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DIVISIONALIZATION AND ENTRY DETERRENCE*

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This paper assumes that incumbent firms can create new independent divisions more cheaply than potential entrants, who must incur the additional overhead costs of new entry. The main theoretical result is that such divisionalization ability leads perfectly informed incumbents to preempt all rational entry into their industries. In contrast, existing models of entry deterrence imply that informed incumbents, even those with steadily decreasing average costs, will often allow rational entry. Our result may explain why successful, large-scale entry by firms with no informational advantage is extremely rare. The use of divisions to preempt entry may also explain why large firms in high-profit oligopolies often divisionalize, allowing their divisions to compete freely despite the negative pecuniary externality that each division imposes on others.

I. INTRODUCTION

It has long been informally conjectured that there can be no rational entry into established industries possessing "naturally monopolistic" cost conditions. In such industries the incumbents—who have already incurred their industry-specific, overhead entry costs—can individually produce any additional output more cheaply than new firms. But whether fully informed incumbents in these industries will in fact forestall all entry depends on the type of entry deterrents that can be employed.

A fully informed incumbent would indeed forestall all rational entry if he could freely precommit himself to any reaction function and communicate this commitment to the potential entrants [Thompson and Faith, 1979]. However, such cooperative-type, predatory reaction strategies are, by and large, illegal and rarely observed. An alternative class of entry-forestalling strategies involves initial commitments not to reaction functions but to predetermined output paths, as suggested by the familiar Sylos-Labini [1962] model [Modigliani, 1958]. Though nonpredatory and generally legal, such strategies are also not widely observed, probably because of high costs of making future output commitments that are appropriately contingent on various possible future states of the world. The question thus becomes, given realistic

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limitations on incumbents' abilities to precommit, will informed incumbents always forestall rational entry.

The answer suggested by existing entry deterrence literature is "no." The deterrents emphasized in this literature—prior investments in firm-specific capital or preemptive purchasing of scarce inputs [Kaldor, 1935; Wenders, 1971; Spence, 1977; Schmalensee, 1978; Eaton and Lipsey, 1979; Salop, 1979; Gilbert and Newbery, 1982]—do *not* generally enable a fully informed monopolist to profitably forestall all entrants. For example, even an arbitrarily large capital stock often will not induce a monopolist to supply an output large enough to make entry unprofitable [Dixit, 1980, and Section II of this paper]. And even under special technologies in which a firm's capital stock rigidly determines its output, entry-forestalling behavior may not be profitable because the current losses from preemptively building ahead of industry demand may easily outweigh the future gains tothe monopolist from preventing entry [Schwartz, 1982, Chapter 4]. Moreover, existing industries typically contain not a monopolist but several noncooperating firms. Since entry deterrence generates a positive externality to existing firms, an entry-forestalling investment can easily be unprofitable to the firm despite its joint profitability to incumbents as a group [Caves and Porter, 1977].[1] In short, the theoretical literature supplies several reasons to expect rational entry, even when incumbents are fully informed.

In this paper we allow each firm to decentralize into independently managed production units, or "divisions," along the lines of General Motors. This ability to divisionalize enables informed incumbents to emulate potential entrants perfectly. Our central theoretical result is that such incumbents *always* profitably forestall subsequent entry. The result holds both for a single incumbent and several noncolluding incumbents.

A crucial part of our underlying argument is that an incumbent would always prefer duplicating the actions of an entrant to allowing entry and letting the entrant receive the profit from the new production unit. This observation, familiar in the entry de-

1. Import protection, for example, would benefit all incumbents while the cost of lobbying for protection fell solely on the initiator, hence a noncolluding oligopoly would probably underinvest in this type of entry deterrence. The case of investment in excess, firm-specific capital is less clear, since in addition to deterring entrants, such investment also yields competitive advantages vis-à-vis other incumbents [Baumann and Schwartz, 1985].

terrence literature (e.g., Eaton and Lipsey [1979], Gilbert and Newbery [1982]), is generally inconclusive because an incumbent does not usually have the ability to duplicate the strategic behavior of an entrant; the rational future output stream of a new producing unit is generally quite different when the output of the new unit is determined by a centralized incumbent rather than by a new entrant (e.g., Dixit [1980]; Salant, Switzer, and Reynolds [1983]). But this is no longer true once an incumbent firm can establish new, independent divisions of its own. Such divisionalization, by enabling informed incumbents to duplicate the strategic behavior of new entrants, allows us to employ a simple but powerful entry preemption argument to rule out all noninnovative entry.

