3. The pricing decision

For an understanding of how prices are determined under oligopoly it is necessary to examine, not the conditions affecting the individual firm in the short run, but rather, the conditions affecting the industry as a whole over the long run. This extension of the analysis to multiple periods not only introduces time as a factor, it also means that the pricing decision cannot be divorced from the industry’s investment planning.

To speak of the industry in this connection is, of course, to speak of the megacorp-price leader. Its practice of acting as the surrogate for its fellow oligopolists arises out of a real necessity – the need of an industry to avoid price competition that will be destructive to all its members. Still, the question remains of how one firm can decide upon a price that will be acceptable to other firms within the same industry despite the inevitable divergence of interests.

The megacorp-price leader’s task in this regard is greatly facilitated by two conditions inherent in the very situation in which it finds itself. The first is the fact, already noted in chapter 2 (pp. 47-8), that when it acts on behalf of the entire industry, the megacorp-price leader’s own cost and revenue curves can be treated as the marginal portions of the industry supply and demand curves respectively. This means that, on the one hand, assuming the megacorp-price leader to be the least-cost producer, no other firm is likely to prefer a lower price; and that, on the other hand, since all the members of the industry will be faced with equally inelastic revenue curves, no other firm is likely to suffer a greater loss of sales should the price be raised. In other words, no other firm is likely to announce a price that would be more acceptable to the industry as a whole. The second condition that greatly simplifies the megacorp-price leader’s task is the fact that it need not determine a price de nouveau. A price already prevails in the industry. Given its long-run goals as well as those of the other firms in the industry, all the price leader need determine is what change in price – insofar as the subsequent pricing period is concerned – will be optimal. The new price announced by the price leader will thus depend on (1) the absolute price that prevailed during the previous pricing period, and (2) the change in price decided upon. That is,
The pricing decision

\[ P_1 = P_0 + \Delta P \]  \hspace{1cm} (3.1)

where \( P_1 \) is the new industry price that is announced, \( P_0 \) is the previously prevailing price and \( \Delta P \) is the change in price decided upon. It is from this ex ante perspective of the price leader that the pricing decision in an oligopolistic industry needs to be analyzed.

The absolute price that prevailed during the previous pricing period will itself depend on price changes that have occurred antecedently. Each oligopolistic industry thus has a pricing history, this pricing history providing a base line for any subsequent marginal adjustment. But though the previously prevailing price is something the price leader must accept as historically given, that absolute price can nonetheless be understood in terms of the uses to which its component parts will be put by the megacorp. This gives rise to a pricing formula for oligopoly which is a more refined version of the commonly used ‘cost-plus’ approach. Under this formula, the ‘plus’ added to variable and fixed costs is the corporate levy - that is, the amount of internal funds required by the megacorp to finance its planned investment expenditures.

It follows that any change in price will necessarily reflect a change in one of the pricing formula’s components. Assuming variable and fixed costs remain constant - a ceteris paribus assumption relaxed in later chapters - the change in price will, then, be due to a change in the required corporate levy. Any change in the required corporate levy will, in turn, depend on the megacorp’s demand for and supply cost of internally generated investment funds. Thus the pricing decision in an oligopolistic industry is intimately bound up with the capital accumulation process.

This linking of the price level to the industry’s investment program is, in fact, the single most important feature of the pricing model set forth below.

In this model the firm is viewed as using the price variable to alter intertemporal revenue flows. Specifically, what will be argued is that, because of the market power which it possesses in conjunction with the other members of the industry, a megacorp can increase the margin above costs in order to obtain more internally-generated investment funds, that is, a larger corporate levy. As a result of any such price adjustment, the intertemporal revenue flows will be altered in two ways: (1) from the returns to investment thereby being financed, and (2) from the decline in sales over time caused by the higher price. The first effect is encompassed by the firm’s demand curve for additional investment funds, the second, by its supply curve for those same funds. The nature of both curves will be explained once the components of the absolute price level have been described.
The absolute price level

The absolute price level in an oligopolistic industry can be analyzed in terms of the following formula:

\[ P = AVC + \frac{FC + CL}{SOR \cdot ERC} \]  \hspace{1cm} (3.2)

where \( P \) = absolute price level
\( AVC \) = average variable costs
\( FC \) = fixed costs
\( CL \) = corporate levy
\( SOR \) = standard operating ratio
and \( ERC \) = engineer-rated capacity

Each of the terms in the formula will be explained more fully.

Average variable costs. The definition of average variable costs is that usually employed by economists. They are the costs incurred directly in the production process; that is, they are the costs the megacorp can avoid by curtailing current output. Specifically, they represent, on a per unit basis, the wages paid production workers and the price of material inputs. A change in these average variable costs will depend on either a change in the price of labor and material inputs or a change in the technical coefficients governing the manner in which labor and material inputs are combined with the capital inputs to produce the final output. While a change of the first type, that is, a change in the price of direct inputs, is possible in the short run, a change of the second is not. This is because, as previously argued, the technical coefficients are fixed in the short run. Of course, through the addition of new plants or plant segments designed by engineers to reflect the secular shift in relative factor prices, these technical coefficients will gradually change over time. But the effect even within a single planning period - not to mention a single pricing period - is likely to be negligible since all but the new plants or plant segments, and thus most of the megacorp's operating capacity, will be governed by the old technical coefficients. (A somewhat more extended discussion of technological change will be found below in chapter 5.) Although it must still be recognized that average variable cost may change in the short run as a result of changes in the price of material and/or labor inputs, this possibility will be temporarily excluded by invoking the ceteris paribus assumption.

As already suggested, the megacorp's average variable costs can be assumed to be constant and thus equal to marginal costs over the ranges
of output at which the megacorp is likely to produce. To the extent
that this condition holds, it is possible to substitute marginal costs for
average variable costs in the pricing formula.

Fixed costs. These are here defined as those costs of current production
which are independent of the actual operating ratio. They include, in
line with the common usage of the term, both the salaries of managerial
personnel and the interest paid to fixed debt holders. However, because
of the special nature of the megacorp, it is best to modify the conventional
notion of fixed costs in two ways: (a) to include the dividends paid
the stock, or equity, debt holders, and (b) to exclude expenditures on
research and development as well as expenditures on advertising and
other activities designed to enhance the megacorp’s long-run market
position.

With respect to dividends, the reason why in the usual analysis they
are not included among the fixed costs is that those to whom these
payments go, the stock, or equity, debt holders, are viewed as being
the owners of the firm entitled to whatever income remains after all
contractual costs have been met. Their function, in fact, over and above
that of any other supplier of capital funds, is to assume the risk that
the residual income may be smaller than anticipated. This view of the
equity debt holders, in turn, reflects the belief that they are the equivalent,
insofar as the megacorp has an equivalent, to the erstwhile owner-
entrepreneur. However, to treat the equity debt holders in this manner
is to foster a myth which, as previously noted, has little basis in reality.
The equity debt holders are neither owners in the sense of controlling
the property to which they nominally hold title nor de facto recipients
of the megacorp’s residual income.

As pointed out above, the effective decision-making power within
the megacorp rests with the executive group. The corollary to this is
that the equity debt holders have no real voice in determining policy,
not even with regard to how the firm’s net revenue is to be distributed.
They are merely one of the megacorp’s several constituencies, albeit
in a strong bargaining position as a result of their legal right, acting
collectively, to depose the incumbent management. For this reason, they
must be viewed, not as owners but rather, as rentiers, little different
from the fixed-interest debt holders in receiving compensation for the
investment funds they have at some point in historical time supplied
the firm.

