i^n$. If $\pi_e^{n+1} \leq 0$, the target could refuse any offer (which could be no greater than π_i^n and so would not make the target better off), knowing that the entrant would not have a credible threat to enter directly.[6]

Summarizing, acquisition is the preferred outcome if

$$\pi_e^n > \pi_i^{n+1} + \pi_e^{n+1} \tag{2a}$$

and

$$\pi_e^{n+1} > 0 \text{ if } \pi_e^n \leq \pi_i^n. \tag{2b}$$

6. If $\pi_e^n > \pi_i^n$, there would be gains from acquisition even if $\pi_e^{n+1} \leq 0$. If a firm would choose direct entry when indifferent, eq. (2b) would be replaced by the weaker condition $\pi_e^{n+1} \geq 0$.

There are gains from acquisition if the profit that the entrant would earn by taking over the target firm exceeds the total industry profit with direct entry. When $n = 1$ this is the condition that monopoly profits must exceed duopoly profits, which is clearly satisfied if the entrant does not have significantly lower costs than the incumbent.

The entrant's gross profit from acquisition may exceed π_i^n if the entrant has assets that are complementary to the assets of the acquired firm that allow the new owner to operate the firm at lower cost or to inject new technology or marketing skills that enhance the net value of the company. The entrant's gross profit may be less if the entrant is not as efficient a manager as the original owner. Post-acquisition gross profits would be unchanged if the assets of the acquired firm can be transferred at no cost to the new owners, and if the new owners bring no complementary assets to the firm.

Define the surplus from acquisition, S, as the difference between the entrant's profits if the target is acquired, π_e^n, and joint profits with entry, $\pi_i^{n+1} + \pi_e^{n+1}$. Let θ be the share of the surplus that goes to the entrant. The entrant makes an offer to the target of $K_i = \pi_i^{n+1} + (1 - \theta)S$ and receives $\pi_e^{n+1} + \theta S$. The purchase price K_i or, equivalently, the division of surplus θ, depends on the specifics of the bargaining that takes place in the negotiation stage. For example, θ would be arbitrarily close to 1 if the entrant could make a credible take-it-or-leave-it offer. In that case the potential acquirer need offer the target firm no more than $K_i = \pi_i^{n+1} + \epsilon$, where ϵ is arbitrarily small, as π_i^{n+1} is the maximum profit that the incumbent could earn if it rejected the offer and the entrant carried out its direct entry threat. As $\epsilon \to 0$, the value of acquisition to the entrant is $\pi_e^n - \pi_i^{n+1}$, whereas *de novo* entry yields π_e^{n+1}. If the tables were turned, and the target could make the entrant a take-it-or-leave-it offer, the target would demand an acquisition price arbitrarily close to $\pi_e^n - \pi_e^{n+1}$ (equivalent to $\theta = 0$), and the gains from acquisition would accrue to the target firm. This is the highest price the target can negotiate, because any higher price would make the entrant worse off than if it entered directly.[7] For any value of θ, the entrant would prefer to buy, despite the high price, and the target

7. This assumes that the entrant's alternatives are only to acquire the target or to enter directly. Working backwards, there must be a final offer that, if refused, would lead to direct entry if it is profitable. However, a particular target could refuse an entrant's offer, betting that the entrant would acquire another firm rather than enter directly. This would leave the original target with its preentry profit, π_i^n, which is higher than the maximum acquisition price. Takeover defenses such as poison pills and shark repellents could direct an entrant to another firm and result in higher value for the firm with the takeover defense.

would sell if the surplus from acquisition is positive, i.e., if eqs. (2a) and (2b) hold.

Numerous factors may bear on the division of the surplus from acquisition between an acquiring firm and its target. These include possible synergies that raise the value of acquisition and free-rider problems identified in Grossman and Hart (1980) that deter a takeover bid at less than the post-acquisition value of the firm. A large empirical literature on the division of gains from takeovers generally concludes that target firms benefit from takeover attempts, but benefits for the acquiring firm are more problematic. Jensen and Ruback (1983) and Bradley et al. (1988) find synergistic gains from takeovers, with a significant increase in market value for the acquired firm and a modest increase for the acquiring firm. Caves (1989) finds that acquisitions are wealth-enhancing for the target and that, on average, acquiring firms have about broken even, with some recent studies showing a decline in market value for the acquiring firm.

