OLIGOPOLY THEORY, ENTRY-PREVENTION AND GROWTH

by

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1. The focus of the theory of oligopoly has been shifted towards entry-prevention models since the recent work of Sylos Labini and Bain, especially after its brilliant formalisation by Franco Modigliani. This paper examines the entry-prevention approach critically, while relating it to the traditional approaches to the analysis of oligopoly behaviour. The analysis is also extended to incorporate the phenomenon of "growth of firms."

2.1. Traditional oligopoly theory was founded on two basic assumptions: (1) each firm maximises its profits; and (2) each firm concerns itself with the repercussions of its action on the behaviour of other firms already in the industry, firms which could be described as actual rivals. The former assumption was universal and extended to all market structures. The latter assumption, of interdependence among firms, was supposed to be the hallmark distinguishing oligopoly theory (the "small group" case) from the traditional competitive theory (the "large group" case).  

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1 I am grateful to G. C. Archibald, W. H. Gorman, Ian Little, Harry Johnson, Walter Eltis, and N. Kaldor for helpful comments on earlier drafts of this paper.


3 It should thus be emphasised that the distinction between the small and the large group cases is a matter, not of numbers, but of the pattern of behaviour that characterises the firm.
2.2 Under the perfectly competitive structure, the firm is assumed to act as if an infinitesimal "cut" in its price will enable it to sell as much as it likes and an infinitesimal "raise" to lose it its entire sales. This follows from the fact that it is assumed to be atomistic in relation to the industry and hence the effects of its action will be "spread over many sellers" and hence provoke no attempt on their part to alter their prices in response to this firm's action. Oligopoly theory departs from competitive theory basically in so far as each oligopolistic firm is conscious of the impact of its decisions on the economic behaviour of its rivals. Under this view, the solution to the oligopolistic system would be quite different from the competitive solution unless each firm, in reaching its policy decision, assumed that the rival firms would keep their prices unchanged (so that the demand curve for each firm becomes infinitely elastic, as in the competitive case, at least in the relevant range). Traditional theory thus proceeded by assuming some rule under which each firm played the game of maximising its profits: the firm assumes the rivals' outputs to be maintained in the face of a change made by the firm (Cournot); the rivals' price is assumed to be so constant (Bertrand; this is the competitive solution); and so on with Fellner and Stackelberg.

3. It is often wrongly thought that the "kinked demand" analysis, developed independently by Hall and Hitch in England and by Sweezy in the U.S.A. in 1939, 4

4This obviously is the well-known Bertrand solution to the oligopoly problem. It is difficult, however, to consider this solution plausible because the firms are going to learn soon that prices will not be maintained by their rivals in the face of price cuts!

5For an extensive discussion of these various solutions, see Chamberlin, The Theory of Monopolistic Competition (4th Edition), Harvard University Press, Ch. III; and W. Fellner, Competition Among the Few, New York: A. Knopf, 1949. Edgeworth and Chamberlin were both skeptical about the possibility of a determinate solution of the problem in the general case; cf. Chamberlin, op.cit., Ch. III.
represented an innovation in oligopoly theory. Actually, it is no more than a variation upon the traditional formulation, designed to explain rigidity in prices. It assumes that, given a market price, the firm will argue that a price increase by it will not be followed by its rivals but that a cut will be; hence the kink. With the demand curve so derived, the firm is assumed to maximise its profits.

4.1. The really fundamental innovation in oligopoly theory came with the realisation that oligopoly theory must deal with "potential" competition as distinct from "actual" competition (with existing rivals). In perfect competition, (and, indeed, in any "large group" case regardless of product differentiation), the firm does not worry about the reactions of existing rivals; the question of "potential" rivals is hence irrelevant. The distinction between the "short" period and the "long" period, in Marshall, concerns only the question of excess profits in an industry but has nothing to do with each individual firm's economic behaviour (which continues to be the same under both periods). This is not so, however, with oligopolistic firms which do worry about rivals' reactions. The distinction between the short and long periods becomes of great relevance because the rivals multiply in the long period. More important, except

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7 There is thus no radical departure involved in this model and the only advantage of the model consists in providing testable hypotheses relating the variability of prices to the several factors affecting the extent of the kink and hence the magnitude of the discontinuity in the marginal revenue curve. On some elementary tests, see Stigler, "The Kinky Oligopoly Demand Curve and Rigid Prices," Journal of Political Economy, Vol. 55, No. 5, October 1947, pp. 432-49.

