Entry In Oligopoly Theory: A Survey*

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1. Introduction
The study of entry in oligopoly theory is largely concerned with the nature of incentives and barriers facing potential entrants into an industry and the consequences of these factors on structure and performance in the industry.

Under the other two market forms studied in microeconomics, namely monopoly and perfect competition, entry problems are nonexistent or, at best, straightforward. Under monopoly, potential entrants are excluded by definition, whereas, under perfect competition potential entrants mechanically enter into the industry until equilibrium is attained.

Potential entrants in perfect competition enter smoothly and implicitly costlessly. There are no barriers to entry and entry is instantaneous or the time period for entry is short or vague. The role of entry in perfect competition is, by assumption, straightforward. Entry is crucial to long run equilibrium analysis. It appears as one of the important factors which helps to drive price, output, and profits to competitive levels and ensures the well-known efficiency results of perfect competition.

It is quite clear that entry in oligopoly theory must deal with more complex problems than those raised by perfect competition. Given their complexity it has taken some time for entry problems in oligopoly theory to be clearly formulated.

The purpose of this paper is to survey the growing body of literature on entry and to discuss the issues and problems raised in the literature, their shortcomings as well as their contribution to our understanding of the process of competition in oligopoly. Also, we indicate some of the outstanding areas of research which may fruitfully be pursued in the theory of entry.

2. Early Development of Entry Theory
Since perfect competition was the only realm of microeconomics in which included entry in its analysis, entry in oligopoly was initially treated within the same theoretical framework defined by perfect competition. Consequently, the questions posed as well as the analysis of entry in oligopoly tended to follow the one-sided mechanistic concepts derived from perfect competition. Entry was seen as a long run regulator of industry structure and performance in oligopoly. Even when it was recognized that the effects of potential entrants in oligopolistic competition would lead to qualitatively different results from
those of perfect competition, the analysis was
generally not followed through rigorously.

E. H. Chamberlin whose major work, The
Theory of Monopolistic Competition, revived
oligopoly theory several decades ago, devoted
some thoughts to the problem of entry in
oligopoly. Though Chamberlin posed radic-
ally new questions on oligopoly and systema-
tically sought to answer them, his view on
entry was largely within the traditional
framework emanating from perfect competi-
tion. Chamberlin’s view is summarized as
follows:

In so far as profits are higher than the general
competitive level in the field as a whole or in any
portion of it, new competition will, if possible,
invade the field and reduce them.1

Basing his analysis of long run oligopolistic
adjustments to equilibrium, Chamberlin de-
duced that even though prices may exhibit
monopolistic effects under oligopoly, entry will
drive profits to competitive levels. Long
run equilibrium will be attained at the so-
called tangency point where the industry
demand curve is tangential to the long run
average cost curve. An implication of the
tangency condition is that under monopolistic
competition, firms will tend to operate with
excess capacity. Chamberlin’s conclusion was
obviously controversial but it later provided
an impetus for further discussions on the role
of entry in oligopoly theory.

Chamberlin’s view, though somewhat in-
dividually distinct from the traditional perfect
competition views on entry, contained parochial
remarks on the subject which were important.
He recognized that potential entrants would
not only be different but also that effects of
their entry into competition would be asym-
metric. He observed:

Again, if high average profits lead new competitors
to invade the general field, the markets of different
established producers cannot be wrested from
them with equal facility. Some will be forced to
yield ground, but not enough to reduce their profits
below the minimum necessary to keep them in
business. Others may be cut to the minimum, and
still others may be forced to drop out because only
a small demand exists or can be created for their
particular variety of product. Others, protected by
a strong prejudice in favor of theirs, may be
virtually unaffected by an invasion of the general
field—their monopoly profits are beyond the reach
of competition.2

Perhaps this view expressed by Chamberlin
should not surprise us. He was studying markets
where the product of each firm was differentiated
from other products in the industry and consumers, to varying degrees,
were attached to specific products. Hence he
recognized the possibility that entry could
have asymmetric effects on established firms,
and sowed the seeds for a systematic analysis of
the problem.

It is important to note that Chamberlin’s
book provides a large- and small-group theo-
ry. The former is close to competitive equilib-
rium in spirit, while the latter takes interaction
into account explicitly and is closer to a
cooperative equilibrium analysis.3

Robert Triffin” also saw entry (and exit) of
firms as relevant to oligopoly theory espe-
cially when competition is viewed from a
general equilibrium framework. Since a
general equilibrium model of an economy exhibits
so many interlinkages between indus-
tries and sectors, the effect of entry on olig-
opoly with product differentiation is partic-
ularly important. Entry (and exit) of firms
influences factor prices and demand condi-
tions. Thus oligopolistic interdependency
becomes more complex if there are potential
entrants who may upset supply and demand
conditions. Triffin also hinted that the behav-
ior of established firms could influence the
entry of a new firm. That is, the possibility
that established firms may plan to control
entry is recognized by Triffin. Unfortunately
he does not investigate the issue.