In order that preemptive divisionalization reliably forestall all future entry, an incumbent must be able to establish new divisions in response to industry-expanding exogenous shocks before outsiders can enter. Informed incumbents should be expected to possess this requisite speed advantage because they have already incurred certain overhead costs that entrants have not (the promotion costs required to give the firm credibility in transacting with input suppliers and customers in the industry). Also, for preemptive divisionalization to credibly forestall entry, divisionalization cannot be instantaneously and costlessly reversed. Here, too, it is reasonable to assume that incumbent firms can adopt the requisite organizational behavior. For example, an incumbent firm could, if it wished, permanently divisionalize by converting itself into a nonmanagerial, purely financial, holding company which sold to the public stocks in individual divisions so that controlling interest in each division's stock was ultimately held by different groups of stockholders (e.g., the recent acquisitions by General Motors of Electronic Data Systems and Hughes Aircraft).

The assumption that firms can inexpensively establish independent divisions may seem strange. In fact, it is only slightly stronger than the assumption of a natural monopoly technology, which is standard in the existing literatures on both oligopoly and entry deterrence. In the absence of divisionalization, managerial diseconomies would, in general, eventually lead to increasing costs in multiplant firms. Therefore, divisionalization is generally required to prevent pyramiding management costs. The presence of natural monopoly cost conditions and the absence of entry thus emerge as simultaneous joint products of the ability to divisionalize.

Our theoretical no-entry result does not show that preemptive permanent divisionalization is the most profitable entry-forestalling strategy. What it does show is that such divisionalization always dominates allowing noninnovative entry, thereby ensuring that incumbents in oligopolistic industries—where firms observe one another's prior behavior—will rationally forestall *all* entry by noninnovative, potential entrants. The result therefore may explain the following: why free-market entry into oligopolies by firms without superior technological information is both rare [Harris, 1973; Scherer, 1980, p. 248] and, when occurring, almost always unsuccessful [Biggadike, 1976]; why successful entry into oligopolies occurs mostly through innovators who cannot convince incumbents of the benefits of their new technologies [Brock, 1975, 1981; Scherer, 1980, pp. 437–38]; and why ordinary measures of industry profitability, which perform well in explaining entry in unconcentrated industries, consistently fail to explain any significant fraction of observed variations in large-scale entry into oligopolistic industries [Caves and Porter, 1978]. (A detailed analysis of the above studies is developed in Schwartz and Thompson [1983].)

Finally, our theory generates a prediction opposite to that from the standard, purely cost-saving theory of the divisionalized firm (e.g., Caswell [1956]; Hirschleifer [1957]). The latter theory has the center imposing taxes on its various divisions in order to internalize any pecuniary externalities arising from competition among the divisions. In contrast, under our theory allowing the center to freely tax its divisional inputs or outputs would defeat what may often be the whole purpose of divisionalization, the forestalling of entry by new firms. In fact, a standard observation in the empirical literature on divisionalized firms is that centers, rather than taxing their divisions to cut back their outputs, almost universally provide inputs to their competing divisions at market price or, if it is lower, average cost [Drucker, 1972, pp. 53, 57, 66; Tomkins, 1973, pp. 179–89].

II. An Example

To illustrate our theorem, we start with an example in which prior investment in capital can never prevent entry by identical-cost firms. The example involves a Stackelberg-Cournot interaction whereby entry and capital choices are made sequentially and output choices simultaneously. (Dixit [1980] considers a similar interaction but deals with only two firms.) We then show that decentralization into divisions will always prevent such entry.

All firms have the same cost function,

$$C(Q_i,K_i) = F + wQ_i^2/K_i + rK_i, \tag{1}$$

where F is the fixed, nonsalvageable entry cost, K_i is firm i's nonsalvageable capital stock, Q_i its output, and w and r the fixed, nonnegative input prices. Long-run average production cost is constant at $2\sqrt{wr} \equiv c$. The industry faces a stationary, linear demand relationship,

$$P\left(\sum_j Q_j\right) = a - \sum_j Q_j. \tag{2}$$

Firms are assumed to choose capital stocks sequentially at the beginning of the period, foreseeing that outputs will be determined in a subsequent, asymmetric Cournot equilibrium given the marginal cost functions implied by the capital choices.