8 This is described as a "fundamental innovation" because it represents a radical departure in the theoretical formulation of the problem. Whether this stands up better against the test of empirical verification than the traditional approach is, of course, a separate issue.
when the firm wants to leave the industry, the firm's decision must always be affected by both actual competition and the possibility of potential competition.

4.2. This shift of focus makes it necessary to examine afresh the second assumption of traditional oligopoly theory as well. Profit maximisation must now be reinterpreted. Firms already in an industry at any point of time will often have the following choice: either to maximise profits in the short period (defined, a Marshall, as the period when entry cannot take place)—this being the framework of the traditional oligopoly solutions; or to maximise the value of profits (duly discounted) over the long period, taking into account the repercussions on entry, and hence on future profitability, of any price policy pursued in the short period—this being the hallmark of the new approach to oligopoly theory.

4.3. The recent thinking on oligopoly theory, therefore, departs from tradition in two important and related ways: (1) it focusses on the problem of "potential" competition; and (2) it correspondingly distinguishes between short-period and long-period profit maximisation and takes the latter to be the objective of firms that maximise profits (excepting, of course, those that are planning to move out of the industry). 9

5. This shift of focus may be primarily associated with the work of P. W. S. Andrews who has developed this theme in numerous writings on the

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9 Firms may not want to maximise profits. They may desire a stable stream of profits even if the present discounted value thereof may be less than that of an alternative stream that is variable. Alternatively, they may pursue the objective of increasing their share of the market in preference to profit maximisation, as W. Baumol has argued in Business Behaviour, Value and Growth, Macmillan Co., N.Y., 1959. In either case, however, the impact of the current price-policy on potential competition and thus on the long-period stream of profits and share of the market must still be considered by existing firms.
Several Oxford economists have followed with discussion of the ways in which potential competition affects a firm's price-policy. Much of the analysis, principally of Harrod, Andrews and Edwards, has assumed that firms, faced with potential competition, will pursue a price-policy designed to prevent the entry of potential competitors—with strong overtones that this is equivalent to long-run profit maximisation. However, there is disagreement on the level of the entry-prevention price which reflects, in turn, differences in the postulates made concerning the existing firms' expectations, and hence strategy, with respect to the entrant's evaluation of the possibility of successful entry.

The following are of particular interest: Manufacturing Business, London, Macmillan & Co., 1949; and "Theory of Individual Business," Oxford Economic Papers, N.S. Vol. 1, No. 1, January 1949, pp. 54-89. Mr. Kaldor has drawn my attention to the following paragraph on pp. 69-70 of his paper on "Market Imperfection and Excess Capacity" (Economica, February 1935), reprinted in his Essays on Value and Distribution, Duckworth, London, 1960: "Thus a producer, if far-sighted, will take the effect of his own actions not merely on his existing competitors into consideration but also on his potential competitors. He will act on the basis of an 'imagined demand curve' which shows the amount he can sell at different prices in the long run, under the assumption that his competitors' products, prices and the number of his competitors are all adjusted to his price. If a producer knows that if he charges a high price today a competitor will appear tomorrow whose mere existence will put him in a permanently worse position, he will charge a price which will afford him only a low profit, if only he hopes to secure his profit permanently; i.e. he will act in a manner as if his own demand curve were very much more elastic than it is." Indeed, references to the importance of potential competition abound in the literature even prior to Kaldor's paper (including, in the United States, the writings of J. M. Clark). However, nothing like a complete theoretical system appears to have been based on the idea of potential competition until Andrews placed it squarely at the centre of his analysis of oligopoly prices and behaviour.