At the time of Triffin’s work, general equili-

drium theory had not attained anything like
its current development. The analytical appa-
ratus offered by Triffin was not sufficient to
deal with the complexities of a closed
economic model. Even today, entry in a
general equilibrium system has not been dealt
with adequately. It is easy to see an immedi-
ate problem. All individuals must already be
somewhere within the economy; hence entry is
defined as “state” not new creation.

J.A. Schumpeter argued persuasively that
the kind of competition that counted the most
in a capitalist economy, as far as economic
progress goes, is “the competition from the
new commodity, the new source of supply, the
new type of organization…competition
which commands a decisive cost and quality
advantage and which strikes not at the
margins of profit and the outputs of the exist-
ing firms but at their foundation and very
lives.”4 Schumpeter termed this kind of
generalized competition from the new and its
effects as “creative destruction.” Schumpeter
therefore saw entry of new firms, like other
forms of competition from the new, as deadly
competition which had to feature more promi-
nently in economic theory. Indeed, to him,
competition from the new was more impor-
tant than already existing competition which
had dominated most of economic theory.

The excess capacity controversy raised by
Chamberlin’s Monopolistic Competition pro-
vided further impetus to the development of
entry theory. Roy Harrod, among others, re-
examined the arguments leading to the
Chamberlinian conclusion that monopolistic
competition tended to give rise to excess
capacity, especially when there is relative
freedom of entry.5 Harrod observed that the
firm in Chamberlin’s theory would not be
exhibiting sufficient foresightfulness if it set
its price at a level which ultimately attracted
new firms into the industry, shifting the
marginal revenue curve to the so-called
tangency point which gives rise to excess
capacity. Harrod suggested, instead, that the
rational firm would set prices to discourage
entry and even forgo some potential short
term profits in order to control as large a
market share as possible. Unfortunately,
Harrod’s treatment of entry under imperfect
competition, carefully scrutinized, does not
make clear the difference between the large-
and small-group analysis of Chamberlin.

With a small group facing a threat of entry,
rational firms would need to weigh some short
term benefits against other costs arising from
the erosion of market position; this is less
likely with a large group.

Other participants in the excess capacity
controversy also discussed the meaning and
implications of concepts such as “free” entry.
H. R. Edwards’s for example, pointed out that
“free” entry in oligopoly did not mean “easy”
entry. New entrants had to seek “conncct-
ions” in the market. Resources, such as
finance, raw materials, marketing outlets,
technical know-how and other factors are
critical to successful market penetration.
Others, like M.E. Paufl and F.H. Hahn6
pointed out that discouraging entry was not
necessarily the most rational strategy for
established firms. Some established firms
would prefer to charge the short-run profit
maximizing price and let entrants establish
themselves as they pleased. Other established
firms would just use rule of thumb pricing,
such as full cost pricing, perhaps worrying
about entry but not about excess capacity.

1C. Chamberlin, op. cit., p. 82.
2Paradoxically when the explicit recognition of threat is considered the Nash noncooperative equilibrium analy-
is stronger outcomes which appear to be quasi-coopera-
tive but can be enforced noncooperatively.
3Robert Triffin (1940), especially Chapter 3.
4Schumpeter (1939).
5Roy F. Harrod (1952).
7M. E. Paul (1946).
Hicks, also writing on the excess capacity controversy, modeled established firms as seeking advantageous trade-off between short-run profit maximization and long-run erosion of market share. Hicks concluded that the optimum price of established firms, as well as their scales of operation, would be determined by optimizing a weighted sum of short-run profits and long-run profits. The weight would depend on many factors, such as the relative sizes of their profits and the rates of price change. This suggested that the straightforward entry prevention strategy proposed by Harrod was not necessarily optimal, even if practical arguments could be made in favor of such a policy.

The empirical work of R.L. Hall and C.J. Hitch also stimulated the development of entry theory. By means of an interview survey of businessmen, Hall and Hitch found that the rule of thumb pricing was rather widespread. Many of the businessmen interviewed used variations of full-cost pricing whereby they determined their prices by adding a "normal" mark-up to production cost. The mark-up would cover fixed cost, inventory charges, etc., and also make allowance for a "normal" profit rate. Apparently, these businessmen were not utilizing marginal analysis, which would have demanded that they equated marginal cost and marginal revenue in order to maximize their profits. Significantly, full-cost pricing strategy, especially the choice of normal profit rates, was explained by the businessmen among other rationales, as a means to avoid excessive exploitation of the market in the short-run which might ultimately lead to the invasion of the market by new firms. Rule of thumb pricing apparently allowed firms in an oligopolistic industry to exercise pricing restraint so that they would avoid counterproductive price wars and collectively protect their markets from potential entrants.

Joe S. Bain also attributed the discrepancy between rule of thumb pricing and marginal analysis to the tension between short-term and long-term interests of established firms. Though Bain recognized other factors which might influence established firms' attitude to the future, his analysis sought to explain the pricing discrepancy in terms of entry threat. Bain introduced the concept of "limit price," which he defined as the highest price established sellers can charge without attracting a new firm into the industry. Upon exaggerating the specification of the limit price, he set up a spectrum of price policies that profit maximizing firms might adopt under threat of entry. Bain concluded that the relative sizes of the limit price and the short-run profit maximizing price were critical to the analysis.