These empirical findings suggest an interpretation of the bargaining game where most of the surplus goes to the target (θ close to zero). However, these results should be applied with caution because they relate to observed changes in the market valuation of a firm's outstanding shares, which is not an element of this analysis. An established firm's pretakeover market value should reflect the probability that direct entry may occur, which would have negative consequences for profitability and hence for the firm's pretakeover market value. When a (successful) tender offer is made, this brings with it the positive news that direct entry will *not* occur. In response, the market value of the target firm should *increase* (along with the values of other established firms that are less likely to feel the pressure of new competition).[8]

The division of gains from acquisition is not central to this analysis. What is important is the condition that acquisition should occur if the surplus from acquisition, S, is positive; that is, if inequality (2a,b) holds. This would be the result of any model where bargaining is costless. Depending on the technological capabilities of the incumbent and the entrant, the degree and nature of competition in the industry, and the number of firms, n, acquisition may or may not be more attractive than entry; inequality (2a,b) need not hold.

8. Stillman (1983) notes that most takeovers in the 1980s have not coincided with higher share prices for nonmerging firms in the same industry, and therefore concludes that competitive motives were not dominant. A similar result is reported in Eckbo (1983).

For the special case of symmetric firms, the condition for acquisition to be the preferred entry mode and for a single entrant to succeed in a takeover attempt simplifies to

$$\pi^n > 2\pi^{n+1} > 0. \tag{3}$$

The fact that a potential new competitor may enter the industry *de novo* and earn a profit is important to the credibility of an acquisition attempt. If a firm did not have a credible *de novo* entry alternative, a target firm would not sell for less than its preacquisition value of π_i^n. A target could reject any lower offer with the security that subsequent direct entry would be unlikely. The existence of a credible direct entry threat distinguishes the theory of acquisition by a potential competitor from the theory of conglomerate merger, where an acquiring firm has no credible intent to enter a market as a new producer, and from the theory of horizontal merger, where the entry threat is already realized. The assumption that a potential competitor can earn positive profits if direct entry were to occur implies that the model is most appropriate for a market that is growing or where there is a potential entrant with unique qualifications to enter the industry. The entry threat need not involve a large profit, but the profit must be nonnegative if direct entry is to be credible.

2.1 Entry with Multiple Targets

The build or buy decision is more complicated when there are several acquisition candidates for a potential entrant. The bargaining game between an entrant and any particular target is likely to depend on the bargains that could be struck with other firms. The surplus that can be divided between an entrant and a target will depend on the extent to which the target's assets can be transferred without cost to the new management and on the extent of asset complementarities. Assume bargaining is costless and that the fraction of the surplus from acquisition that goes to the entrant, θ, is the same for each target. If acquisition occurs, the entrant would choose the target for which $\pi_e^{n+1} + \theta(\pi_e^n - \pi_i^{n+1} - \pi_e^{n+1})$ is a maximum. Suppose the entrant's profit from acquisition depends only on the entrant's own managerial resources and not on the assets of the target firm. This rules out any complementarities between the entrant and the target. The entrant's gross profit from acquisition is π_e^n, independent of the target firm and if the entrant acquires, the target should be the firm for which π_i^{n+1} is the lowest among all of the established firms. In this case, acquisition would target the weakest (e.g., highest marginal cost) firm.

Suppose instead that an acquiring firm inherits the capital of the target firm and utilizes that capital no worse or better than the incumbent, so that $\pi_e^n = \pi_i^n$. The entrant would target the firm for which $\pi_i^n - \pi_i^{n+1}$ is a maximum, which would typically be the strongest (e.g., lowest marginal cost) firm. The target choice is less clear in the case of complementary assets. A potential acquirer would want to join forces with a firm for which π_{ie}^n is high (where the subscript *ie* means acquisition of firm *i* by the entrant), but the net value of acquisition is improved if π_i^{n+1} is also low.

Further results on the relative attractiveness of acquisition and entry require a more specific model of competition in the industry. Consider the symmetric Nash-Cournot case in which all firms have constant marginal cost m and sunk cost s. Let $\bar{N}$ be the solution to $\pi^n = 0$. From eq. (1), this is unique and determined by

$$s = \left[\frac{a - m}{\bar{N} + 1} \right]^2 . \tag{4}$$

Let N be the free-entry number of firms, the equilibrium size of the industry above which entry *de novo* is unattractive. N is equal to the integer value of $\bar{N}$.