This equivalence, however, does not necessarily obtain in the case of any of the different strategies discussed in this paper. Hicks, op.cit., however, is explicit on this question.
6.1. The Harrod Strategy: Harrod, explicitly citing Andrews' analysis, has advanced an entry-preventing strategy which is based squarely on the assumption that the potential entrant can be put off if, and only if, the existing firms are making merely normal profits. Hence, the existing firms will equate average cost, inclusive of normal profits, to average revenue instead of maximizing profits in relation to the demand curve derived on the basis of competition with existing rivals. Thus assume that, in view of existing competition, the demand curve facing the (typical) firm is \( AR \) in Figure 1. LAC, the long-run average cost curve of the firm, shows constant costs beyond \( E \).

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13 Harrod wishes to make this behaviour applicable to firms in the "large group" case. This, however, is not persuasive. If firms are unconcerned about the reactions of existing rivals (the definition of the large group), it is impossible to see why they should bother about potential rivals! Harrod's strategy is plausible only in the case of oligopoly. This leads up to a problem which has been treated only cursorily, at best, in the literature on potential competition. How are existing rivals to agree on the entry-preventing price? How is such mutual agreement to be obtained? Curiously enough, some of the contributors almost wholly neglect this problem of actual competition in their concern with potential competition: the pendulum has swung to the other end! Hicks, op.cit., skillfully frames his analysis in terms of a single firm which has no current rivals. Harrod does not analyse actual competition either. Edwards, op.cit., in developing Andrews' theory, does have much to offer, however, in this direction. The most efficient firm in the industry, as currently constituted, will usually set the price at the entry-preventing level and other firms will have to follow it as best they can. If they cannot, the efficient firm(s) will expand at their expense and still keep the price at the entry-preventing level. Actual competition, therefore, adjusts itself to the demands of potential competition. Modigliani, op.cit., does not pose the problem in the way it has been formulated here. While concentrating on potential competition, however, he offers several comments, based on Sylos' work, concerning "industrial structure," which closely parallel the arguments of Edwards concerning actual competition. Alternative solutions to the problem raised here would be either to have actual collusion or to argue, as Schelling has recently done with persuasiveness in The Strategy of Conflict (Harvard University Press, Mass., 1960), that firms will often arrive at similar policies without actual collusion if attractive mutual gains follow from this event.
Under traditional doctrine, the equilibrium output is $Q_T$ and price $A_T$. Under Harrod's strategy, however, the output is $Q_H$ and price $A_H$.

6.2. However, even if this strategy were successful in preventing entry, one must ask why firms should wish to eliminate entry at the cost of all excess profits currently. Why make normal profits throughout (as per Harrod's strategy) instead of making excess profits immediately (ignoring the resulting entry) and normal profits later? Such a curious scale of preference on the part of Harrod's firms may be explained, of course, in terms of the firms seeking, for instance, a "stable" stream of profits or a larger share of the market, at the expense of extra profits. However, a rationale may be found for the Harrod-type behaviour even within the framework of profit maximisation. The optimum plant may be different for the pre-entry and post-entry situations. If the firm decides to invite competition by maximising profits currently with a plant optimal to this objective, the profits following on entry will become subnormal until the plant is adjusted to the post-entry, optimum level. If the time-lag by which an existing plant can be adapted (at worst, through amortisation and new purchase) to the post-entry optimal size is greater than the time-lag required for entry (as, one may suspect, may be the case for many plants), then subnormal profits are inevitable initially when entry occurs. If so, Harrod's strategy acquires cogency, from the viewpoint of profit maximisation, if the initial losses on entry, duly discounted, exceed the gains that would have accrued from short-period profit maximisation.