Because of the positivity of F, a significant threat of entry will exist only if the difference between the level of demand and long-run average production cost, $a - c$, is sufficiently high. We assume that $a - c > 4\sqrt{F}$, the necessary (and sufficient) condition for the industry to support at least three firms in a symmetric Cournot equilibrium with constant marginal cost c. Given this regularity condition, when either input price is zero, so that $c = 0$ as in Cournot's original model, there is obviously no prior investment the first or second entrant can make to forestall further entry. The equilibrium is symmetric with at least three active firms.

Scope for entry deterrence through prior investment arises once $c > 0$, implying that both input prices are positive. Instead of being identically zero, short-run marginal cost, from (1), is now $2w_iQ_i/K_i$ which, for a given Q_i, obviously decreases as K_i increases. The first firm in the market, firm 1, might now consider choosing a larger K_1 to forestall subsequent entrants. Nevertheless, for reasonably small c, entry will still always occur as the following argument shows.

Consider a Cournot duopoly involving only the first two movers, firms 1 and 2. The linear short-run marginal cost and demand conditions from (1) and (2) ensure that a unique Cournot equilibrium exists for any pair (K_1,K_2) and also that each firm's Cournot output decreases as the rival's output increases. Since firm 1's equilibrium output increases with K_1 (because higher K_1 reduces firm 1's short-run marginal cost) and firm 2's equilibrium profit obviously decreases as firm 1's equilibrium output increases, a higher K_1 will reduce firm 2's maximum profit. However, there exist wide ranges of cost and demand parameters for which even an arbitrarily high K_1 cannot make firm 2's profit negative. To see this, refer to Figure I. First, consider the entry-forestalling, Sylos-Labini output $\overline{Q}$. If firm 1 were committed to supplying $\overline{Q}$, firm 2's residual demand-price, $P(\overline{Q} + Q_2)$, would leave it zero profit at its then-optimal output, $Q_2^*(\overline{Q}) = (a - c - \overline{Q})/2$. The output $\overline{Q}$ thus satisfies $(P[\overline{Q} + Q_2^*(\overline{Q})] - c)\, Q_2^*(\overline{Q}) = F$, which yields $\overline{Q} = a - c - 2\sqrt{F}$. Next, note that a monopolist with zero marginal cost would produce $\hat{Q} = a/2$. Since firm 1's short-run marginal cost is always positive regardless of how large its prior choice of K_1, its simple monopoly output is always below $\hat{Q}$. Therefore, since firm 1's simple monopoly output is also its Cournot output when firm 2 produces zero and firm 1's Cournot output is everywhere decreasing in firm 2's output, firm 1 will always produce less than $\hat{Q}$. Firm 2 can thus rationally count on a residual demand exceeding $P(\hat{Q} + Q_2)$. Since $P(\overline{Q} + Q_2)$ leaves firm 2 with zero profit and since $P(\hat{Q} + Q_2) > P(\overline{Q} + Q_2)$ if $\hat{Q} < \overline{Q}$, a sufficient condition for firm