Of course, the equity debt and fixed-interest debt holders exercise
differing degrees of influence over the megacorp’s affairs and incur
differing degrees of risk. But the difference are not necessarily what
they are often assumed to be. While it is true that only the equity
debt holders have the formal right to select new corporate officers, as a practical matter it is the fixed-interest debt holders who are more likely to be able to effect a change in management. This is because the fixed-interest debt holders are usually a smaller, more cohesive group and because, since they tend to be financial intermediaries, they are in a better position to shut off the flow of external funds. On the other hand, while it is true that the fixed-interest debt holders are contractually entitled to a certain nominal rate of return, as a practical matter it is the equity debt holders who are more likely to receive the anticipated real rate of compensation. This is because dividends, while they may fluctuate somewhat in the short run, are nonetheless more likely to rise over time to offset the effects of inflation. Yet these differences in the degree of influence exercised and the degree of risk incurred are less important than the similarity of function which both the equity debt and fixed-interest debt holders serve as suppliers of investment funds to the megacorp. The similarity is made all the greater by the complementary nature in the short run of equity shares and fixed-interest obligations within the megacorp's debt structures.\(^3\)

The risk of the residual income being smaller than anticipated is, in fact, borne for the most part not by the equity debt holders but instead by the megacorp itself. Of course, if the megacorp's revenues decline drastically, the dividend rate may be temporarily reduced. But the executive group is likely to take such a step only as a last resort;\(^4\) and the equity debt holders are amply compensated for this additional risk they run over and above that of the fixed-interest debt holders by the substantially higher rate of return they receive. Chapter 5 will discuss at some length the factors that actually determine the dividend rate. All that need be noted here is that the payment itself is a de facto obligation of the megacorp—i.e., unexplainable failure to meet itplacing the executive group's control in jeopardy—but that the amount of the payment will depend only slightly on the megacorp's current earnings per share. A decline in net revenue will be felt, more generally and more directly, by the megacorp itself—through the concomitant decline in its cash flow, or corporate levy. The latter, not the dividends paid the equity debt holders, constitutes the megacorp's true residual income. But since it is the megacorp qua organization to which this residual income accrues, it is also the megacorp on which devolves the risk that the residual income may be smaller than anticipated. The equity debt holders, meanwhile, can expect that their own compensation, if not somewhat higher than the previous year's, will probably be no lower. It is because the equity debt holders have thus been stripped almost entirely of any entrepreneurial function that the dividends paid them, like the interest disbursed to the fixed-interest debt holders, are
treated here as part of the megacorp's fixed or overhead costs.

The reason for avoiding the term 'profit', as has been done for the most part so far, should now be clear. While suitable for describing the returns to the owner-entrepreneur of a neo-classical proprietorship, it simply leads to confusion in the case of the megacorp. What is generally referred to as the 'profit' of a megacorp actually lumps together two quite different income flows, a return to stockholders in the form of dividends and a return to the megacorp itself in the form of retained earnings - the latter comprising part of the corporate levy, or residual income. For analytical purposes, as will be argued below, it is best to keep these two quite different income flows separate.

With respect to the expenditures on research and development as well as on advertising, the reason why, in the usual analysis, they are included among the fixed costs is not entirely clear. It may simply reflect the fact that, under normal accounting procedures, these types of expenditures are allowable costs to be deducted from revenue before determining the firm's net profits - a practice not critically examined by economists since, in the conventional theory, research and development as well as advertising are dealt with, if at all, largely as an afterthought. Whatever the reason, it seems clear that such expenditures have little to do with current production. If they were to be terminated, the megacorp's sales and output are unlikely to be seriously affected, at least for some time. Expenditures on research and development as well as on advertising are intended, rather, to enhance the megacorp's long-run market position. In this respect, they are similar to the more conventional forms of investment. Like the latter, they will influence only future, not current, revenue; and though they are contractual obligations of the firm once entered into, they are nonetheless entirely discretionary beforehand. It is for this reason that they are herein treated, like the purchase of new plant and equipment, as part of the megacorp's investment expenditures to be financed out of the corporate levy. (This point will be dealt with more fully later in this chapter.)

It should be noted that these modifications of the conventional notion of fixed costs - whether it be the inclusion of dividend payments or the exclusion of research and development along with advertising expenditures - are not critical to the pricing model that follows. They are suggested here simply in the interest of greater realism and because some of the judgments made in later chapters depend on these points. Even if these modifications of the conventional notion of fixed costs are rejected, however, the pricing formula set forth above, along with the pricing model to which it gives rise, still pertains.

A change in fixed costs will, like a change in average variable costs, also depend on a change in the price of inputs or a change in technical
coefficients - in this case the price of those inputs and a change in those technical coefficients reflected in the overhead cost structure. Here the inclusion of dividends among the fixed costs is a complicating factor, for it is not clear what input is provided by the equity debt holders. If the salaries paid managerial personnel should rise, it follows that the cost of that type of labor has increased. But if the dividends paid the equity debt holders should rise, one cannot be sure that the cost of capital - or even the cost of obtaining additional investment funds - has similarly increased. It may just be that the cost to the executive group of placating the stockholders, and thereby avoiding the possibility of a take-over by an outside group, has risen. For this reason it is necessary to add that a change in fixed costs may also occur through a change in the rate of compensation received by the equity debt holders.

In the short run, the possibility of a change in the technical coefficients relevant to the overhead cost structure is excluded for the same reason it was excluded in the earlier discussion of average variable costs. The development of new managerial techniques, no less than the construction of new plants embodying more efficient factor combinations, is essentially a long-run phenomenon. The possibility of a change in the price of overhead input and/or a change in the rate of compensation received by the equity debt holders will also be excluded, at least for the remainder of this chapter, by again invoking the *ceteris paribus* assumption.

**The corporate levy.** This is here defined as the amount of funds available to the megacorp from internal sources to finance investment expenditures. It includes not only what businessmen themselves refer to as the 'cash flow' - depreciation allowances plus retained earnings - but also whatever is currently being spent on research and development, advertising and similar means of enhancing the megacorp's long-run market position. The corporate levy can also be viewed as the difference between the megacorp's total revenue and the payments it is obligated to make, *de facto* as well as *de jure*, to its various constituencies. It thus consists of the funds that accrue to the megacorp *qua* organization. The distinction between this concept and the more conventional notion of profits can readily be seen. On the one hand the corporate levy excludes, for reasons already indicated, that portion of the megacorp's accounting profits that are paid out to the equity debt holders in the form of dividends. On the other hand it encompasses, unlike the conventional notion of profits, both depreciation allowances and any expenditures on research and development, advertising and the like... An underlying premise of this treatise is that the corporate levy is a more useful concept for understanding oligopolistic pricing behavior - and that, moreover, it is not simply a residual figure, the sum left over when all costs, including dividends,
have been subtracted from gross revenue. Rather it is an amount deliberately decided upon by the megacorp so that it will have sufficient internal funds to achieve its long-run investment goals.