7.1. The Andrews Strategy: Much of Andrews' writing suggests, however, that some premium in the form of a profit margin in excess of normal profits

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Harrod does allow a firm with advantages "peculiar to itself" to make abnormal profits. But the premium considered here is that which does not rest on such advantages but merely on the fact of being already inside the industry. Advantages such as Harrod has in mind are discussed by Bain, *op.cit.*, and are referred to in this paper in paragraph 10.
(as with output \(Q_A\) and price \(A_A\)) can be secured where entry is not "easy." Entry can be difficult if it is hard to get a "foothold in the market" (i.e. the demand that accrues to the entrant may be insubstantial). A large market may further be needed to reach the "scale of efficient production" (i.e. the minimum size of plant, with least average cost, with which the entrant can come in, may be large). The premium that can be enjoyed by the existing firms will thus reflect both the entrant's requirement of demand (determined by the scale of his plant) and his possibility of securing that demand.

7.2. It is assumed that the entrant and the existing firms will expect (1) the existing firms to follow the entrant's price-cuts, and (2) the customers of the existing firms not to switch to the entrant except in pursuit of a price-advantage. Under these assumptions, the demand for the entrant's

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15 Thus, Edwards, op. cit., who offers an excellent account and extension of Andrews' theory, shows a premium being charged by an Andrews firm in Figure 2 on p. 110. Edwards' analysis seems to me to be the best formal statement of Andrews' theory, and I shall draw upon it frequently. It is only fair to warn the reader that Andrews does not himself regard this as the correct interpretation of his theory; hence, it is probably best to regard the theory in the text as an "Andrews-type" rather than as an Andrews theory.


18 With a single exception to be considered shortly, this is one of the central assumptions of Andrews' theory. It is held to be particularly true when the buyers themselves are manufacturing firms. Thus, consider: "The buyers of the product--themselves manufacturers at a higher stage of production--will tend to look first to their customary suppliers because of the confidence gained by previous custom, and it is from these firms that they will normally buy." Edwards, op. cit., pp. 95-6. It should be noticed that this argument contradicts the premise of random pairing of buyers and sellers. In the absence of this assumption, the premium that could be charged, consistent with entry-prevention, would be reduced.
output is restricted to a share in the marginal increment in aggregate (industry) demand when the price falls below the pre-entry level. This increment may be equally divided among the existing firms and the entrant. However, if part of the increment ensues from the buyers attached to the existing sellers, the entrant's share is likely to be lower than that of (at least some of) its rivals. The demand curve so derived for the entrant is PA¹ in Figure 2(a). However, Andrews admits an important qualification to the assumption that buyers do not switch to the entrant except when there is a price-advantage. Buyers will be expected to transfer custom (in chagrin) to the entrant if the post-entry price reveals the pre-entry price to have been unduly high in relation to cost and hence exploitative.¹⁹ Thus the demand curve for the entrant will be more elastic—PA² in Figure 2(a). If the entrant's demand curve so derived for any given price, say PA² for price P in Figure 2(a), is below the average cost of production for the range of outputs at which the minimum average cost obtains,²⁰ entry will be expected to be unprofitable and hence is barred. The existing firms will then choose the maximum price—P₀ in Figure 2(b)—which is consistent with the prevention of entry.²¹

¹⁹"In the event that the price has been maintained high, gratuitously, by otherwise efficient producers, it will very soon be reduced to match the price of the new entrant. But the resentment of the buyer-firms at the high price now revealed to have been not warranted by costs, provides a reservoir of ill-will which, properly exploited, will ensure the new entrant access to the market." Edwards, op.cit., p. 97.

²⁰Andrews rules out the possibility of a stable equilibrium at levels of production which involve operating at falling costs to the level of the minimum average cost point, the argument being that in this situation firms will feel that they must expand production and drive out existing rivals until at least the efficient scale is achieved. Analogously, the entrant will not enter if he cannot cover his costs at a level of output characterised by minimum average costs.