Acquisition is preferable to direct entry if the condition in eq. (3) is satisfied. Substituting eq. (1) and eq. (4) in eq. (3) gives as the acquisition condition

$$\left[\frac{a - m}{n + 1} \right]^2 - \left[\frac{a - m}{n + 2} \right]^2 > \left[\frac{a - m}{n + 2} \right]^2 - \left[\frac{a - m}{\bar{N} + 1} \right]^2 . \tag{5}$$

For $n \geq 2$, this condition is satisfied if

$$\bar{N} < \frac{(n + 1)(n + 2)}{\sqrt{n^2 - 2}} - 1. \tag{6}$$

With a single entrant and identical firms, acquisition is always satisfied if there is only one firm in the industry. In addition, the condition in eq. (6) is satisfied and acquisition is the preferred entry path when $\bar{N}$ is small and n is less than the free-entry number of firms, so that the entrant has a credible direct entry threat. When $\bar{N}$ is large, the condition in eq. (6) is satisfied if n is near, but not equal to, the free-entry number of firms. These results are summarized in the following proposition.

PROPOSITION 1: *Let n be the number of established firms and N the free-entry number of firms. In the symmetric, linear Nash-Cournot model, acquisition is preferred to direct entry if (1) $N < 6$ and $n < N$, or (2) $N > 7$ and $n = 1$ or $N - k \leq n < N$, for $k = 1$ or 2.*

Proof. In the symmetric case, acquisition is the preferred alternative when $n = 1$. By direct calculation, eq. (6) is satisfied for $n < N < 6$. Thus, acquisition is always preferred if $N < 6$. For $N \geq 6$, direct calculation shows that acquisition is preferred if $n < \bar{N} - 2$. But N is the integer value of $\bar{N}$; hence, acquisition is preferred if $n = N - 2$ or $n = N - 1$. Whether $k = 1$ or 2 depends on whether $\bar{N}$ is closer to N or to $N + 1$. Note that a firm has no credible entry threat if $n = N$. For $N = 6$, acquisition is preferred for all values of n except $n = 3$ (and $n = 6$). For $N = 7$, acquisition is preferred if $n = 1$ or if $n = 6$, and depends on the relationship of N to $\bar{N}$ for other values of n. □

Entry by acquisition is thus more likely in mature industries (which are almost in equilibrium with further direct entry still profitable, but relatively unattractive), or in highly concentrated industries (industries with room for approximately six firms). These results lend a theoretical perspective to the findings in Caves and Mehra (1986) that in a sample of 138 foreign entry attempts, entry by acquisition was more likely in concentrated industries, and also to the results in Baldwin and Gorecki (1983) that acquisition is more likely in profitable industries.

When firms differ in costs, the value of acquisition relative to direct entry depends on the cost structure of the industry and on the competitive consequences of entry. However, in the linear Nash-Cournot case, the following proposition holds for any distribution of costs.

PROPOSITION 2: *In a Nash-Cournot oligopoly with constant (but not necessarily equal) marginal costs, it is always more profitable to acquire rather than enter directly when there is room for no more than one additional firm in the industry.*

Proof. Let $n = N - 1$. Define $A \equiv a + \sum_{i=1}^{N-1} m_i$ and consider the left-hand side of eq. (2a). If the entrant's variable costs are m, and if there is at least one target with variable costs no higher than m, then the minimum value of the left-hand side of eq. (2a) is

$$\left[\frac{A - Nm}{N}\right]^2 - \left[\frac{A - Nm}{N + 1}\right]^2.$$

The right-hand side of eq. (2a) is a maximum when s is at the lowest value consistent with the free-entry number of firms, N. This corresponds to $s = [(A - Nm)/(N + 2)]^2$. As $N^{-2} - (N + 1)^{-2} > (N + 1)^{-2} - (N + 2)^{-2}$, inequality in eq. (5) is automatically satisfied. □