In the case of "blocked entry," the limit price is too high to be economically relevant to decision making. But when the short-run profit maximizing price exceeds the limit price, a dichotomy in pricing policy arises. On the one hand, a firm may consider to set its price at the limit price, accepting certain but low profits and avoiding any gambles associated with uncertain consequences of new entry. On the other hand, the firm may choose to set its price at the short-term optimum, and let entrants squeeze their way into the industry. The limit price concept did not only help to explain possible pricing policies in an industry, but also indicated that the level of the limit price could be directly linked to entry barriers within the industry. Bain also pointed out that if potential entrants faced time lags to effect entry, established firms may be encouraged to charge the short-run profit maximizing price.

The work of Bain cited above marks the end of the pre-history of the theory of entry in oligopoly. Most of the leading questions and concepts already existed in the developing theory. It only remained to systematize the discussion and direct the kind of issues which could preoccupy later researchers. It was Bain's outstanding work, *Barriers to New Competition*, which accomplished this important task.

3. Major Theoretical Analysis on Entry

*In Barriers to New Competition*, Joe S. Bain sought to explain, theoretically and empirically, how the condition of entry, evaluated in terms of the advantages that established firms in an industry have over potential entrants, may influence performance within the industry. These advantages originate from diverse sources. Bain presented a well-documented and well-argued analysis of how scale economies, capital requirements, absolute cost differences, and product differentiation within an industry may contribute to imperfections in competition. Because of the structural advantages of established firms over potential entrants, the pressure of potential competition, an important regulator of long-run industry performance, may be weakened, permitting established producers to increase their profits and control in the industry more than they would without the existence of barriers.

Naturally, the first set of questions which must be answered in any serious theorizing on entry are: What constitutes entry? And what is a barrier to entry? The answers generally given to these questions have been along the definitional framework outlined in Bain's book.

Bain considers entry of a new firm into an industry to involve the combination of two events: (1) the establishment of an independent legal entity, new to the industry as a producer, and (2) the building of or introduction by the new firm of physical production capacity that is not used in production prior to the establishment of the new firm. Bain's first requirement for entry hinges on the legal superstructure in a given society and it is closely related to Dunn and Bradstreet's definition of new business incorporation in the U.S. as the "total number of stock corporations that issue charters under the general business law of the various states and the District of Columbia." His second requirement for entry is physical, involving new capacity and, presumably, other measures of economic activity such as employment, payrolls, sales, or asset growth, etc., as defined, for example, in the U.S. Bureau of Census Annual Survey of Manufacturers.

However, Bain specifically excluded corporate mergers, change of ownership, corporate reorganizations, and capacity expansion by established firms from his definition of entry. He saw these situations as part of intra-firm competition among established firms in an oligopolistic environment, arguing that his exclusions, though arbitrary, were necessary for simplicity of analysis. But a firm, new or old, is identified not only by legal and technical relations but also by its set of competitive strategies, its organizational form and by the identity of its management. Some of the barriers may then be ruled out by Bain may, for all practical purposes, be equivalent to new entry.

The definition of entry in merger litigations in the U.S. courts also seems to be broader in conception than that of Bain. The U.S. courts generally consider entry as potential competition from any source, including expansion by established firms and growth of firms producing substitute products. Thus a firm whose...
behavior makes it difficult for other competitors, producing similar or substitute products, to expand may be charged with impeding entry.11

What constitutes entry is therefore not as obvious as it may seem at first. Defining entry raises many difficulties in the realm of concepts, modeling, and measurements.

Characterizing and defining entry barriers also raises conceptual and measurement problems. Abstractly, entry barriers are the aggregate of advantages established firms in a given industry have over potential entrants. But what variables and relative to what origin should these advantages be measured? Bain considered the ratio of the highest price (or maximum entry cost) to the competitive price as a measure of entry barriers. However, Bain's measure has the disadvantage that is oligopoly there may not be any such "limit price" that absolutely forestalls all entry. George Stigler, on the other hand, defines barrier to entry as a differential higher cost of production that must be borne by a potential entrant.12 Within Stigler's framework, scale economies and capital requirements, paradoxically, do not qualify as barriers to entry. However, if differential costs were measured in terms of the post-entry unit cost facing the entrant and not in terms of the entire cost curve the seeming paradox would disappear. It is clear that Bain's characterization of entry barriers is performance oriented while Stigler's is cost oriented.

In any case, whichever definition one chooses to work with would still be riddled with profound measurement problems. The problem, basically, is how does one measure any attribute of a potential firm in order to determine the advantages that an established firm has? Even if one uses proxy variables, as has often been done in empirical studies on entry, how can one really prove that the effects of entry barriers were measured and not something else? And what about questions of causality? Clearly these issues are difficult to resolve unambiguously.