²¹Assuming, of course, that prices and profits are positively correlated. This assumption is shared by Modigliani, op.cit.
FIGURE 2(a)
FIGURE 2(b)
7.3. The premium charged under Andrews' strategy is then approximately given by the formula:

\[ P_0 = P_C \left[ 1 + \frac{X}{X_{C} \left( \frac{\zeta}{N+1} + \varepsilon \right)} \right] \]

where \( P_0 \) is the entry-preventing price, \( P_C \) the competitive price (equal to the minimum average cost of the potential entrant), \( \bar{x} \) the minimum scale of plant (of the entrant) at which the minimum average cost is achieved, \( X_C \) the industry demand at price \( P_C \), \( N \) the number of existing firms, \( \zeta \) the price-elasticity of industry demand at price \( P_C \), and \( \varepsilon \) the elasticity, with respect to change in price, of the current buyers' transfer of custom to the entrant.\(^{22}\)

It follows that the premium obtainable in an industry will vary directly with (1) the minimum size of the scale of most efficient production and (2) the number of existing firms; and inversely with (1) the size of the total market, (2) the price-elasticity of industry demand and (3) the extent to which existing buyers will transfer custom to the entrant consequent upon entry.\(^{23}\)

8.1. The Attractiveness of Entry: Andrews often appears to argue as though, in addition to making entry easier for the potential entrant, a higher premium also makes entry more "attractive"; however, no cogent discussion of

\(^{22}\) The sign of \( \zeta \) is negative and of \( \varepsilon \) (since custom is lost to the entrant and hence reduced when price falls with entry) positive. Some of the symbols have been borrowed from Modigliani, \textit{op.cit.} For simplicity, it has been assumed that the increase in demand, as price falls with entry, is shared equally by all firms.

\(^{23}\) Three observations are in order here. (1) The "Andrews strategy" presented here abstracts, for the purpose of analysing the problem of price-formation, certain key postulates from, and hence is only a segment of, a full-blooded and rich account of the industrial process contained in Andrews, \textit{op.cit.} (2) On the other hand, the testable hypotheses listed here as deductions from this strategy represent an extension of Andrews' analysis in so far as they are not all to be found (at any rate in the form given here) explicitly in Edwards and Andrews, \textit{op.cit.} (3) It should further be noted that Andrews considers that, with the possibility of entry by multi-product firms into adjacent markets, the relevant minimum size of the entrant's plant will often be sufficiently small to make the premium chargeable negligible.
such attractiveness is to be found in his work. It would appear, however, that the mere enjoyment of lucrative premia by existing firms (no matter how amply justified in terms of difficulty of entry as defined previously) will attract firms into the industry who may want to undergo initial losses with a view to driving some existent firms out, in the hope of surviving and earning the lucrative premia that are being made in the industry. If, therefore, it is possible that if the premium charged appears lucrative enough, the entrant will risk coming into the industry in the hope of securing a foothold at the expense of some existing firm(s), the premium that will be charged will be lower than otherwise available.

8.2. This argument is illustrated in Figure 3. OE represents the profits, discounted back to the current period, that will be earned by the existing firms in the industry, in the absence of entry, at different premia. LP represents the expected losses and profits, duly discounted again, of an Andrews entrant, corresponding to the premia being charged currently by the existing firms. For premia up to $P_0$, the entrant is supposed to take losses; with premia exceeding $P_0$, the entrant will expect to make profits. Then OE then represents Harrod's entry-prevention price; and $P_0$ that of Andrews. If the attractiveness-of-entry argument is considered, however, the entrant will now have a new schedule of profits expected in case of survival, corresponding to the range of (lucrative) premia from $0'$ to $P_0$. These profits will be expected

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24 It is assumed that the greater the premium charged, the greater the profits made. The schedule could be easily adjusted to incorporate any alternative assumption.

25 The expected losses could be estimated presumably at the minimum level of output at which minimum average cost is obtained; and the expected profits in a similar way.
with uncertainty and are likely to accrue after an initial period of losses; hence the schedule ought to be left of OE. However, the profits must be computed from the level of losses estimated in deriving LP₀, to permit lateral aggregation with the latter; hence the schedule may be to the right of OE (for some premia). The resulting schedule is O'R in Figure 3. By aggregating LP₀ and O'R for each premium charged, we arrive at the truly relevant curve LR. This curve intersects the Y-axis at \( P₀^1 \) which is the entry-prevention price.