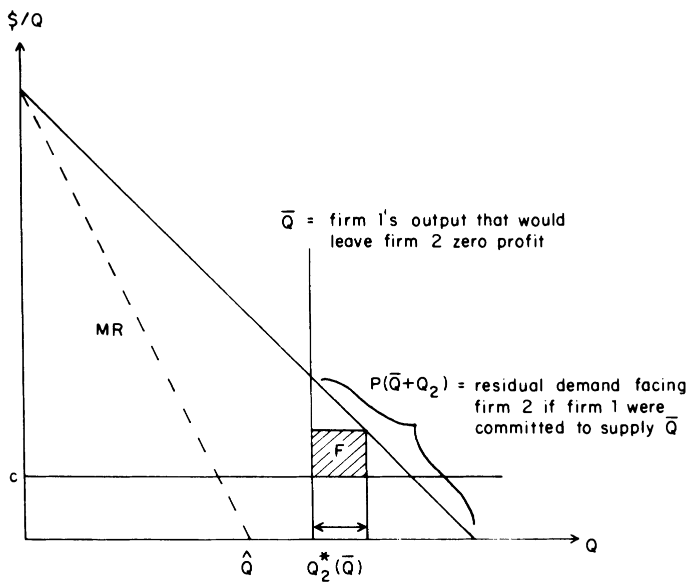

FIGURE I
Sufficient Condition for Further Entry: $\overline{Q} > \hat{Q}$

2 to enter is that $\hat{Q} < \overline{Q}$, or $a - 2c > 4\sqrt{F}$. (Figure I shows such a case.) This condition holds for all $c < a/2$, given our regularity condition.

One should thus expect an equilibrium with $m > 1$ firms active in the standard environment described above. In general then, let $(K_1^*, K_2^*, \ldots, K_m^*) = K^*$ and $(Q_1^*(K^*), Q_2^*(K^*), \ldots, Q_m^*(K^*))$ denote, respectively, the positive equilibrium capital and resulting output choices under the above Stackelberg-Cournot interaction, where the subscript denotes order of entry. In this perfect foresight equilibrium, the m active firms earn positive profits. The remaining, idle firms earn zero.

When firm 1 can decentralize into independent divisions, it will forestall all further entry. Instead of selecting K_1^*, firm 1 can now set up m independent divisions and select the vector K^*. The m divisions would then have the same short-run cost functions that the m independent firms would have had. Since each division would maximize its individual profit, the interaction among the divisions would be the same as among the m firms; hence the same output vector, would emerge, with division j supplying $Q_j^*(K^*)$. There would be no further entry: in the original m-firm equilibrium, firm $m + 1$ could not enter profitably given the expected output interaction with the m active firms; for the same reason, now firm 2 could not enter profitably given the m independent divisions that would have the same short-run costs and the same output interaction as the m firms. Although choosing K^* and permanently divisionalizing may not be firm 1's optimal strategy, it dominates choosing K_1^* and allowing entry, because such divisionalization increases firm 1's profit by the sum of operating profits that firm 2, . . . , m would have earned.[2] This entry-forestalling argument is formalized into a theorem and extended to a more general environment in the next two sections.

III. A General Environment

We consider a countably infinite set of firms (1,2, . . .) in which any member i produces a state-dependent, nonnegative time stream

2. This dominance would obviously carry through if there were several incumbents and each firm could establish multiple divisions. Then we would simply interpret the initial equilibrium as a multiform, multidivision equilibrium, with m denoting the total number of divisions, and point out that any incumbent would earn more profit if it preempted later entering firms through the prior establishment of the same number of divisions as that of the later entrants. The result also holds with a positive cost of establishing divisions as long as this cost is exceeded by F, a plausible condition reflecting the presence of some additional, firm-specific overhead.

of outputs Q_i, for an expected present value π_i. Firms can be either "active" or "inactive." An "inactive" firm, one for which $Q_i = 0$ for all t, has $\pi_i^I = 0$. An active firm (i.e., a firm that has "entered") must set itself up as a credible transactor and must therefore incur a one-shot, overhead promotion cost for entering at time t, the present value of which is F_{it}. Since entry by active firms sets them up as credible transactors, they and their divisions never need duplicate these setup costs when establishing new divisions. Thus, the ith active firm's profits are the excess over F_{it} of the sum of the profits of its various divisions, where each division's profits depend on its own output stream and market prices, which are determined by the aggregate output stream of all firms. The above is formalized in the following assumption.

A.1. THE OVERHEAD NATURE OF A FIRM'S ENTRY COST. $\pi_i^A = -F_{it} + \Sigma_j \pi_{ij} (Q_{ij}, Q)$, $F_{it} > \delta > 0$ for all $t > 0$, where π_{ij} the expected present value of the profit of the jth division of the ith active firm, Q_{ij} is the stream of output vectors produced by this division, and $Q = \Sigma_i \Sigma_j Q_{ij}$ is the aggregate output stream of all firms.