The acquisition condition is related to the condition for an incumbent firm to acquire (or merge with) an existing firm derived by Salant et al. (1983). A merger is advantageous if the profits of the combined

firm exceed the premerger profits of the merging parties. In the symmetric case, this condition is $\phi^n > 2\phi^{n+1}$. This compares to the acquisition condition, which in terms of gross profits is $\phi^n > 2\phi^{n+1} - s$. Salant et al. found that merger was rarely attractive in the symmetric Nash-Cournot oligopoly (see also Kamien and Zang, 1990). For similar reasons, we find that when N is large, potential entrants would only prefer to acquire when there is a single established firm or when the industry size is close to the free-entry number of firms. An important difference between the analysis of the incentives for merger and the analysis of the build or buy decision is that in the merger case, the amount of capital available to the merging partners and the industry as a whole is fixed. If direct entry occurs, the entrant must incur costs for new plant (the sunk cost s), and these costs can be avoided by acquisition. For this reason, the range of industry parameters for which acquisition is the preferred entry mode is larger than the range of parameters for which merger is profitable in the symmetric Nash-Cournot oligopoly.

Varying the degree of competition affects the acquisition decision in a similar fashion to mergers between established firms. Deneckere and Davidson (1985) showed that merger was more likely to be attractive in an industry with differentiated products and price competition. Acquisition is also likely to be more attractive than entry *de novo* in this case, because product differentiation gives each firm local monopoly power and acquisition is attractive when the incumbent is a monopoly. Perry and Porter (1985) examined the incentives for merger when the degree of industry competition was parameterized and when the merger resulted in production advantages for the merged firms. They found that merger is less likely to be profitable to the merging parties when there is a high level of implicit collusion. A similar result would be expected for the build or buy decision. With Nash-Cournot competition, gross industry profits decrease rapidly with the number of firms, while with perfect collusion there is no decrease. The effect of competition on profits increases the cost of entry to an established firm and makes the firm more willing to accept a buy out offer. Although rivalry also lowers the value of direct entry, this does not diminish the entry threat as long as the profits from direct entry are positive. Acquiring firms is thus cheaper when more competition sharply reduces profits and the condition for acquisition is more likely to be met.

3. Multiple Entrants and the Dynamics of Entry

The analysis so far has been static and restricted to the case of a single entrant and a single period. Moreover, we have assumed that the

management of a target firm could not join in the bidding as a separate potential entrant. In a leveraged buy out (LBO), management's response to a hostile takeover is to organize as a separate bidder for the assets of the target firm. To the extent that target management is prepared to organize as a direct entrant in competition with the acquiring firm, the takeover activity does not succeed in eliminating a potential competitor. However, in practice, most LBOs are only an addition to the bidding contest and are not credible direct entrants. We will ignore the LBO entry option in the following and focus instead on the complications raised by many new potential entrants and by the dynamics of entry.

A single entrant can bargain with a target firm for acquisition under favorable terms, but competition among two or more potential entrants might erode the gains from acquisition and leave direct entry as the only profitable alternative. Yet the following proposition shows that under certain conditions, bidding among potential entrants does not eliminate the gains from acquisition.

PROPOSITION 3: *Consider the symmetric case with n established firms and $J = n + j$ simultaneous potential entrants, with $j \geq 1$. If*

$$\pi_e^{n+j} - \pi_i^{n+j+1} > \pi_e^{n+j+1} > 0, \tag{7}$$

there exists an equilibrium where n potential entrants acquire the n established firms and the remaining j potential competitors enter directly.

Proof. The assumed outcome is an equilibrium if each firm makes nonnegative profits and no firm would be better off with a different action, taking the actions of others as given. As in Grossman and Hart (1980), two or more firms competing to acquire a single target will dissipate profits, and so it will be better for one of them to enter if there are positive profits from direct entry. If $\pi_e^{n+j+1} > 0$, then *a fortiori* $\pi_e^{n+j} > 0$, and profits from direct entry are positive when all of the n targets have been acquired and the remaining j potential competitors enter directly. If more potential entrants attempt to acquire than there are acquisition targets, they earn no profits, and the profits from direct entry are positive. Hence, this cannot be an equilibrium. Suppose that n firms acquire and j firms enter directly. None of the j entrants would choose to acquire, and if eq. (7) holds, none of the n acquiring firms would choose direct entry given that there are already j direct entrants. As an example, in the symmetric Nash-Cournot case, eq. (7) would hold for any $n < N$ if $J < N < 6$. □

With simultaneous entry, the firms that enter the market directly earn π_e^{n+j}. Those that acquire earn no more than $\pi_e^{n+j} - \pi_i^{n+j+1}$. Although

the acquiring firms earn less than the direct entrants, the outcome is an equilibrium. None of the j direct entrants would choose to acquire. If one of the n acquiring firms chooses to enter directly, profits would fall to π_e^{n+j+1}, and the firm would be worse off.[9]

3.1 Sequential Entry

The multiple entry case considered previously is static, where entry occurs once and for all. The possibility that potential entrants may appear on the competitive horizon in different numbers over a period of time raises additional issues. Each entrant must evaluate the decision to build or buy knowing that any subsequent *de novo* entry will erode profits and that any successful entrant may be the target of a future takeover attempt.