Working with the above mentioned definition, Bain indicated how entry barriers arising from scale economies, cost differences, and product differentiation may make it possible for established firms to elevate prices above the competitive level without attracting entry. For example, if there are scale economies, the fact that new entrants must add significantly to industry output to achieve cost efficiency may make it possible for established firms to persistently raise prices above the competitive level without inducing entry. Such a situation may arise even when the pre-entry price exceeds minimum average cost, the large output needed for optimal production may drive post-entry price below average cost, making entry unprofitable.

Similarly, under conditions of product differentiation and cost differences, the fact that potential entrants may incur extra production and marketing costs makes it possible for established firms to elevate prices above minimum cost without attracting entry. Hence, even as a long term trend, the force of potential competition may neither force price to equal minimum average cost nor eliminate any restrictions on output. Furthermore, the fact that strategic considerations are important in oligopoly raises the possibility that established firms may consciously regulate their pricing policies in accordance with entry conditions. Bain also pointed out that pricing policies adopted by established firms under a given condition of entry could be an important source of structural instabilities in some oligopolistic industries.

Paolo Sylos-Labini also devoted some effort to entry in his book, Oligopoly and Technical Progress.13 Sylos-Labini's project was ambitious and his contribution to entry theory would have been truly outstanding had he successfully accomplished his task. Recognizing that neither the kinked oligopoly demand curve nor the method of full-cost pricing explained, in a logical manner, why oligopoly pricing attains specific levels, he hypothesized that price determination could be explained by the condition of entry. He argued that technology is typically discontinuous in concentrated oligopolies and only large firms, which act as price leaders, have access to the most efficient technology and organization and its attendant economies of scale. All other firms, including potential entrants, to varying degrees, only have access to inferior technology and organization. Hence it is only when adjustments to equilibrium takes technological discontinuities and entry into consideration that price levels in oligopoly can be explained.

Sylos-Labini's analysis, though marred by its over-reliance on two numerical examples and inconsistent assumptions, is nevertheless ingenious and rich in ideas. The analysis is based on a Walrasian adjustment process whereby an initial price and industry structure is arbitrarily quoted and checked to see if it could be an equilibrium in the face of entry and price-quantity adjustments by established firms. New firms, employing various technologies within the accessible set, may enter into competition so far as they can make a minimum rate of return, which is arbitrarily chosen by Sylos-Labini as 5%. Established firms, mainly the price leaders, may however prevent entry by fixing prices so that entrants cannot attain the minimum profit rate. In addition, established firms may pursue intra-oligopolistic warfare to eliminate other firms.

Sylos-Labini concluded from his analysis that not only were there several equilibrium prices and industry structures but also the equilibrium attained depends on the initial industry structure, the types of firm, potential entrants as well as established firms that participate in the adjustment to equilibrium, and the absolute market size in the industry.14 He also applied his results to some important problems in the distribution of the fruits of technical progress. Sylos-Labini argued that widespread oligopolistic structures tend to weaken the forces that channel excess resources from one sector into another in an otherwise dynamic economy.

In retrospect, Sylos-Labini's analysis leaves many important questions unanswered. The equilibrium price and market structure is found to depend on the original market structure but no attempt is made to explain how the original distribution of firms and their outputs came about. The equilibrium price and market structure also depend on the type of firms which participate in the adjustment process. For example, if entry by both small and large firms are feasible then the equilibrium obtained depends on whether small or large firms decide to enter. No attempt is made to explain why one group of firms participate in the adjustment process instead of another group.

Together the last two criticisms constitute a serious setback to Sylos-Labini's theory. According to the theory, there are many legitimate original market structures and many acceptable adjustments leading, perhaps, to a large set of plausible equilibrium prices and structures. In the face of so many plausible solutions a good theory should go further and ascertain the more probable solutions. Otherwise, it will explain everything and explain nothing.

12 George J. Stigler (1946).
14 It is usually inappropriate to generalize from two numerical examples but Sylos-Labini believes his numerical treatment "enables us to sample it tight" and has the advantage of "greater simplicity and clarity."
The integration of entry conditions into oligopoly advocated in the books by Joe S. Bain and P. Sylos-Labini were enthusiastically welcomed by Franco Modigliani. In his excellent review and summary of the books, Modigliani showed, within the traditional microeconomic framework, how the limit price may be endogenously determined from the cost and demand curves facing the entrants, under various conditions of entry. This was an important contribution to the theory since it had generally been assumed that the limit price was determined exogenously. Bain, for example, expected the limit price to exceed the competitive price by some percentage without giving adequate consideration to how the ratio may be determined analytically. In addition to a critique of Sylos-Labini’s macroeconomic conclusions, Modigliani also attempted to investigate whether some of the equilibria structures arising from Sylos-Labini’s theory of entry were more rational and probable than others. Using a concept similar to dominance in game theory, Modigliani proposed that one equilibrium structure was more rational than another if the total profits accruing to members of the former exceeded the profits accruing to members of the latter. He then hypothesized without much substantiation that a real oligopolistic environment more rational structures are more likely to be realized than less rational structures and that less rational structures cannot persist for a long time. Such a situation obviously need not hold since oligopolistic competition is characterized by so much uncertainty and imperfection.