Once established, each division becomes a wholly independent decision unit for its parent, making its own output and subsequent divisionalization choices. We think of the division's manager as being rewarded by an increasing function of only his own division's profit. Firms per se can be treated as deciding only *when*, if ever, to enter, and if so, with how many divisions; the firm can be thought of as a holding company leaving the output and subsequent decentralization decisions to its divisions, even if it owns only one such entity.[3]

3. Our firms are thus quite specialized agents; they serve solely to warranty the promises its divisions make to various trading partners. In the special case in which divisional managers and stockholders receive all of the variable profit and pay only a fixed fee to the parent, the division is perhaps better thought of as a separate "firm" and the parent firm a "trade association" granting its members credibility in input and output markets. The conclusion of our theorem would then be interpreted as describing an absence of entry of new trade associations. Further, with divisional managers and stockholders receiving 100 percent of the variable profits, this "no-entry" result would no longer depend upon either risk neutrality or identical production costs (described below). However, since a trade association admitting an unreliable member into its pool of "approved" companies loses only a fraction of the loss to those who trade with the pool, the optimal warranty would also have the warrantying agent display his confidence in his warrantied operations by taking an equity interest in the operations. The typical case should therefore be, and apparently is, a case in which divisionalized firms take equity interests in each of their divisions.

Market conditions may be changing over time, which starts at $t = 0$, and divisions need not be price takers. However, exchange markets in both outputs and inputs—including entrepreneurship and technologies—are assumed to be complete and not personally discriminatory. This means that the operating profits of division ij can be described by a function that is independent of i and j and that F_{it} is the same for all new entrants. That is,

A.2. PERFECT EXCHANGE MARKETS. $\pi_{ij} = \pi(Q_{ij},Q)$ for all ij, and $F_{it} = F_t$ for all i and all $t > 0$.

A.1 and A.2 together obviously imply that a single active firm could, by adding divisions while avoiding the duplication of firm-overhead costs, produce a *given total output* for a larger profit than can several active firms. The environment is therefore one in which firms have "naturally monopolistic" cost conditions.[4]

As long as the resources available to the economy will always be limited, the strict positivity of F_t implies that there is a positive integer N, such that the number of active firms n_t is always less than N. Given an infinity of firms (active and inactive), this implies

A.3. THE PRESENCE OF INACTIVE FIRMS. The set of firms for which $Q_i = 0$ is never empty.

An almost immediate consequence of incumbents' having already incurred their overhead promotion costs is that an incumbent can respond to new information faster by establishing new divisions than outsiders can respond by entering. The explanation is that an incumbent is looking at a higher profit than new entrants from supplying a given expansion in industry output in response to a positive demand shock. He is therefore willing to devote more resources to winning a race to form a commitment to adding the appropriate number of new divisions. Rather than supplying assumptions for this result—mainly perfect informa-

4. Natural monopoly cost conditions preclude increasing firm average costs that arise from rising supply prices of firm-specific factors such as managerial or promotional inputs that are unique to the firm. Still admitted are increasing firm average costs caused by rising supply prices of inputs specific to particular divisions, industries, or economies. Our model also implicitly admits the existence of "fringe" sellers, who may have insignificant entry costs but possess generally unique, increasing-cost supply schedules. Such fringe sellers are treated here—as in existing literature [Scherer, 1980, Ch. 81]—as price-takers serving merely to alter the net demand curves facing the implicitly much larger firms in the formal model.

tion regarding one another's racing activities—we merely add the following assumption:

A.4. THE SPEED ADVANTAGE OF AN INCUMBENT. Let D_t be the number of new divisions at time t committed at time $t - \varepsilon > 0$, $\varepsilon > 0$, to be introduced by any new entrant. Then at some earlier time $\tau(t) < t - \varepsilon$, an incumbent can commit (i.e., "decide") to introduce D_t divisions at time t while possessing the same information available to the new entrant for his time $t - \varepsilon$ decision.