The required corporate levy, like fixed costs but unlike the realized corporate levy, is a sum which does not vary with the level of output. To convert it to a per-unit-of-sales figure comparable to price, it is necessary to determine the appropriate divisor. If one is interested in the ex post result, that is, in the average corporate levy already being realized, the appropriate divisor is simply the quantity of output currently being produced or sold. However, if one is interested in the ex ante calculation, that is, in the average corporate levy to be realized in the future, a different divisor is needed. This divisor, given in the pricing formula above, is the standard operating ratio multiplied by engineer-rated capacity.

The latter has already been defined as the sum of the capacities of all plants or plant segments, these capacities in turn being defined as the quantities which, in the judgment of the engineers who designed them, each of the plants or plant segments owned by the megacorp is capable of producing when operated at maximum efficiency. It corresponds to the level of output at which, all plant facilities having been put into operation, marginal costs begin to rise sharply and continuously. The standard operating ratio, in turn, is the percentage of total capacity at which, based on past experience, the megacorp can expect to operate on the average over the business cycle. It takes into account the fact that the megacorp will already have acquired sufficient reserve capacity to meet any likely fluctuations in demand. This ratio, applied to the engineer-rated capacity, gives the quantity of output which the megacorp is most likely to produce at any given moment in time. It therefore provides the best basis for estimating, ex ante, the probable per unit fixed costs and the probable per unit corporate levy. Thus,

$$ACL = \frac{CL}{SOR \cdot ERC}$$ (3.3)

where $ACL = ex \ ante$ per unit or average corporate levy.$^5$

The inclusion in the oligopolistic pricing formula of the term $(ERC \times SOR)$ as the best estimate of the expected rate of output and/or sales has an implication worth noting even at this point. It means that any likely fluctuation in industry demand, and thus in aggregate demand, has already been allowed for; and that therefore a change in the level of industry sales will have little or no effect on the price level, at least during the current pricing period. Indeed, the use of the SOR to estimate the likely level of sales satisfies the final of the three objections commonly
raised against cost-pricing models. These three objections are (1) that costs, especially average variable costs, will vary with the level of output; (2) that sales volume will depend on the parallel behavior of rivals in the industry, and (3) that sales volume will also depend on the level of industry and aggregate demand (Skinner, 1970). Objections (1) and (2) have already been met by positing that marginal costs, and hence average variable costs, are constant over the relevant range of output, and by positing that prices are set through a system of price leadership with relative market shares likely to remain unchanged in the short run. Still a fourth objection— that the margin above costs is not invariable but depends on 'what the traffic will bear' (J. Robinson, 1969, p. vii) — will be dealt with shortly.

In addition to the ex ante per unit corporate levy, it is possible to specify a marginal corporate levy, that is, the change in the total corporate levy that will be realized from the sale of an additional unit of output. Assuming that the de facto obligations represented by fixed costs will have already been allowed for by the megacorp — assuming, in other words, that the fixed costs are treated as having a prior claim on the megacorp's revenue — the marginal corporate levy is simply the difference between the absolute price level and average variable costs. Thus,

\[ MCL = P - AVC \]  

(3.4)

where \( MCL \) = marginal corporate levy.

If, as previously suggested, average variable costs are constant over the ranges of output at which the megacorp normally produces, the marginal corporate levy will not only be constant as long as the absolute price level remains unchanged, it will also be equal to the difference between that price level and marginal costs.

A geometric presentation. Its various components having been described, the oligopolistic pricing formula can now be translated into a geometric diagram as is done in figure 6. The only change from the earlier diagrams is that the average corporate levy has now been added to average variable and average fixed costs. Since the required corporate levy is a fixed sum which does not vary with the rate of capacity utilization, it will, when converted to a per unit basis, decline at a constant rate. In this respect, it differs not at all from fixed costs. Mathematically, in fact, the required corporate levy can be considered simply an addition to the fixed cost component.

The absolute price level prevailing at any given moment in an oligopolistic industry will thus be equal to the price necessary to cover, not only the average variable and average fixed costs but, in addition, the
average required corporate levy at the standard operating ratio. Assuming the standard operating ratio to be 80, as in Figure 6, this will be the price level $P_0$ as indicated in the diagram. It is this price level which the megacorp-price leader, acting on behalf of its fellow oligopolists, will have previously announced and this price level which, until the next pricing period, will then be maintained by all the firms in the industry.

A price which has been set and then maintained at level $P_0$ implies, of course, that insofar as the actual operating ratio differs from the standard operating ratio, the total corporate levy realized ex post will differ from the corporate levy planned ex ante. Even though the standard operating ratio will have been computed so as to average out these differences over the normal business cycle, the fact is that, at any given moment in time, there is almost certain to be a discrepancy between the two – with the total corporate levy actually realized being affected accordingly.

The total corporate levy realized ex post depends, of course, on the actual operating ratio. Indeed, with the marginal corporate levy necessarily being greater than the average corporate levy, the total corporate levy actually realized will both rise and fall more sharply than the rate of capacity utilization. The larger the marginal corporate levy, that is, the greater the difference between $P$ and $AVC$, the greater will be this
The pricing decision

Sensitivity of the realized corporate levy to the actual operating ratio. Since the realized corporate levy is identical to the savings being generated by the megacorp, it then follows that the greater the marginal corporate levy, the greater too will be the megacorp's marginal propensity to save. This marginal propensity to save being equal to the ratio of the marginal corporate levy to the price level, \( MCL/P \). The significance of this point will become clear when, in chapter 6 below, the macro-dynamic impact of the oligopolistic sector is analyzed.

In figure 6, the price level is fully determinate only because specific values for \( AVC, FC \) and \( CL \) have been explicitly assumed. How these values themselves are determined must now be explained. This can be done, starting in the next section, by analyzing from the megacorp-price leader's perspective the desired change in industry price when costs have either not changed or, if they have changed, been exactly offset by productivity gains.

A change in price

With average variable and fixed costs held constant, a change in the price level of an oligopolistic industry must necessarily reflect a change in the required average corporate levy. Since the latter's sole function is to provide internal financing for capital expenditures, a change in the required average corporate levy must, in turn, reflect a change in the demand for investment funds over the next planning period relative to the supply cost of those funds.

The planning period, it should be noted, is the megacorp's time horizon for capital expenditures. It is at least equal to the gestation period for an additional production unit, that is, the time required to bring an entirely new facility into operation starting from scratch. With the pricing decision inextricably linked to the investment decision, the planning period thus corresponds to what, as a minimum, the megacorp must construe the long run to be. In deciding what price should prevail, the megacorp cannot avoid peering at least that far into the future - even though the price decided upon can be changed precipitously, if necessary, at the end of the next pricing period.

It follows, then, that with average variable and fixed costs held constant, a change in the price level in an oligopolistic industry must be a function of a change in either the demand for or the supply cost of additional investment funds over the next planning period. Thus,

\[
\Delta P = f(D_t, S_t)
\]

where \( D_t = \) demand for additional investment funds and \( S_t = \) supply cost of additional investment funds.
Each of these determinants will be considered in turn, beginning with the latter.

The supply of investment funds. The megacorp can obtain additional investment funds internally through the corporate levy or externally through new debt financing. In the conventional analysis the cost of internal funds is held to be the same as that of external funds. By retaining a portion of the net revenue for its own use rather than allowing it to recirculate through the capital funds market, the megacorp, so the argument runs, incurs an opportunity cost equal to the rate of interest it would receive if, instead, it lent out those funds to others. That rate of interest, assuming the capital funds market works reasonably well, should be equal to the rate of interest the megacorp itself would have to pay on borrowed funds, adjusted for any difference in the relative degree of risk involved. The argument, however, ignores two important factors. The first is the margin between what the megacorp can earn by investing funds in its own business and what can be earned by lending out funds to others instead. This margin reflects, in addition to the cost of brokerage services, portfolio management and the like, the megacorp’s differential skill in employing investment funds in the industries to which it is committed (this point will be elaborated below, pp. 119-20). The second, and far more significant, factor is the real cost incurred when additional investment funds are obtained through the corporate levy.