A model of Martin Shubik sheds further light on this issue. In *Strategy and Market Structure*, Shubik looked at the entry problem from a game theoretic perspective. For the case in which potential entrants faced differential fixed cost barriers, he showed that the equilibrium structure depends not only on the solution concept adopted, but above all, on the entry sequence. Clearly one has no control on the entry sequence in an oligopolistic industry. Hence less rational structures can persist for a long time.

Franco Modigliani’s article also served to bring the entry problem to the attention of a wider audience. The August 1959 issue of the *Journal of Political Economy*, for example, published several articles on the topic. Among the articles in the ensuing debate on entry, D.K. Osborne’s was, perhaps, the most critical of the limit pricing theory. Osborne insisted that limit price theory was “important not from the standpoint of price but of concentration.” That is, the theory was not a theory of price determination but of welfare economics. He tried to prove that the long run equilibrium price is independent of the strategy (limit pricing versus entry ignoring) adopted by established firms, arguing that the long run equilibrium price would be identical under both strategies but only the distribution of outputs, and perhaps profits, would be different. But Osborne established his result using a somewhat noncredible analysis. He used the long run post-entry cost and demand curves facing *established* firms to determine the entry forecasing price for the entrant. But the works of Bain, Sylos-Labini, and, especially, Modigliani, cited earlier, all make it quite clear that the entry forecasting price is determined from the cost and demand curves of potential entrants. Consequently Osborne ended up discounting the long term effects of entry barriers on price formation in oligopoly.

Ostrowe also questioned, quite correctly, whether the theory could be tested in practice since significant entry seemed to occur even in industries with substantial barriers. In spite of the flaw in Osborne’s theoretical analysis, the value of his work stems from the fact that it critically examined some of the conceptual problems in entry theory, as well as the views of the foremost exponents of the theory.

Meanwhile, Oliver Williamson pointed out that limit price theory was too deterministic. Due to uncertainty in oligopolistic interaction the application of a limit pricing strategy need not absolutely prevent entry. Realistically, it would generate a probability that the market would be penetrated. Thus, the probability of market penetration, both in terms of number of entrants and time of entry, would be increased as price exceeded the limit price. George Stigler also suggested that established firms would find it worthwhile to control the rate of entry. These extensions to the limit price theory have provided a basis for mathematical optimization models of pricing under the threat of entry which routinely take dynamics and uncertainty into consideration. B. P. Pashigian, Morton Kamien and Nancy Schwartz, and Darius Gaskins have made the foremost contributions in this direction. All of these models conclude that, under threat of entry in a dynamic and uncertain environment, the optimum price lies between the entry prevention price and the short-run profit maximizing price. Moreover, the optimum price depends on the level of uncertainty in each time period, the effects of entry on market shares, the discount rate and other cost data.

Developing the concept of correcting potential entrants as “firms-in-being,” it is possible to show in the context of a closed economy that the limit price concept appears to be highly related to the concept of threat used in enforcing or policing equilibrium in multi-stage games. In general the limit price will not be unique but will depend upon the credibility of the threats, i.e., the beliefs of the entrants and existing firms concerning the probabilities that entry will precipitate conflict. A simple example with two firms and one entrant for an open economy shows this phenomenon elsewhere. The existence of multiple equilibria equilibria is more easily demonstrated when one adds to the above assumptions a single equilibrium point. James Friedman has devoted attention to equilibria in multiperiod markets. In particular he utilizes the concept of a “weak noncooperative equilibrium” in the sense explained below. The firm at each period controls three moves—one involving the choice of an exit strategy and the probability of exit and investment. At a weak equilibrium point, changes of all three moves are not considered. Strategies over time which are stable for both a change in survival or exit probabilities and in price and investment (but not necessarily in all together) are sought to determine weak noncooperative equilibria. Friedman develops the conditions under which these equilibria exist.

The earlier work of Shubik and the work of Friedman referred to here are both promising and disappointing. They both represent attempts to formalize a dynamic oligopoly problem. A certain amount of success in doing so has been achieved. However the number of variables and specific considerations which must be accounted for indicates that the attempts to build formal mathematical
dynamic models of competition among the few lead naturally away from neoclassical economics towards specific models of specific industries where the natural descriptions and analysis call for behavioral models, simulations and detailed ad hoc calculations pertaining to specific structures of interest. The emphasis on the detailed modeling of threats is implicit not only in attempts to formalize game theory models but in the recent work of Spence where the irreversibility of investment is noted as a barrier.

An important development which weaves together the observations of Schumpeter and the behavioral theory of the firm has been the work of Nelson and Winter. A basic way this approach is highly complementary to the dynamic game theory approaches because any attempt to specify long term strategies tends to quickly realize that the complexity and size of the set of strategies available is so overwhelming that extra conditions must be imposed before a fruitful analysis can take place. But the most promising clues in how to limit or simplify strategies are triggered by words such as search, satisfying, decentralized decision making, innovation, flexibility, viability, organizational slack, etc.