The information structure underlying our basic theoretical result allows each decision maker to know both the above environment and all previous entry and divisionalization decisions. Game theoretically, there is complete information and perfect information regarding entry and divisionalization decisions. As emphasized in the Introduction, we do not allow the communication of precommitted entry-divisionalization reaction functions. An equilibrium outcome to the resulting, noncooperative entry-divisionalization interaction is therefore a stream of value-maximizing entry-divisionalization decisions for each firm, given (1) the *prior* entry-divisionalization decisions of others and prior states of the world; (2) the *simultaneous*, entry-divisionalization actions of others; and (3) the *subsequent*, rational responses of others to each of his possible entry and divisionalization decisions. The resulting "perfect equilibrium" number of divisions for firm k at time t is described by D_t^{k*}.[5]

We are interested in characterizing a newly entering firm's equilibrium number of entering divisions at date t, E_t^k, a state-dependent function, $E^k(t, \sum_{\tau=0}^{t} \sum_{j \neq k} D_\tau^j)$ of the total number of divisions of other firms at that date. The function is nonnegative because the overhead promotional inputs purchased at entry are perfectly durable and firm-specific; "exit" here would merely mean that the total outputs of all of a firm's divisions has fallen permanently to zero. And E_t^k is, for a given k, positive for at most

5. Our result leaves a potential indeterminacy over which incumbents will divisionalize to preempt entry. Such an indeterminacy would undermine the entire solution concept, for any solution loses its justification whenever a decision maker cannot confidently estimate the rational choices of others. Fortunately, the investment decisions of preexisting incumbent oligopolists are typically sequential [Thompson and Faith, 1979]. This enables us to avoid the divisionalization indeterminacy in oligopolistic cases, where we expect the theorem to apply. When there are many incumbents and therefore essentially competitive conditions, firms no longer find it worthwhile to influence the investment decisions of other firms.

one t because each firm incurs the overhead entry cost at most once, at which time it would also establish its chosen number of initial divisions. *Firms* do not directly alter the number of their divisions beyond their initial entry dates because, as explained earlier, our firms allow their divisions to make all post-entry decisions. To determine an optimal E_t^k, a potential firm must evaluate the post-entry, state-dependent optimal output paths of its prospective divisions. A division's *optimal output path*, Q_{kj}, obviously depends on the date at which the kth firm enters and the subsequent interaction between all of the firms and divisions. To simplify the firm's entry decision, we now assume that this interaction will generate a unique, state-dependent output path for any given entry decision, yielding the function described below.

A.5. THE UNIQUENESS OF OPTIMAL OUTPUT PATHS.

$$Q_{kj} = Q_{kj}\left(t, E_t^k + \sum_{\tau=0}^{t} \sum_{j \neq k} D_\tau^j\right).$$

Thus, given a time t at which firm k enters, E_k^t tells us with how many divisions it enters and Q_{kj} describes the ensuing, unique, state-dependent, optimal time stream of outputs of the jth division of the entering firm. We shall not impose any restrictions on the nature of $Q_{kj}(\ )$; output interaction between the various divisions can take any form whatever as long as it yields a unique equilibrium. We are now ready to characterize our equilibrium entry function,

$$E_t^{k*} = E^{k*}\left(t, \sum_{\tau=0}^{t} \sum_{j \neq k} D_\tau^{j*}\right).$$

IV. THE THEORETICAL RESULT

PROPOSITION. Under A.1 to A.5, if $\Sigma_j D_0^j > 0$, then $E_t^{k*} = 0$ for all $t > 0$; i.e., once one or more firms have entered, there is no perfect equilibrium with future entry beyond that initial entry date.

Proof of Proposition. Suppose that the proposition is false. Then, in the hypothesized equilibrium, x_t' new firms enter at time $t > 0$, introducing a total of D_t' new divisions in addition to the D_t^0 time-t divisions of the original firms. (All D's are positive integers.) Since this is a perfect equilibrium and there are still, from (A.3), inactive firms at time t, these inactive firms must find it unprofitable to enter at time t. Thus, using (A.2) and (A.5), given the $D_t^0 + D_t'$ total divisions of old and new firms existing at time t, for any number D_t'', of extra divisions that any *additional* new firm I, might contemplate introducing for time t,

$$\pi_I = -F_t + \sum_{j=1}^{D_t''} \pi(Q_{Ij}(t, D_t^0 + D_t' + D_t''),$$
$$Q(t, D_t^0 + D_t' + D_t'')) < 0.$$