The conventional analysis obscures the real cost of internal funds because it implicitly assumes that the megacorp has no control over how large an amount of those funds will be generated. In the usual microeconomic treatment the current level of accounting profits, on which the amount of internal funds generated will depend in the first instance, is determined solely by the intersection of the marginal revenue and marginal cost curves; while the retention rate, on which the amount of internal funds generated will depend in the second instance, is determined solely by the ability of the firm to reinvest those funds on behalf of the stockholders at a more favorable rate of return than the stockholders themselves could obtain. By now the inapplicability of this conventional line of reasoning to the megacorp should be readily apparent – first, because, the amount of net revenue realized in the short run does not depend on the intersection of any marginal revenue and marginal cost curves and, second, because the retention rate does not necessarily depend on what is in the best interests of the equity debt holders. Rather, what is here being suggested – and it is a fundamental premise upon which rests the pricing model that follows – the megacorp-price leader, acting with the tacit acquiescence of its fellow oligopolists,
The pricing decision

is in a position to increase its net revenue in the short run by raising the industry price. Moreover, by doing so its intention is to augment, not the returns to the equity debt holders but rather, the megacorp’s own residual income as reflected in the growth of the corporate levy over time.

What limits the megacorp-price leader in its willingness to increase the industry price level, and thereby obtain additional investment funds internally, is the real cost incurred as a result of any rise in industry price. This cost, it will be argued, derives from three sources: (a) the substitution effect, (b) the entry factor, and (c) the possibility of meaningful government intervention.

The substitution effect. Any increase in the relative price charged for a product will cause that product to lose part of its market to competing goods. This is because, as the relative price rises, other goods - including both those supplied by rival domestic industries and those imported from abroad - will become more attractive as substitutes. The resulting loss of industry sales is what is meant by the substitution effect.

A decrease in the relative price will, of course, have the opposite impact. While an announced price cut is somewhat rare in oligopolistic industries for reasons to be brought out later in this chapter, an increase in the price of competing goods while the price of the product in question remains unchanged - a set of circumstances equivalent to a fall in the relative price of the latter - is quite common. In fact, in a dynamic system, it is more generally the differential rates of increase in the price levels among competing industries that give rise to the substitution effect.

This effect, it is important to note, will be a function of time (cf. Pollack, 1970; Scherer, 1970, pp. 213–16). The ability to substitute other goods for any product the relative price of which has risen will be limited by the need to make certain prerequisite adjustments. In the case of a product sold to other business firms, production techniques will have to be revised; in the case of a product sold to households, taste preferences will have to be altered. (The distinction between production techniques and taste preferences is the distinction between objective and subjective considerations; thus there will be an element of taste in the purchasing decisions of business firms and an element of production technique in the purchasing decisions of households.) Moreover, unless the change in relative price can be expected to persist over time - and only by waiting can one have confidence in this regard - the necessary adjustments are not likely even to be attempted.

For these reasons the full impact of the substitution effect will not be felt at once. In the time period immediately following the rise in price the impact will be similar to the one shown in figure 7. With
The pricing decision

AR the portion of the industry's short-run demand curve that is identical in terms of elasticities with the megacorp-price leader's own revenue curve, an increase in price from $P_0$ to $P_1$ will lead to decrease in output sold from $Q_0$ to $Q_1$. Net revenue will thus, on the one hand, be increased by an amount equal to the rectangle $P_1ABP_0$. This represents the additional net revenue that will be realized, as a result of the higher price, on the quantity of output still being sold. But net revenue will, at the same time, be reduced by an amount equal to the rectangle $BGFE$. This represents the net revenue (price less marginal cost) which will no longer be realized as a result of the decline in sales caused by the higher price. Since a change in the megacorp's net revenue position is the same, in this context, as a change in the realized corporate levy, the one term can be substituted for the other. Thus the rectangle $P_1ABP_0$ represents the increase in the total corporate levy as well as the increase in net revenue realized while the rectangle $BGFE$ represents the reduction in the total corporate levy as well as the reduction in net revenue.\(^9\)

Whether the megacorp-price leader will, on balance, be better off as a result of the price increase will depend on the relative size of the two rectangles, $P_1ABP_0$ and $BGFE$. In figure 7 the former is larger. This means that the net effect of the rise in price will be to increase the total corporate levy realized. Such a result was assured, however, by positing a revenue curve for the megacorp-price leader that is price

![Figure 7](image-url)
The pricing decision

inelastic at the prevailing price level. For the reasons brought out in chapter 2, this is not an unreasonable assumption to make about the meagacorp-price leader's revenue curve in the time period immediately following an increase in price. Thus the immediate impact of any rise in price is likely to be an increase in net revenue, that is, an increase in the total corporate levy realized.

But in subsequent periods, whether time is measured weekly, monthly, quarterly or annually, the meagacorp-price leader's revenue curve is likely to become more elastic. This is because buyers will increasingly have the time necessary to make whatever changes in production techniques or tastes are needed to take advantage of the lower relative prices being charged for substitute goods. In fact, each succeeding time period should bring a revenue curve which, for any given price coordinate, is more elastic than that of the previous time period. As a result, the rectangle $P_1ABP_0$ should, over time, become smaller and the rectangle $BOFE$, bigger.

At some point in time following the increase in price, the relative size of the two rectangles may even come to be reversed, with rectangle $BOFE$, representing the corporate levy no longer realized as a result of the ensuing decline in sales, exceeding rectangle $P_1ABP_0$. If this occurs - and it is by no means certain that it will - the price increase may be said to have imposed a real cost, due to the substitution effect, on the meagacorp-price leader. The internal funds generated through the corporate levy will henceforth be even less than they were before the rise in price. Indeed, if the industry demand curve continues to become more elastic with the passage of each additional time period, the total corporate levy realized will not only be less than it was initially, it will grow smaller and smaller.

Still, the meagacorp-price leader - not to mention the other firms in the industry - may be better off as a result of the higher price. Though the meagacorp-price leader may ultimately suffer a decline in the total corporate levy realized, this will not happen for some time. In the meantime it will have the additional internally generated funds to use as best it can to improve its long-run market position. To determine whether the meagacorp-price leader will, in fact, be better off, it is necessary to compare the prospective rate of return from investing those funds with the cost, due to the substitution effect, of obtaining the funds internally through the corporate levy rather than obtaining them externally through new debt financing. This, in turn, requires that the real cost to the firm, due to the substitution effect, of obtaining the additional investment funds internally through the corporate levy be converted into an implicit interest rate.

Conceptually it is possible to break down into two parts the probable long-run impact of the rise in price on a meagacorp-price leader's realized
The pricing decision

corporate levy. There is first the anticipated immediate increase in the realized corporate levy, spread over the number of time periods for which the net substitution effect is likely to be negative or zero. If the additional corporate levy likely to be realized in each of these time periods is properly discounted and if the adjusted figures for each of the time periods are then added together, the result is an estimate of the present value of the additional internal funds likely to be obtained through the price increase. This is the equivalent of a principal sum, such as could alternatively be borrowed from external sources.