The perspective of the role of the "competitive environment" is also radically different in the evolutionary theory, and leads one to focus on a set of questions concerning the interwining of competition, profit, and investment within a dynamic context. Is the investment of a particular firm strictly bounded by its own current profits? Can firms borrow for expansion? Are there limits on firm size, or costs associated with the speed of expansion? Can new firms enter? How responsive are "consumers" to a better or cheaper product? How long can a firm preserve a technically based monopoly? What kind of institutional barriers or encourage-ments are there to imitation? The answers to these questions are fundamental to understand- ing the workings of the market environ- ment. The dynamics of their treatment, like that of the nature and topology of "search," is an empirical issue within our theory.

Nelson and Winter and others have constructed simulations and contrasted the synthetic outputs with neoclassical theorizing. The suggestion is that explanations differ from the neoclassical theories of growth yet consistent with the same data can be obtained.

4. Structural and Behavioral Determinants of Entry

In this section, a summation of structural and behavioral factors that influence entry, together with existing empirical find- ings supporting these conclusions, is presented and discussed.

In a broad sense, factors that influence entry may be considered to originate from six main sources. These are: (1) institutional framework and government policy, (2) performance, (3) economic, (4) informational uncertainties, (5) time lags and (6) strategic behavior of market participants. However, it is obvious that entry conditions in a given industry, may be influenced by factors associated with one or more of the sources cited above.

The institutional and policy framework, national and international, within which competition takes place creates incentives as well as disincentives to entry. On the one hand, are the set of laws that determine who may participate in certain economic activities and the extent of such participation. And on the other hand, are the set of governmental policies designed to encourage or inhibit such participation. Within the legal superstructure are the various national and international laws on economic activities, the nature of anti-trust regulations, the laws on patents, royalties, and franchises which determine to varying degrees the extent to which entry is open or closed in a given sector of an economy.

Governmental policies influencing entry include tax incentives, investment credits, depreciation on capital equipment, conces-sions, guaranteed markets, and insurance against investment losses. Virtually every national industry has experiences relating how institutional and policy framework have influenced entry. In classic example of how these factors can facilitate market penetra-tion is provided by the U.S. aluminum industry.

For over half a century Alcoa monopolized aluminum reduction in the U.S. but with the outbreak of the second world war the U.S. government constructed several aluminum plants to help the war effort. These govern-ment-owned plants were sold on very favorable terms to private industry at the end of the war but Alcoa was barred from submitt-ing bids because it had been convicted under the anti-trust laws. Thus, the U.S. aluminum industry was converted from a monopoly to a triopoly in one stroke when Reynolds and Kaiser won the bids. Furthermore, Alcoa was even induced to donate its patents to Kaiser and Reynolds. And again, during the Korean War, the U.S. government undertook to help finance capacity expansion by the existing firms as well as the entry of some new firms. Included among the government incen-tives were accelerated depreciation of capital investments and the offer of guaranteed minimum price government purchase contracts for aluminum produced with new capacity. In the developing nations, too, government policy plays an important role in national develop-ment.

Among performance variables, profitabil-ity and growth rate are the important deter-mnants of entry. Persistently high industry-wide profit rates encourage entry while heavy losses may induce inefficient firms to stay out or exit from competition. Edwin Mansfield established in an econometric study that entry rate into several U.S. industries was positively correlated with industry profit rates. This is what one should expect from the general notion of profit as a leading force in business. But in a study on diversification and integra-tion in U.S. industries, Michael Gort found profitability to be a less decisive factor in explaining entry. Instead growth and technolo-gical intensity (the ratio of technical employees to all other employees) were the key determinants of entry. Gort's sample was heavily weighted towards the technically intensive largest corporations so his findings may reflect the possibility that large firms may tend to diversify into industries in which long-run trends are favorable, even if short term profits are not immediately favorable. Another possibility that ties in quite well with entry theory is that, beyond a certain point, high profit rates are a consequence of high entry barriers. So direct effect of profit rates on entry is confounded. The latter possibility is the logic behind most empirical work that attempt to relate entry barriers and profit rates.

Regarding the effects of growth on entry, a distinction must be made between the effects of industry-wide growth and those associated with the anticipated internal growth rate of potential entrants. Entry tends to be strong in high growth industries since established firms lack excess capacity which serves the dual purpose of accommodating demand increases and viability threatening potential entrants to.


10Nelson and Winter, op. cit.


13Michael Gort (1962).
stay out. On the other hand, if potential entrants are large dynamic firms then strategie considerations determine whether entry is enhanced or discouraged. It is easy to see that under some conditions entry may be easier for weak firms while under other conditions large dynamic firms have the advantage.

Economic factors that serve as barriers to entry include absolute cost differences, capital requirements, economies of scale, and product differentiation. How and why these factors may serve as entry barriers were discussed in Bain's book and summarized in our earlier discussions. Also, Bain's pioneering empirical investigations helped to ascertain the relative importance of these barriers.