9.1. The SBM Strategy: The Sylos-Bain model, as presented by Modigliani, and referred to hereafter as the SBM model, is startlingly similar to, though not identical with, Andrews' analysis.²⁶ The SBM firms agree on sharing the following expectations: (1) the potential entrant will not enter if the post-entry price does not cover its average cost of production; and (2) the existing firms, assumed to be producing at minimum average cost, maintain their output unchanged when entry occurs. Under these rules, the entrant's demand curve starts from the price-axis at the pre-entry price and is drawn so that the entire increment in aggregate industry demand with each price-reduction accrues to the entrant. In other words, this demand schedule is the industry demand schedule minus the unchanging output of the existing firms. Assuming then that costs fall steeply to the minimum average cost level,²⁷ the following approximate formula holds for the maximum entry-preventing price (using the notation of paragraph 7.3):

\[
P₀ = P \left[ 1 + \frac{x}{\bar{x}_C} \right].
\]

²⁶ Modigliani, op.cit., in a brief footnote on p. 216, refers to Edwards, op.cit., as having anticipated "many of the conclusions of Sylos and Bain." However, he misses the differences between the two strategies.

²⁷ The SBM model, in contrast to Andrews' model, admits the possibility of equilibrium at ranges of output where the average cost is in excess of the minimum. The formula in the text, however, ignores this complication.
9.2. In common with Andrews' results, the following testable hypotheses are obtained: the premium that can be charged, consistent with the prevention of entry, varies directly with the minimum scale of the entrant's plant and inversely with both the size of the total market and the price-elasticity of industry demand. The differences with Andrews, however, are that the premium is not affected by either the number of existing firms or by expectations about the transfer of custom to the entrant by current buyers; further, the premium will now rise if costs do not fall steeply to the minimum average cost level.

9.3. These testable hypotheses relate, however, to variations in the profit margins between industries and for an industry at different points of time. It is possible to construe the analysis, however, as also stating something testable about the actual size of the margin: the SBM result, 

$$P_0 = P_C \left[ 1 + \frac{x}{X_C C} \right]$$

provides such a hypothesis. It is difficult, however, to expect anything except a refutation of this hypothesis. The premium charged according to the SBM strategy is likely to be an overestimate for a variety of reasons, related to the attractiveness-of-entry factor considered in paragraph 8.1. If lucrative premia are charged in an attempt to capitalise on the difficulty of entry, the attractiveness of entry becomes great and firms will enter the industry in the hope of survival. The reasons for this type of behaviour by the entrant are quite plausible:

(1) When the entrant enters the industry, every firm makes losses; it should thus be a matter of chance as to which firm goes out. If the premium is lucrative enough, it could pay the firm to take the chance that it (rather than some existing firm) will survive.

(2) Indeed, if the SBM strategy is pursued, the entrant will be making smaller losses than the existing firms, except in a limiting case, under the assumptions made concerning costs; and hence its chances of survival will be
greater than those of existing firms so that the argument about survival is considerably strengthened. In Figure 4, designed to illustrate the SBM strategy, AR\(^1\) is the demand curve for an existing firm (symmetry of demand for each firm is assumed for the sake of simplicity; nothing substantive in the following argument hinges on this); P\(^1\) is the entry-preventing price; P\(^2\) is the price after entry; OW is the output of the existing firm before entry which is now maintained, _a la_ the Sylos Labini strategy, in the face of entry; OK is the (minimum) plant with which the entrant has entered the industry; and AR\(^2\) is the demand curve for each existing firm after entry. The pre-entry profits, in excess of normal, are P\(^1\)RMN; the post-entry loss for each pre-entry firm is NMQP\(^2\); and the post-entry loss for the entrant itself is only NEHP\(^2\) (< NMQP\(^2\)). In the limiting case, when each existing firm produces, prior to entry, at E, each firm (inclusive of the entrant) must make identical losses after entry.

(3) Further, if the question is one of survival, to earn lucrative premia, it is quite possible that the entrant may have greater financial reserves than some existing firm(s)—an assumption clearly compatible with the assumption of homogeneity of cost curves—and hence also a greater capacity to survive. Since the entrants are often, and will almost always be assumed to be, multi-product firms, this argument acquires special cogency.