Suppose that there are a countably infinite number of periods and let β be the per period discount factor, assumed to the same for all agents. At $t = 0$ there are $n < N - 1$ established firms. Potential entry occurs at date 0 and at a subsequent date T. At $t = 0$ a single entrant appears and chooses whether to acquire or to enter *de novo*. At date T a second entrant appears and chooses whether to enter *de novo* or to acquire one of the existing firms, which now includes the first entrant. There is no potential entry at $t = 1, \ldots, T - 1$ and no further entry after date T. (These assumptions will be relaxed later.)

As before, in the absence of transaction costs, an entrant will acquire if the acquisition surplus is positive. The acquisition surplus at date $t = 0$ is complicated, however, by several factors that did not arise in the static game. The acquisition profits that can be shared by the first entrant and a target depend on the probability that the entrant or the target is acquired at date T and on the price received if acquisition occurs. The acquisition surplus also depends on the profits that the negotiating parties would earn if the first entrant chose to enter *de novo*, which depend on whether the second entrant would acquire or enter *de novo* at date T and on the identity of the second entrant's acquisition partner if it acquires.

There are clearly a number of possible outcomes that affect the value of acquisition to the first entrant. Assume all firms are identical and $\pi^n > 2\pi^{n+1}$, so that the first entrant would choose acquisition if there were no further entry. In a symmetric Nash-Cournot oligopoly with constant marginal costs, $\pi^n > 2\pi^{n+1}$ implies $\pi^{n+1} > 2\pi^{n+2}$, so that acquisition is a dominant strategy for the second entrant. Let $p = 1/n$ be

9. This is a static model. It does not consider competition to be one of the direct entrants, which would tend to dissipate the rents from entry.

the probability that the first entrant, if it acquires at $t = 0$, would become the acquisition target of the second entrant at date T. If the first entrant enters *de novo*, let $q = 1/(n + 1)$ be the probability that either the first entrant or its acquisition target becomes the target of acquisition by the second entrant at date T. We will show that the possibility of subsequent entry by acquisition reduces the gains from acquisition to the first entrant and thus makes *de novo* entry more attractive.

Define $\pi^n = \phi^n - s(1 - \beta)$, where $s(1 - \beta)$ is the annualized sunk cost. The acquisition profits available to the entrant and the target are (note that the first entrant will continue to earn flow profits π^n if the second entrant acquires a different firm)[10]

$$V^a = \pi^n \frac{1 - \beta^T}{1 - \beta} + \beta^T(pK_T^n + (1 - p)\frac{\pi^n}{1 - \beta}). \tag{8}$$

The acquisition price K_T^n depends on the bargaining power of the firm that enters at date T (when there would be n established firms if the first entrant acquires). If the second entrant receives a fraction θ of the surplus from acquisition,

$$K_T^n = [\pi^{n+1} + (1 - \theta)(\pi^n - 2\pi^{n+1})]/(1 - \beta). \tag{9}$$

If the first entrant chose to enter *de novo* at date 0, the total profits earned by the entrant and the target firm would be

$$V^e = 2[\pi^{n+1}\frac{1 - \beta^T}{1 - \beta} + \beta^T(qK_T^{n+1} + (1 - q)\frac{\pi^{n+1}}{1 - \beta})], \tag{10}$$

where K_T^{n+1} is defined as in eq. (9), but for an established industry of $n + 1$ rather than n firms. (We assume that the division of the acquisition surplus does not change with the number of established firms.)

Define $z^n \equiv \pi^n - (1 - \beta)K_T^n$. The entrant would acquire at date 0 if $V^a > V^e$. From eqs. (8)–(10), this is equivalent to

$$\pi^n > 2\pi^{n+1} + \beta^T(pz^n - 2qz^{n+1}). \tag{11}$$

This is a stronger requirement than the single-entrant acquisition condition if $pz^n > 2qz^{n+1}$, or if

$$\pi^n - \frac{2n}{n + 1}\pi^{n+1} > (\frac{2\theta - 1}{\theta})(\pi^{n+1} - \frac{2n}{n + 1}\pi^{n+2}).$$

This condition is always satisfied in the symmetric Nash-Cournot case. The result is summarized in the following proposition.