Bain found scale economies (in production) and product differentiation to be of the same general order of importance as impediments to entry, with great entry barriers more frequently attributed to product differentiation than to scale economies. Absolute cost barriers were of slight importance while the effects of capital requirements appeared to be less certain, in general, but barrier-creating in only a few industries. Apparently, large corporations seeking to diversify are rarely disadvantaged, cost-wise, in the markets for raw materials, technology, personnel, and finance. On the other hand, small firms lacking resources and bargaining power could be significantly disadvantaged in these markets.

In connection with product differentiation, the special role of advertising is worth noting. Although Bain noted that the force of advertising plays a significant role in erecting product differentiation barriers the issue seems to be somewhat unsettled. In a study on the liquor industry, which is highly differentiated, J.M. Ferguson did not find any evidence to support the view that advertising adversely affected competition. Instead entry was frequent and the market shares of the big four firms kept declining. Yale Brozen, on the other hand argued that advertising rather than serving as a barrier to entry actually promoted entry while the curtailment of advertising would raise the long-run cost curves of potential entrants. But Comanor and Wilson have pointed out that while Brozen's view correctly emphasizes the effects of advertising on consumer information, it ignores the impact of established firm advertising on exit conditions.

Advertising is both a symptom and a source of product differentiation. Advertising by established firms, like innovations, may have its own return which may persist through several time periods. It may also create consumer loyalties which may be difficult to erase. Also advertising messages may require large volume purchases to be effective while the market for advertising messages may be characterized by scale economies. Furthermore, large volume purchases may be difficult to finance since advertising is often considered as a current expense with little or no depreciation value.

Comanor and Wilson found advertising to be a source of entry barriers leading to increased profits for established firms. H. Bloch and L. Weiss have also investigated the effects of advertising, considered as an investment, on profitability. In this way, they tried to minimize a possible overstatement of profits which arises when advertising is treated as a current expense. While Weiss found advertising to be positively correlated with advertising, Bloch found no significant relationship between the two.

The overall effects of entry barriers on profit rates were investigated by Bain. Within limits imposed by insufficient data, he demonstrated that profit rates were not correlated with overall entry conditions. He classified his sample of 20 U.S. manufacturing industries into three groups: high, substantial, and low to moderate entry barriers. Because prices could be significantly elevated above minimum cost without inducing entry as entry barriers increased, he hypothesized that profit rates would increase with entry barriers. However, there was significant concentration within many of the industries so it was necessary to establish the independent effects of entry barriers on profit rates. The results of H. Michael Mann, who conducted an investigation similar in scope and intent to that of Bain, but with a larger sample, are discussed below.

While average profit rate on equity for highly concentrated industries was 13.3%, the rate jumped to 16.4% if high concentration was also accompanied with high entry barriers. However there was no significant cleavage between profit rates for industries with substantial barriers and those with moderate to low barriers. Thus, although Bain and Mann demonstrated that entry barriers ultimately influence profits in the expected direction, their results did not confirm or disprove the limit price hypothesis.

Under the limit price hypothesis, oligopolists in industries with substantial barriers would be expected to set prices close to competitive levels to discourage entry, leading to lower profit rates. But for highly concentrated industries, for which there was a large enough sample for statistical analysis, profit rates for industries with substantial barriers compared favorably with those for industries with low to moderate barriers (11.1 vs. 11.9 percent).

Apart from the possibility that barrier heights for the two groups may be too close together to be finally distinguished, it is also possible that firms in low barrier industries may ignore entry threats and charge high prices, thereby driving profit rates for the two industry groups closer together.

Other investigators have also followed up on Bain and Mann's analysis. Using the profit rate on sales as a proxy for price-cost margins, David Qualls obtained results similar to those of Bain and Mann. In this way he avoids the problem that rate of return on stockholders' equity, because it reflects financial structure, may be an inadequate proxy for price-cost margins. On the other hand, S. A. Rhodes doubts that the independent effects of entry and concentration on profit rates obtained in the Bain/Mann analysis has any statistical significance. K. D. George has also extended the Bain/Mann analysis to include growth rates. In addition to supporting the Bain/Mann results, George indicated that industries with high concentration and those with high entry barriers independently have above average growth rates.

Another source of entry barriers originates from informational uncertainties associated with market penetration. Potential entrants may not only lack complete information on current market conditions and production techniques but they also face the risk of being unable to cope with changes in these variables. Discovery of new raw materials, depletion of old resources, changes in consumer preferences, and technological innovations are frequent in dynamic economies. Consequently, potential entrants face two kinds of risks: the risk that they will earn less than the competitive return, and the risk that they will be forced to exit from competition with substantial losses. Robert Stonebraker has hypothesized that the entry risk may act as a barrier which allows established firms to remain.
earn excess profits. Using the distribution of earnings of fringe firms in an industry a proxy for entry risks, he found the profits of large firms in 33 U.S. industries to be positively correlated with entry risk. More than 60% of the differences in interindustry profit rates were attributable to differences in growth rates and entry risk.