Besides the anticipated immediate increase, however, there is also the possible eventual decline in the realized corporate levy, beginning with the time period during which the substitution effect is first likely to become positive and continuing thereafter. If the anticipated loss of corporate levy in each of these time periods is properly discounted so that the interval between the rise in price and the positive impact of the substitution effect is, in essence, eliminated and if the adjusted figures for each of the time periods are then averaged, the result is an estimate of the subsequent loss of income per time period to the megacorp-price leader. This is the equivalent of a periodic interest payment on the principal sum likely to be obtained.

Dividing this last estimate by the first produces a ratio, $R_1$, which may be viewed as an implicit interest charge, due to the substitution effect, on the additional internal funds likely to be obtained through a rise in price. This ratio is, of course, a contrived figure, designed to permit comparison both with the marginal efficiency of investment, $r$, and with the 'permanent' rate of interest, $i$, that must be paid on external funds. Nevertheless, $R_1$ is derived from the real cost likely to be incurred by a megacorp-price leader when it uses the price mechanism to increase the amount of investment funds available to it from internal sources. This real cost, in the sense of forgone income, is the possible decline in the total corporate levy being realized, below the initial level, if the substitution effect should in a subsequent time period become positive.

The implicit interest charge due to the substitution effect, $R_1$, will be a function not only of time and the increasing price elasticity of demand which time is likely to bring but also of the percentage change in price, $n$. The greater this percentage change in price, the greater will be the arc elasticity of demand in any given time period, that is, the greater the resulting percentage decline in sales. To assume otherwise would be to imply an industry demand curve considerably more curvilinear than any ever actually observed empirically. The greater the arc elasticity of demand in any given time period, however, the greater will be the arc elasticity of demand in every subsequent time period. At the same
time, the greater will be the overall substitution effect. Thus,

$$R_t = f(n).$$  \hspace{1cm} (3.6)$$

In other words, the greater the percentage increase in price, the greater will be the implicit interest charge due to the substitution effect. This relationship derives from the fact that the arc elasticity of demand in any given time period - a key determinant of \(R_t\) - is itself a function of the percentage increase in price. That is,

$$|\epsilon_f| = h_f(n)$$  \hspace{1cm} (3.7)$$

where \(h_f\) is the factor by which the absolute value of the arc elasticity of demand in any given time period, \(|\epsilon_f|\), increases as \(n\) increases.\(^\text{18}\)

There are a number of reasons why \(R_t\) may not be very significant, at least as a factor inhibiting the megacorp-price leader from raising the industry price. If the available empirical evidence on the elasticity of industry demand curves is to be accepted, the immediate impact of a rise in price is likely to be a substantial increase in the total corporate levy realized. Whether, over time, the substitution effect will become positive and thereby impose any real cost on the megacorp-price leader is by no means certain.\(^\text{19}\) Moreover, if the megacorp-price leader underestimates the long-run impact or, alternatively, has reason to assume that the industries supplying substitute goods will raise their prices too, \(R_t\) is likely to be quite small if not actually negligible. But while the substitution effect may not suffice by itself to restrain the megacorp-price leader, it may, when considered together with the other sources of real cost arising from an increase in price, nonetheless be important.

**The entry factor.** Any increase in absolute price, holding costs constant, will facilitate the entry of new firms into the industry. This is because, as the absolute price rises (and with it the margin between revenue and costs), potential rivals will have a better chance of overcoming the cost disadvantages which constitute the barriers to their entry. If, as a result of a higher absolute price, new firms should succeed in entering the industry, the established enterprises will necessarily find that their own relative shares of the market have been reduced. The resulting decline in the sales of these established firms, including that of the megacorp-price leader, is what is meant by the entry factor.

Whether in fact new firms - or established firms from other industries - will succeed in entering the industry will depend on the size of the barriers they face. In the case of an oligopolistic industry, these barriers, by the very nature of the industry, can be expected to be quite significant. Otherwise, the number of firms is not likely to have remained small over time nor the concomitant interdependence of those firms to have persisted. Following Bain's schema, barriers to entry can be divided
72 The pricing decision

into three types, depending on whether they relate to (a) economies of scale, (b) absolute cost advantages, and (c) product differentiation.29

The economies of scale barrier reflects the fact that unless the potential entrant is able to attain a certain size it will find itself at a cost disadvantage. This necessary size has two aspects, one related to the scale of the individual plant, the other related to the number of such plants, that is, the scale of the firm itself. To be able to produce with the least direct cost per unit of output, the new firm must enter into production with a plant of minimal optimal size, \( m \), where \( m \) is a certain percentage of total industry sales. The value of \( m \) will vary from industry to industry, depending on what sorts of technical indivisibilities exist relative to the total volume of sales.30 This situation presents the potential entrant with two choices. It can, on the one hand, erect a plant of size \( m \). If it does, however, it may not be able to capture a sufficiently large share of the market to operate the facility at its most efficient level of output. Alternatively it can choose to build a smaller plant, one which gives rise to slightly higher average variable costs but the least-cost point of which is reached at a lower level of output. In either case the potential entrant will find itself at a disadvantage compared with established firms having plants of minimal optimal size which can be operated, at full capacity, more efficiently.

This disadvantage will be compounded if there are economies of multi-plant operation and if the established firms are of sufficient size to exploit them. The ability to adjust to fluctuations in demand by starting up or shutting down entire plants or plant segments rather than by using any one plant more or less intensively has already been pointed out as one of these economies. Another is the ability to spread over a larger volume of output the overhead costs of managerial personnel. The same benefits of scale are also manifest with respect to what are herein defined as forms of investment but which are more usually classified as additional items of overhead expense. These include expenditures on advertising, research and development, distribution systems and other forms of vertical integration.31 Again, the importance of these economies of multi-plant operation will vary from industry to industry, but to the extent they do exist, they place the potential entrant at an even greater disadvantage (Bain, 1956, pp. 82-93).

The absolute cost barrier reflects the ability of the established firms, because of their prior existence, to obtain certain of their inputs on more favorable terms than a potential entrant. The established firms may, for example, control superior production techniques through patents or secret processes. If so, a new firm will be forced either to pay royalties or do without the superior techniques (Steele, 1964; O'Brien, 1964). The established firms may, in addition, already employ all the
available skilled manpower, including experienced executives. Should this be the case, a new firm will either have to bid away key employees by offering them higher wages and salaries, or suffer the disadvantages of having to operate with a less competent work force. The established firms may also control all the known supplies of a certain raw material. In this case, a new firm will either be forced to develop its own sources of supply at considerable expense, or find itself put in an extremely vulnerable position with regard to a critical input. Finally, the established firms may be able to obtain external investment funds more easily and at lower rates of interest than a potential entrant. This is a reflection not only of the close ties to various financial intermediaries that the established firms are likely to have cultivated over the years but also of the inherently greater risk of a loan to a firm just starting out, especially in an industry dominated by megacorps. Whatever the particular source of the absolute cost advantage enjoyed by the established firms, however, the effect is to add still further to the obstacles which the potential entrant must overcome (Bain, 1956, ch. 5).