10. As defined in eq. (19), K_T^n includes the annualized sunk cost of the target. Thus, eq. (8) makes full account of sunk costs.

PROPOSITION 4: *In a symmetric Nash-Cournot oligopoly with constant marginal cost, suppose that there is a single entrant at date $t = 0$, followed by a single entrant at date T. Assume $\pi^n > 2\pi^{n+1}$. If the probability that a firm is acquired is equal for all firms and if the division of surplus does not depend on the number of firms, then the acquisition condition is*

$$\pi^n > 2\pi^{n+1} + \frac{\theta\beta^T}{n}\left[\left(\pi^n - \frac{2n}{n+1}\pi^{n+1}\right) - \left(\frac{2\theta - 1}{\theta}\right)\left(\pi^{n+1} - \frac{2n}{n+1}\pi^{n+2}\right)\right]. \quad (12)$$

This condition is more difficult to satisfy than the acquisition condition with a single entrant.

The threat of subsequent entry at date T reduces the value of acquisition at date 0. The acquisition profits to be shared by the first entrant and its target are reduced by the possibility that the acquiring firm may be the target of an acquisition attempt by the second entrant. The second entrant has to receive at least its reservation value from direct entry, which means that the acquisition price at date T cannot exceed $\pi^n - \pi^{n+1}$. A larger value of θ means that the first entrant would receive a lower price if it is targeted for acquisition by the second entrant. This lowers the acquisition surplus available to the first entrant and makes acquisition less likely. Acquisition would be more likely if the first entrant could be certain that it would not be a takeover target for the second entrant. For example, if the probabilities p and q were zero in eqs. (8) and (10), the surplus available to the first entrant would be unaffected by the second entrant, and the condition for the first firm to acquire would be the same as in the model with a single entrant.

The sequence of acquisition followed by divestiture raises a curious possibility for the evolution of the industry. If it is profitable for the first entrant to acquire, with full knowledge that T periods later, the first entrant will become the target of a successful takeover attempt, the same may be true for the second entrant, and so on. Every potential entrant could prefer acquisition to direct entry, and no infusion of new capital into the industry will occur. The paradox of the industry that is attractive to enter but never grows can be avoided in different ways. If there are different types of entrants—for example those with sufficient resources to buy up incumbents and those who lack such resources, but have sufficient capital to enter and prosper—then the second type might prefer direct entry even if the unconstrained entrants might prefer acquisition. In such cases the industry will grow anyway, and may pass through configurations in which acquisition is attractive, and then reach a size at which direct entry is preferable. But it need not be necessary to resort to financial con-

straints as a motive for industry growth. An extension of the dynamic game described above to the case of multiple entrants suggests that as competition for entry into an industry increases, direct entry will emerge as the preferred alternative.

Suppose that potential entrants arrive at the rate of one per period. (This implicitly defines the length of the period). Suppose also that m firms are potential targets for acquisition. There are several reasons why potential acquisition targets may be restricted to a subset of established firms. Some firms may have invested in measures that would deter a takeover attempt. Firms operate in states that differ in legislation concerning legal measures that management may adopt to defend against an acquisition. Firms that are incorporated in states with similar antitakeover legislation may differ in the measures that they applied to thwart a takeover attempt. In addition, some firms may be more disposed to acquisition, perhaps because the firm was founded by an entrepreneur with a gift for identifying profitable opportunities, but no special talent for running a mature business. Such a firm would prefer to be bought out on favorable terms and then move on to seek out another profitable opportunity, while another firm in the same industry with a mature managerial bureaucracy might strongly resist an acquisition attempt.

The evolution of the industry can now be described for the symmetric Nash-Cournot example. Suppose the sunk costs of entry are sufficiently small that the free-entry number of firms, N, is large. With a single entrant, if $n > 1$, direct entry is preferred to acquisition unless $n > N - k$, where k is no more than two (see Proposition 1 and the discussion that follows). With a sequence of entrants, we will show that each period a firm will enter until the total number of established firms reaches a number $M \geq N - k$, the first point at which acquisition becomes more attractive than *de novo* entry. The m targets will now be acquired, after which direct entry will continue until there are N firms in the industry and further entry is unprofitable.