Entry is fundamentally a disequilibrium process, requiring the expenditure of resources and time to move from one state of competition to another. Time lags associated with the transformation of a potential entrant into an active producer is a barrier to entry. The time required to make entry effective is not determined endogenously but it can be exploited by established firms to the detriment of entrants.

And such time lags can be expensive. Law suits, cost overides, and the loss of lucrative opportunities are all intimately linked with time lags. Hence time lags may be an important regulator of entry.

Finally, the influence of market participants on entry is taken up. Strategically the players (entrants, established firms, government agencies, labor unions and consumers) participate in an economic game with rules and with their own interests and options. So it should be expected that established firms will exploit their structural advantages to promote their economic interests.

Some of the more clear-cut options available to established firms threatened with market penetration include the decisions to ignore, prevent, delay, accommodate, or fight entry. The choice of a specific option depends on how the practical and economic consequences flowing from that option are evaluated. Such a valuation necessitates an explicit, internally consistent value system and a "solution" concept. In oligopolistic competition, just like in multi-person decision problems, there is no unique criterion of rationality so the kind of behavioral assumptions made about the firms and the optimal method of play derived from these assumptions determine a solution.

An active firm may consciously ignore the threat of entry if interference is expensive or illegal. Also a strategic possibility arises that a marginal entrant will provide an anti-trust shelter to established firms while simultaneously enhancing the latter's product quality image. Entry threats are also likely to be ignored if they are not perceived as credible.

Entry threats may only be signalling disapproval with the activities of established firms by other firms in related industries and not an intention to penetration the market. On the other hand such an interpretation could be completely erroneous. The complexities and subtleties associated with threats have been discussed generally by Thomas Schelling and in an oligopolistic context by Scherer and Shubik. Though Schelling's analysis deals mainly with international relations, the substance of his findings is applicable to the entry problem. Schelling points out many conceptual difficulties in the analysis of competition caused by problems of communication, credibility, and enforceability of threats.

Although much of the literature on entry is devoted to the competitive consequences of entry strategies, empirical evidence on limiting pricing at the level of the individual firm is rather scant. However an important test in this direction was conducted by Erwin A. Blackstone. He demonstrated that the pricing of Xerox Corporation in the copying machine industry fits a rather sophisticated model of entry deterrence pricing.

Delaying strategies are intimately tied in with the existence of time lags. They are also related to the presence of leakages in entry prevention techniques. Sometimes established firms may find it profitable to retard the rate of entry instead of preventing entry altogether. Law suits and other delaying strategies can be judiciously exploited by established firms to make entry costly for potential entrants with limited resources. Even the use of these strategies may develop into a profitable sub-game. The judicious use of legal suits can be profitable not only to corporations but also to corporate lawyers. Hence the use of delaying strategies could even serve more than one aim.

If entry actually occurs despite efforts to prevent or delay it, then established firms must decide on what to do about it. Should the entrant be peacefully accommodated or should it be fought? The common view among writers on entry is that potential entrants would be wiser to assume that either their entry will be fought or market conditions would be made very unfavorable. The argument goes that active firms would maintain or expand their outputs and even lower prices to make market conditions as unfavorable as possible for entrants. We are of the opinion that accommodating strategies may be optimal under certain conditions and should not be downplayed on a priori grounds. If entry actually occurs and the costs of a fight are huge then it may not be wise for active firms to wage campaigns against entrants.

Accommodationist strategies are rather common when a cartel excludes a major producer which the cartel is unable to control or penalize. Invariably, the cartel members have to cut back on their production to support the floor price. On the other hand if an active firm decides to fight entry through price wars, maintenance or expansion or output, massive advertising, law suits or any other effective means, it must take a hard look at the following issues: (1) What are the chances of successfully driving out the entrant? (2) How long will it take? (3) What are the advantages of having the market to oneself? (4) How costly will the fight be? and (5) How vulnerable is the active firm to an extended warfare? Shubik has studied some of these issues using economic survival game models and has made some headway on the questions of warfare costs and vulnerabilities in the U.S. automobile and tobacco industries. One of his conclusions was that fights may be worthwhile if the time to ruin a competitor is short and if the "bonus" associated with having the market to oneself is large.

A firm which engages in economic warfare has its own vulnerabilities to contend with. Its vulnerabilities are related to the amount of damage it can take which results from its own positive actions or those of other firms or from changes in other exogenous economic variables. In a modern corporate economy, issues such as solvency, threats of bankruptcy, inventory positions, product quality shifts, value of corporate stocks and changes in general economic conditions, need to be specified or known before one can realistically determine a firm's ability to make war.

5. Conclusion

The problem of entry in oligopoly is complex. Although there is a substantial body of theoretical and empirical knowledge on entry, several fundamental issues still need to be investigated and understood.

The entry problem, like the oligopoly problem from which it is derived, involves the study of strategy. Hence the rules of the

J. M. Scherer (1970), Chapter 4
M. Shubik, op. cit., Part IV
Ernst A. Blackstone (1968).


Martin Shubik, op. cit., p. 214.
Martin Shubik (1958).
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