The product differentiation barrier reflects the fact that the established firms are likely, over the years, to have created a strong customer loyalty toward their respective brands. The result of advertising and other marketing efforts, this loyalty is likely to be most significant in the case of goods sold to households; but it will exist even in the case of goods sold to other business enterprises. Whether they be households or other business enterprises, buyers can generally be expected, in the absence of any disturbing element, to maintain their habitual purchasing patterns. Thus, to gain a foothold in the industry, a potential entrant will be forced to do one or both of the following: (a) incur promotional expenses even beyond those of the established firms, (b) shave its price. Either recourse will have untoward consequences.

If the new firm attempts to capture a share of the market through extraordinary promotional efforts, it will find that its per unit expenditures for that purpose have placed it at a substantial cost disadvantage - first, because a larger total amount will have to be spent to offset the edge enjoyed by the established firms and, second, because the new firm will have a lower volume of sales over which to spread the cost. The product differentiation and economies of scale barriers thus interact to reinforce one another: unless buyer resistance can be overcome sufficiently to attain a per cent of the market, the potential entrant will suffer from higher average variable costs; but the means of overcoming buyer resistance are themselves subject to economies of scale that place the new firm at a disadvantage.

The only alternative is for the new firm to try to capture the necessary share of the market by shaving its price. If it attempts this, however,
not only may it invite retaliatory price cutting by the established firms\textsuperscript{24}
but, more to the point in this context, its own net revenue will be correspondingly reduced. In either case, product differentiation can be expected to make entry even more difficult.

Taken together, all three types of barriers - economies of scale, absolute cost advantages and product differentiation - serve to create a margin between the average variable and fixed costs of the established firms in an industry and those of a potential entrant. The average corporate levy, on the other hand, has the effect of narrowing this margin, and an increase in the absolute price (the equivalent of a rise in both the average and marginal corporate levy) serves to narrow it even further.

While this margin might at first appear to define a precise point at which an increase in price will lead to the entry of a new firm into the industry, as a practical matter it must be taken as little more than a benchmark. Even an established firm like the price leader can be expected to have only a rough notion of how great is the cost disadvantage of a potential entrant; the new firm itself will be still less capable of making a precise estimate. It may consider the barriers to be less than they actually are, or it may consider them to be more. Which will be the case, and to what extent, cannot be known beforehand. Faced with this uncertainty, the megacorp-price leader can at best only estimate the probability of entry following a rise in price, this estimate being based on its own knowledge of how significant are the barriers which a new firm faces. The entry factor, then, must necessarily be probabilistic.

This probability of entry, \( \pi \), will, like the arc-elasticity of demand, \( e \), be a function of time. Following a decision by a new enterprise to enter the industry, plans will have to be formulated, capital funds secured and construction begun. Even then, the gestation period before the plant is actually ready to begin full-scale production may be considerable. This means that, whatever the probability of entry in the time period immediately following an increase in price, it is likely to be even greater in each succeeding time period until finally it attains some maximum value.

While the probability of entry can be expected to increase with time, the loss of sales and thus the real cost incurred by the megacorp-price leader will be the same regardless of when the new entry actually occurs. This real cost will be equal to the marginal corporate levy on the sales of the megacorp-price leader which the new firm displaces. If the new firm is likely to enter the industry with a plant of minimum optimal size, \( m \), and can be expected to find a market for all its output, the sales of the established firms are likely to be reduced by a percentage equal to \( m \), both in the aggregate and, on the average, individually. Given these expectations - and to simplify the exposition these are
The pricing decision

the expectations which, it will be assumed, are held - the real cost incurred by the megacorp-price leader due to the entry factor will depend on the value of \( m \). Of course, if a new firm is more likely to enter the industry with a suboptimal plant and/or cannot be expected to find a market for its full capacity output, the appropriate percentage will be less than \( m \).

The real cost the megacorp-price leader can expect to incur in any given time period, due to the likelihood of entry, will thus be the product of two factors: (1) the probability of entry, \( \pi \), in that time period, and (2) the real cost incurred if entry should actually take place, a cost based on the value of \( m \). What this means is that in any given time period following an increase in price, the entry factor can be expected to give rise to two rectangles similar to the rectangles \( P_1 ABP_0 \) and \( BGFE \) in figure 7. In this case, however, the reduction in the quantity of output sold reflects the possibility that a new firm may enter the industry and displace some of the megacorp-price leader's sales. This change in the quantity of output sold will depend, not on the arc elasticity of demand but rather, on the values of \( \pi \) and \( m \); and it will give rise, not to the rectangles \( P_1 ABP_0 \) and \( BGFE \) but rather, to the rectangles \( P_1 CG'P_0 \) and \( G'GFF' \) as in figure 8. It should be noted that \( AR' \) is the average revenue curve which the megacorp-price leader could expect.

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**Figure 8**
to face following the entry of a new firm of minimum optimal size and that the distance \( Q_0 - Q_s' \) is equal to the inroads on the price leader's total sales volume which that new firm could be expected to make \((m \cdot Q_0)\) multiplied by the probability of the entry occurring \((n)\).

Again it is likely that over time rectangle \( P_1 G G' P_0 \) will become smaller and rectangle \( G' G F F' \) larger - in this case because of the higher probability of entry in each succeeding time period. It is even possible that at some point in time following the rise in price the relative size of the two rectangles may come to be reversed, with the result that the total corporate levy realized by the megacorp-price leader will be less than it was initially. Still, since the internal investment funds being generated will, up to that point, be greater, the megacorp-price leader may be better off to raise the price. Whether in fact it will be better off will depend on how great is the real cost due to the entry factor, relative to the marginal efficiency of investment and the 'permanent' interest rate on external funds. To permit this comparison, it is necessary once more to convert the real cost due to the entry factor into an implicit rate. This can be done by again breaking down into its two parts the long-run impact, due to the entry factor, of the rise in price: first, the more immediate increase in investment funds obtained and, second, the possible eventual decline in the total corporate levy realized.\(^{26}\)

If the latter sum, properly discounted and averaged, is divided by the first, also properly discounted and averaged, the result is a second ratio, \( R_2 \), which can be viewed as the implicit interest rate, due to the entry factor, on the additional investment funds likely to be obtained through a rise in price.\(^{27}\)

This implicit interest rate, \( R_2 \), will also be a function, not only of time and the increasing probability of entry which time brings but, in addition, of the percentage change in price, \( n \). The greater this percentage change in price (with average variable and fixed costs remaining constant), the greater will be the average corporate levy and thus the greater will be a new firm's chances of overcoming the barriers to entry which it faces. Assuming that these improved chances will not go unnoticed by a potential entrant, the greater, too, will be the probability of entry in each time period following the rise in price and the more significant will be the overall entry factor. Thus,

\[
R_2 = f(n). \tag{3.8}
\]

In other words, the greater the percentage increase in price, the greater will be the implicit interest charge due to the entry factor.\(^{28}\)