In addition, for this to be an equilibrium, it must not have paid any of the original incumbents to commit themselves, at time $\tau(t)$, to any additional divisions beyond D_t^0. (By (A.4), any established firm can commit itself at time $\tau(t)$ to introduce additional, permanently independent divisions at time t with the same information that is available to the later-committing new firms.) But if any one of these original firms *had*, at time $\tau(t)$, set up D_t' additional divisions for time t, then (i) from the above inequality, the value of any one of the entrants in the hypothesized equilibrium would have been negative so that not one of them would have decided to enter; and (ii) from A.1, A.2, and A.5, the value of the expanded incumbent would have been the same except that it would have included the operating profits of the replaced firms,

$$\sum_{j=D_t^0+1}^{D_t^0+D_t'} \pi(Q_{ij}(t, D_t^0 + D_t'), Q(t, D_t^0 + D_t')).$$

This term is necessarily positive in the hypothesized equilibrium; otherwise the firms would not have entered. So the hypothesized equilibrium, which has $E_t^{k^*} > 0$ for some $t > 0$, contradicts the rationality of any incumbent.

V. Conclusion

This paper has developed a theorem offering to resolve two paradoxes. The first paradox is that successful entry into oligopolies almost never occurs unless the entrant enjoys a significant information advantage over incumbents, whereas prevailing theoretical literature suggests that successful noninnovative entry should often occur in high-profit oligopolies. The second paradox is that, contrary to predictions of the standard literature on divisionalized firms, multidivisional firms such as General Motors allow their divisions to compete freely despite the pecuniary externalities that each division imposes on the others.

Our theorem concludes that there is no perfect equilibrium with further entry once one or more firms are established in an industry. The intuition is that any informed established firm would, if all else failed, profitably forestall a noninnovative entrant by replacing it with permanently independent, competing divisions whose behavior would perfectly emulate the entrant's. Incumbents that are informed about market conditions and potential rivals thus profitably preempt all potential noninnovative rivals.

Perhaps the most notable example of independent, competing divisions is General Motors [Chandler, 1962, pp. 114–61]. Since its formation in 1908 as a holding company, GM has made no obvious attempt to influence its divisions' output choices, delegating virtually unlimited operating authority to the chief executive of each division. This operating autonomy was maintained even when divisions sold in much the same market [Chandler, 1962, p. 374]. The costly recentralization of some of GM's divisions in the early 1970s can be explained by a reduction of U. S. profit rates in automobiles (due to lower cost Japanese imports) to the point that a costly entry-forestalling strategy was no longer necessary to deter imitative entry. A similar historical trend has been observed in the U. S. liquor industry. Seagram [1972, 1982] allowed its various sales divisions to engage in unrestrained competition with one another when industry profits and, thus, threat of entry were high, in the 1950s, 1960s, and 1970s, but recentralized divisions in the 1980s as industry demand and threat of entry receded. Finally, Procter and Gamble, the leading marketer in the steadily highly profitable consumer packaged goods industry, has consistently followed a strategy of launching several brands in the same product category (e.g., toothpaste) with each brand manager running his brand independently of the other brand managers and competing with them [Kotler, 1980, p. 278].

Entry-forestalling behavior, including divisionalization, should be expected only in exceptionally profitable, oligopolistic industries. In fact, the industries where divisionalization has been most prominent, automobiles, liquor, and consumer packaging, have been three of the most profitable oligopolistic industries of the twentieth century [Bain, p. 196]. The fact that few other industries adopt divisionalized forms indicates (i) that increasing long-run average costs in the empirically relevant ranges are typically avoidable without reverting to divisionalization, and (ii) that in all but a few, exceptionally profitable industries normal interactions among established firms—most of which have entered through past innovations—are sufficiently competitive to completely eliminate the profit to noninnovative entry [Thompson and Faith, 1979].

Regarding welfare implications, the noninnovative entry that is always preempted by the permanently divisionalized incumbents in our model would be Pareto nonoptimal entry because of a pointless duplication of overhead promotion costs; and the innovative entry that our incumbents would *not* preempt (being entry by firms that cannot practically convince incumbents of the value of their technologies) is efficient entry. These results support a laissez-faire policy toward permanent divisionalization as an entry deterrent. Nevertheless, since other, less socially desirable forms of private entry deterrence may be more privately profitable than permanent preemptive divisionalization, our results imply no criticism of the standard policy of discouraging incumbents from investing in these other, more familiar forms of entry deterrence. In the same vein, regarding temporary divisionalization, internal company policies that centralize previously established, competing divisions should perhaps be reviewed for their possible anticompetitive effects.

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