(4) The entrant may quite possibly be willing to take initial losses and to consider them as inevitable "investment in a market" particularly if a market that is already substantially being exploited is being entered.

(5) Finally, multiple-product firms can always set off losses on a new venture against profits from existing activities and hence let the Treasury share the losses, so that the prospect of initial losses again is relatively less inhibiting than might otherwise be supposed. For these various reasons,
FIGURE 4
therefore, the premium that will be charged by oligopolistic firms is likely to be overstated by the SEM formulation and is unlikely to be successfully verified empirically. 28

10. All this is not to deny that sometimes existing firms may have absolute cost advantages over entrants, which may persist for long periods. For instance, patents provide an example. Where such advantages obtain and are likely to persist for long periods, the premium charged will be higher than that indicated by Andrews' as also Sylos Labini's analyses. Bain provides a careful and valuable analysis of these advantages and several testable hypotheses about variations in the size of the available premium follow directly from his analysis. 29

11. Many of the paces through which the entry models are taken involve the assumption of a given demand curve for the industry. Sylos Labini and Modigliani argue, for instance, that the implications of a growing demand will be (1) to put a downward pressure on the premium that can be charged (because the aggregate demand is now larger) and hence (2) to cause the existing firms

28 Of course, under certain assumptions, the issue of survival could be plausibly shown to exercise some upward pressure on the premium as well. Thus, for instance, as Mr. Archibald has pointed out to me, if entry is a function of the reserves possessed by existing firms and usable in a "war to the ruin" in case of entry, and reserves in turn depend on the level of profits in the short period, then the best entry-prevention strategy would appear to be to maximise current profits. However, it seems to me that this argument must be balanced against the fact that the worthwhileness of a "war to the ruin" to the entrant is itself a function of the presence of lucrative premia in the industry. The Archibald-type argument thus merely makes the O'R curve in Figure 3 steeper than it would otherwise be, because the expected profits are reduced at higher premia if the higher premia improve the existing firms' profits, reserves and hence fighting strength and thereby dim the entrant's prospect of survival. The result is then to raise the premium that can be obtained by the existing firms.

29 Modigliani, op.cit.
to ration out scarce supplies instead of raising prices if capacity creation has lagged behind the expansion of demand.\textsuperscript{30} It is possible, however, to incorporate the effects of growing demand formally into the entry analyses of the variety discussed here; and the results are interesting.

12.1. The formula for the equilibrium price, under the Andrews strategy, should now read: \( P_0 = P_C \left[ 1 + \frac{\bar{x} - k\lambda}{X_C(\frac{C}{N+1} + \epsilon)} \right] \) where \( \lambda \) is the growth of aggregate demand subsequent to entry, \( k \) the proportion thereof that accrues to the entrant, and \( X_C \) now the aggregate demand at the competitive price after growth. An Andrews-type version of the share of the increasing demand accruing to the entrant would probably be: \( k\lambda = \frac{qm\lambda}{N+1} \) where \( (1-m) \) is the proportion of increased demand that accrues through current buyers attached to existing sellers, and \( (1-q) \) the fractional scalar by which the entrant's share in the increased demand must be reduced because the existing sellers' "goodwill" gives them a more than equal share of the demand accruing through new buyers. The prospect of increasing demand will thus reduce the premium available; and the reduction will vary directly with \( q, m, \) and \( \lambda \) and inversely with the number of current sellers.

12.2. However, there is a further implication which is positively startling. It is no longer possible to argue that entry, even though "free," can be closed by the "very effective and legitimate weapon of a competitive price based on the costs of efficient production."\textsuperscript{31} Thus, where \( \bar{x} < k\lambda \), the entry-prevention price is lower than \( P_C \). However, the price cannot be set (permanently) below \( P_C \), so that the use of price-policy to prevent entry

\textsuperscript{30} Modigliani draws attention to the fact that these conclusions are found in Edwards, \textit{op.cit.}

\textsuperscript{31} Edwards, \textit{op.cit.}, p. 96.