Besides the very concrete loss of sales which the entry of a new firm can be expected to cause, there is a less tangible effect. The very
ability to coordinate pricing decisions among the various members of the industry may be jeopardized by the intrusion of a new enterprise, one without a vested interest in the price stability of the industry and, indeed, with a real need to undermine that stability if it is to obtain some minimum share of the market. Moreover, once a new firm has been encouraged to attempt entry into an industry, it is not readily dislodged – even if the barriers it faces should turn out to be greater than anticipated. Whatever the returns, the new enterprise is likely to remain in the industry for some time, displacing the sales of the establishment firms and/or making price coordination more difficult.\footnote{For these reasons, the prevention of new entry into the industry may have come to be viewed as essential to the optimization of a firm’s long-run position. It is not possible, of course, to increase the industry price (with average variable and fixed costs remaining unchanged) without running some risk that a new firm will be encouraged to enter the industry. Still, the megacorp-price leader may want to avoid a change in price which has more than a certain probability of entry, \( \pi_e \), associated with it in the long run. If so, that percentage increase in price, \( n_{x'} \), will serve as a ceiling or upper limit on the industry price level. This means that \( n \) will be subject to the restraint that the long-run probability of entry, \( \pi_e \), associated with it not exceed \( X_1 \) where \( X_1 \) is the maximum acceptable probability of a new firm entering the industry as a result of the attendant increase in price.\footnote{Even before this upper limit is reached, however, the price leader may be deterred from announcing more than a certain percentage increase in price by the fear of the government’s likely reaction. It is this third constraint on pricing discretion that will now be considered.}}

The possibility of meaningful government intervention. Any increase in industry price, if construed to be contrary to the public interest, may provoke meaningful intervention by the Federal government. What is meant here by the adjective ‘meaningful’ is that the long-run growth of the megacorp-price leader and/or the other members of the industry is likely to be adversely affected. Meaningful intervention by the Federal government can, at least theoretically, take a number of different forms. These include (a) nationalization, (b) price regulation, (c) taxation, (d) tariff reduction, (e) release of government stockpiles, (f) qualitative restrictions of all types and (g) antitrust prosecution. As a practical matter, however, American political attitudes and precedents effectively preclude most of these alternatives.

Nationalization, for example, is not likely even to be considered seriously by United States political leaders. Aside from the substantial ideological objection to the take-over of private property, there is the feeling on the part of those most likely to advocate such a remedy
that nationalization, based on the experience of other countries, simply exacerbates the problem of controlling large-scale enterprise. On the one hand it would seem that too often a change in the nominal owners of the firm does little to alter the behavior of the executive group. A new board of directors may be appointed, its members even chosen from among public officials, but the discretion of the permanent bureaucracy appears to remain unimpaired. On the other hand it would seem that the interjection of politics has sometimes led to the loss of efficiency. Since nationalization has usually been carried out for a complex set of reasons – only one of which may have been the desire to limit pricing power - it may be questioned how relevant is this comparative experience in evaluating the likely effectiveness of that approach in the United States. Still, there can be little doubt as to the lack of significant political support for the nationalization of any part of American industry.31

Price regulation of specific industries is somewhat more within the realm of the politically feasible, if only because price regulation is not foreign to the American experience - even in peacetime. Yet the precedents themselves are probably the reason for the lack of enthusiasm which this approach arouses. Aside from the general reluctance to increase still further the government’s power to overrule private decisions, there is the widespread feeling that the regulation of public utilities in this country has not brought the results desired. Rather it seems that the industries being regulated have succeeded in capturing the sympathies - if not the independence - of the various regulatory bodies to such an extent that regulation may be said to exist in name only. Some would even argue that regulation serves primarily to give the cover of governmental legitimacy to private cartel arrangements. Meanwhile the elaborate procedures that must be followed by the regulated industries would appear seriously to curtail entrepreneurial initiative.32 Whatever may be the potential for improving regulatory procedures, it seems fair to conclude that an extension of this approach to the oligopolistic sector on an individual industry basis is not likely to have sufficient public support to make it a realistic possibility. The question of general price regulation - or controls - will be left temporarily to one side.33

Taxation of specific industries, selected tariff reduction, release of government stockpiles and qualitative restrictions of various types are forms of government intervention that are far less apt to encounter opposition on ideological grounds alone. They are forms of intervention, however, that can significantly impair the long-run growth of the firms in the industries so affected. Still, the deliberate resort to these remedies as a means of controlling prices in the private sector can hardly be described as an accepted American political practice. Whatever precedents may exist are perhaps best viewed as ad hoc measures designed
to deal with quite specific, although limited situations. What are lacking are both the legislative authority and the administrative procedures for using these remedies in a systematic way to deal with the problem of private pricing power. This is not to argue that the legislative authority could not one day be obtained and the administrative procedures subsequently developed. So far, however, this has not happened.

In the absence of price controls and the sanctions thereunder provided, the one remedy most generally available to the government when confronted by a price increase considered to be contrary to the public interest is prosecution under the antitrust laws. It is a response by the executive branch which is fully in accord with accepted political and economic beliefs, and a response which does not require prior legislative authorization. It is thus the remedy to which the government, in the absence of price controls, is most likely to resort in any individual situation. This is true despite the inherent limitations of the remedy.

The weakness of the antitrust approach is that, unlike an administrative action under either utility regulation or general price controls, it does not permit the government to intervene directly to countermand a price increase. This lack of authority is intentional, the rationale being that if only the latent market forces can be strengthened by the appropriate means there will be no need for more direct government action.

In practice, the relatively small sums appropriated by Congress for enforcement, together with the lengthy time required to prosecute even a minor case, have meant that only a handful of firms - mostly price leaders - in a handful of industries need fear the possibilities of antitrust prosecution at any given moment in time. Even more critical, the remedies available under the law have proven to be ineffectual against the type of interdependent behavior that militates against price competition in oligopolistic industries. To be effective, antitrust action would have to be capable of significantly altering the structure of those industries. That is, it would have to be able to increase the number of firms to such an extent that interdependent behavior would no longer be possible or - what might produce essentially the same result - lower the barriers to entry until they ceased to be a major obstacle to the entrance of new firms. Yet attempts to increase the number of firms through antitrust action have generally floundered on the fears of judges and Justice Department officials that important economies of scales might be lost as a result; while attempts to lower barriers - insofar as these have been successful - have simply led to the replacement of the proscribed methods by others less vulnerable to direct legal attack.

Antitrust action having proven inadequate as a means of controlling pricing decisions indirectly through the restructuring of oligopolistic industries, it has devolved into an instrument of largely nuisance value.
The pricing decision

A firm can be fined or even proscribed from certain behavior by a restraining order, and these penalties will impose a certain cost— that of developing a substitute barrier to entry if not that of the fine alone. What is usually most burdensome, however, is the cost of defending against the antitrust suit itself. The firm’s executives may find themselves unable to give their full attention to any other matter for months at a time, with a consequent neglect of the company’s long-run interests. Significantly, this cost is incurred whether the government wins its case or not. Whatever the likely result, the suit must be defended against vigorously, for what is at stake is the company’s public image. Should that image become seriously damaged, the megacorp and the industry to which it belongs will find themselves increasingly vulnerable to political attack—with the risk of even more restrictive forms of government intervention which that vulnerability carries.

While theoretically it is possible to estimate the cost to the megacorp-price leader of antitrust prosecution or whatever other retaliatory act is the most likely form of meaningful government intervention, as a practical matter this is not necessary. The most likely form of intervention, if meaningful in the sense defined above, will pose such a serious threat to the megacorp-price leader’s long-run growth prospects that it will be unwilling to run more than a certain risk of provoking the government to act. That risk, \( \rho \), will depend on the percentage increase in price, \( n \). The greater that percentage increase in price, the more likely it is that the megacorp-price leader will appear to be exploiting its market power, the more likely it is that public criticism will be heard and the more likely it is that the government will feel compelled to respond in some manner. If this percentage increase in price is less than the increase in price associated with the maximum acceptable probability of new entry, it will be this percentage increase in price, \( n \), that will serve as the ceiling or upper limit on the industry price. This means that \( n \) will now be subject to the restraint that the probability of meaningful government intervention associated with it, \( p \), not exceed \( X \), where \( X \) is the maximum acceptable probability of meaningful government intervention.