As before, an entrant's acquisition decision depends on whether the firm expects to be bought out at a future date, and if so at what price. We assume that target firms are bought out at their reservation prices and that entrants are not future acquisition targets.[11] Other assumptions are more favorable to acquisition.

11. If an entrant had to face the prospect of becoming a subsequent takeover target, the analysis would parallel the previous case. Acquisition still may be the preferred entry mode, although the value of acquisition would be diminished by an amount that depends on the terms at which a subsequent takeover occurs.

PROPOSITION 5: *In the Nash-Cournot symmetric linear case, if there are two or more incumbents, $m \geq 1$ targets, $N > 7$, and potential entrants arrive at the rate of one per period, then firms will enter until*

$$\pi^n > 2\pi^{n+1} + \beta W^{n+1} \tag{13}$$

where

$$W^k = \pi^k + \beta\pi^{k+1} + \ldots + \beta^{N-k}\pi^N/(1 - \beta). \tag{14}$$

At this value of n, all targets will be acquired in sequence, after which entry will continue until the industry is in long run equilibrium.

Proof: Suppose that there are M established firms in the market and only one remaining acquisition target. The value to the entrant of acquisition is

$$V^a = \pi^M + \beta W^{M+1}. \tag{15}$$

Suppose the firm chooses to enter directly rather than acquire, and that the next entrant to come along acquires the target at its reservation price. The total present-value profit earned by the entrant and the target is

$$V^e = 2\,[\pi^{M+1}(1 + \beta) + \beta^2 W^{M+2}]. \tag{16}$$

The difference between eqs. (15) and (16) is the surplus from acquisition that can be shared between the entrant and a target firm. By rearranging terms and using eq. (14), the acquisition surplus is

$$S = \pi^M - 2\pi^{M+1} - \beta W^{M+1}, \tag{17}$$

and, in the absence of bargaining costs, acquisition would be profitable if S is positive.

Suppose that eq. (13) holds (S is positive) and there are m remaining acquisition targets. In addition, suppose that the next m entrants acquire and thereafter, entry occurs *de novo*. If one uses the same analysis leading to eq. (17), acquisition is profitable if

$$\pi^M > 2\pi^{M+1} + \frac{\beta^m(1 - \beta)}{1 - \beta^m}\, W^{M+1}. \tag{18}$$

If eq. (13) holds, so will eq. (18), and each entrant will choose to acquire rather than enter directly as long as there are remaining acquisition targets. The inequality in eq. (13) is necessary for the assumed entry sequence, because m entrants would not acquire if eq. (13) did not hold.

The next step is to show that if there are $m > 1$ targets, and if the number of established firms is less than M, it will not be attractive to

acquire rather than enter. Suppose, in contradiction, that it were profitable to acquire when there are $M - 1$ firms in the industry, given that the next entrant will enter *de novo*, and the following $m - 1$ entrants will acquire (which, by the previous argument, is what will happen once the number of firms reaches M). For acquisition followed by entry to be profitable, then reasoning as earlier, the following two conditions must hold:

$$\pi^{M-1} - 2\pi^M > \beta\left[\frac{1-\beta^{m-1}}{1-\beta}\right]\pi^M + \beta^m W^M,$$

$$\pi^{M-1} - 2\pi^M < \beta\left[\frac{1-\beta^{m-2}}{1-\beta}\right]\pi^M + \beta^{m-1} W^M.$$

It will be impossible to satisfy these two conditions if $\pi^M > W^M(1-\beta)$. It remains to be established that this is ensured for all relevant cases. Because, from the Corollary later, $M \geq N - 2$ for $N > 7$, there are only two cases to check, and this is readily done. □

A comparison of conditions in eqs. (3) and (13) yields the following.

COROLLARY 5.1: *With sequential entry, acquisition will not occur for a smaller industry than in the static case of the single entrant, and may occur later, if at all.*

Proof. For any value of $n > 1$, the condition in eq. (13) ensures that if acquisition is the preferred alternative with sequential entry, it is preferred in the single-entrant case, ($\pi^n > 2\pi^{n+1}$). For suitable values of β, π^n, it may not be possible to satisfy eq. (13) for $n = N - 1$, in which case entry will continue until the industry reaches equilibrium at $n = N$. □

Porter (1987), in a study of entry behavior, notes that more than half of the acquisitions made by new entrants in an industry are followed by divestiture. He concludes that "(M)y data paint a sobering picture of the success ratio of these moves" (p. 45). Our analysis suggests a different interpretation for the incidence of acquisition and subsequent divestiture. Acquisition can occur because it is less costly than direct entry. If a new entrant acquires and becomes an incumbent firm, it is not unlikely that circumstances will find this firm on the other side of the transaction at a future date. Porter infers from the subsequent sale that the original acquisition was unprofitable. While there are many examples of ill-fated acquisitions, the fact that an acquisition is followed by divestiture does not necessarily imply that the original acquisition was unprofitable or imprudent.

Porter (1987) also remarks that portfolio management as a corporate strategy is inferior to diversification by shareholders (p. 51). But a firm that is a credible entrant in a target's line of business can improve the terms of acquisition by threatening to enter the target industry as a competitor, a threat that is not available to individual shareholders. Thus, the Miller-Modigliani (1958) argument that shareholders can diversify as well as firms does not apply to the case where firms, but not shareholders, have a credible entry threat.

Porter's sobering view of corporate strategy and our analysis of acquisition versus direct entry are consistent in an important respect. Porter concludes that "portfolio" or "conglomerate" acquisitions in which the target firm has little in common with the acquiring firm have dim prospects for success. Conglomerate acquisitions are examples of acquisitions in which the acquiring firm has no special expertise in the business of the target firm, and, therefore, the threat of direct entry would be minimal. We would expect that in this case the acquiring firm could not secure advantageous terms in an acquisition as a consequence of its entry threat, and there would be little reason to expect such acquisitions to be profitable.[12]

4. Conclusions

Mergers and takeovers may occur for a variety of reasons, though the standard explanation is either executive hegemony or that the acquiring firm expects to put the target firm's assets to more productive use and can therefore bid more for the firm than its current value (at least, until the bid becomes public, at which point the price may rise to its expected future value, as pointed out by Grossman and Hart, 1980). This explanation has always coexisted rather uncomfortably with the empirical evidence that finds little evidence that the joint profitability of the target and acquiring firm rise after merger (see e.g., Jarrell et al., 1988). Our explanation is rather different—it may be profitable to acquire a firm even if there is no improvement in its profitability (and, by continuity, even if there is an increase in its operating costs and a decline in its profitability). The reason is that it may be more profitable to acquire than to enter *de novo*, and the threat of entry may allow the

12. The absence of expertise in the target industry implies that π_e^{n+1} is small. If π_e^{n+1} is small but nevertheless positive for a diversifying firm, this would make acquisition attractive relative to entry and would be a motivating factor for conglomerate acquisitions. This is irrelevant, however, if the target firm believes that the acquiring firm has no intent to exercise a direct entry threat.

acquiring firm to buy up the target at below its previous value. If the entering firm can bring complementary assets or expertise, or lower the operating costs of the target, the acquisition will be more attractive than entry *de novo* for a wider range of cases than those identified here.

Our theory has a number of attractive features. It explains why entry might occur by acquisition in some cases, and *de novo* in others. Acquisition is relatively more likely in small concentrated industries and in nearly mature industries. Thus, depending on industry structure and the technology of existing and potential competitors, there is a preferred path of entry into an industry, which may take the form of either new investment or acquisition of existing corporate assets.

For most of the paper we have employed a simple model of Nash-Cournot oligopolistic competition, although it seems clear that the results will generalize to other forms of oligopoly. The condition for acquisition, rather than entry *de novo*, given in eq. (2a,b) (or its dynamic equivalent) will hold for all such theories—the differences will arise in the determination of the profit levels before and after entry. The more successfully the incumbent firms can collude to avoid dissipating total industry profits, the smaller is likely to be the fall in profits upon entry, and, hence, the less attractive acquisition will be relative to entry *de novo*. Conversely, the more vigorously competition increases with the number of firms, the greater the incentive to acquire rather than enter.

The economic literature on entry and entry deterrence has generally ignored the value of acquisition as an alternative path by which to gain a foothold in an industry. The literature on corporate finance has generally ignored the value of direct entry as an alternative to a takeover attempt. Our paper argues that acquisition and direct entry should not be considered in isolation, and that their consideration as alternative strategies allows insights into the theory of corporate strategy and finance.

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