The supply curve of internally generated funds. By combining the restraints imposed by the substitution effect, the entry factor and the fear of meaningful government intervention, it is possible to derive the megacorp-price leader’s supply curve of internally generated funds. This supply curve will reflect the differing amounts of additional investment funds per planning period, \( \Delta F/p \), that can be generated internally through the corporate levy at differing implicit interest rates, \( R \).

To obtain \( R \), it is necessary to take into account both the substitution effect and the entry factor, keeping in mind the restraint imposed by the maximum acceptable probability of either new entry of meaningful
government intervention. In each time period following a rise in price, the megacorp-price leader can expect its sales to decline by a certain amount, such as $Q_0 - Q_1$, in figure 9. Part of this decline, such as $Q_0 - Q_1$, will be due to the substitution effect, and part, such as $Q_0 - Q_0$, will be due to the entry factor. The internal funds being generated in any one of these time periods will, thus, on the one hand, be increased by an amount equal to the rectangle $P_1A'B'P_0$ - this representing the additional corporate levy that will be realized, as a result of the higher price, on the quantity of output still being sold. Offsetting this gain, on the other hand, will be both the corporate levy no longer realized due to the substitution effect, an amount equal to the rectangle $B'G'F'E'$, and the corporate levy no longer realized due to the entry factor, an amount equal to the rectangle $G'GFF'$. The net change in the total corporate levy realized in any given time period will, then be equal to the rectangle $P_1A'B'P_0$ less the rectangle $B'G'F'E'$. When and if in any subsequent time period the latter comes to exceed the former, the combined impact of the substitution effect and the entry factor may be said to have become positive. By taking this combined impact into account for each of the time periods following the rise in price, it is then possible to derive $R$.

The denominator of $R$ in this case is the present value of the net

![Figure 9](image-url)
gain in the corporate levy, summed up for all the time periods prior
to the one in which the combined substitution effect and entry factor
is likely to become positive. It is, then, equal to the present value of
the additional funds likely to be obtained through the price increase.
The numerator, on the other hand, is the eventual decline in the total
corporate levy realized, due to both the substitution effect and the entry
factor, properly discounted and averaged for all subsequent time periods.
It is, then, similar to the interest that would have to be paid periodically
if a sum equal to the denominator were to be obtained from external
sources. The resulting ratio, $R$, may be viewed as the implicit interest
rate on the additional investment funds generated internally through
an increase in price. \(^\text{46}\)

This ratio, $R$, like the ratios $R_1$ and $R_2$ from which it is derived,
will depend on the actual percentage change in price, $\pi$. The greater
that percentage change in price, the greater will be both the substitution
effect and the entry factor, and thus the greater will be the value of
$R$. This positive relationship between $R$ and $\pi$ is depicted in quadrant
IV of figure 10.

The slope of the curve $0R$ in quadrant IV reflects the changes likely
to occur in both the arc elasticity of demand and the probability of
new entry as $\pi$ varies. A small rise in price, if it still leaves the
megacorp-price leader on the inelastic portion of its revenue curve while
not significantly compensating for the barriers to entry which a new
firm faces, will lead to a value for $R$ which is close to zero. But as
$\pi$ continues to rise, the megacorp-price leader can expect the arc elasticity
of demand to become larger, not only in the time period immediately
following the rise in price but in all the subsequent time periods as
well. This means that the substitution effect will eventually become
positive, at least beyond a certain point. Moreover, as $\pi$ rises, thus
providing a greater offset to the barriers which a new firm faces, the
megacorp-price leader can expect the probability of entry to become
greater, both in the time period immediately following and in each time
period thereafter. The two factors together, the larger substitution effect
and the greater probability of entry, will lead to an increasingly higher
value for $R$ as $\pi$ rises.

As $\pi$ continues to rise, the arc elasticity of demand and, with it,
the substitution effect can be expected at a certain point to become
larger at an increasing rate. This is because, with a negatively sloped
linear - or nearly linear - industry demand curve, the absolute value
of $\epsilon_j$ must necessarily increase at a disproportionate rate relative to
the industry price. Meanwhile, the probability of new entry can also
be expected to become greater at an increasing rate. This is because,
as the barriers to entry are more certainly compensated for by the higher
average corporate levy, new firms are increasingly likely to be attracted into the industry. Thus $R$, reflecting both the substitution effect and the entry factor, will at some point begin to rise at a more rapid rate than $n$.

If $n$ continues to rise still higher, the megacorp-price leader will finally encounter the ceiling imposed by the maximum acceptable probability of either new entry or meaningful government intervention. This ceiling, $n_*$, in figure 10, is the percentage increase in price for which either...
The pricing decision

the associated $n$, exceeds $X_1$, or the associated $p$ exceeds $X_2$, depending on which upper limit is encountered first. Once $n_x$ has been reached, the value of $R$ will, insofar as the megacorp-price leader is concerned, become infinitely large.

An increase in the industry price not only gives rise to an implicit interest rate, $R$, but also enables the megacorp-price leader to generate additional investment funds internally over the next planning period. The additional investment funds thereby generated will be equal to the average net change in the total corporate levy realized for each of the time periods that comprise the subsequent planning period. Clearly, the greater the percentage increase in price, $n$, the greater will be the new average corporate levy and thus the greater will be the additional investment funds generated per planning period, $\Delta F/p$. This relationship between $\Delta F/p$ and $n$ is depicted in quadrant II of figure 10.

The slope of the curve $0F$ in quadrant II, like the slope of curve $0R$ in quadrant IV, reflects the combined impact of the substitution effect and the entry factor. If these two forces were inoperative or, alternatively, if they were independent of $n$, $\Delta F/p$ would be directly proportional to $n$ and the curve $0\Delta F/p$ would be a straight line emanating from the origin such as $0A$. For the substitution effect and the entry factor to be inoperative, however, the industry demand curve would have to be perfectly price inelastic and the probability of new entry would have to be completely unaffected by the margin above average variable and fixed costs. This would imply, of course, that point $G$ in figure 9 is the same as point $B'$ and that therefore the rectangle $P_1A'B'P_0$ can increase without the rectangle $B'GFE'$ - such as it exists - also being enlarged. Since these conditions are not likely to hold, $\Delta F/p$ can be assumed to increase at a less rapid rate than $n$, this being reflected in the diagram by the fact that the curve $0F$ is parabolic to the hypothetical ray, $0A$.

Quadrants I and III in figure 10 are designed to link the curves in quadrant II and IV to one another. Quadrant III, with the aid of a 45° line emanating from the origin, simply measures the percentage change in price, $n$, along both its axes. Its purpose is to convert what is essentially a three-quadrant diagram into a four-quadrant one. Quadrant I, however, draws upon the relationships depicted in quadrants II and IV to derive an entirely new relationship, one showing the differing amounts of additional investment funds per planning period, $\Delta F/p$, that can be generated internally through the corporate levy at differing implicit interest rates, $R$. This new relationship is $S'$, the supply curve of internally generated investment funds.

If, for example, the contemplated percentage increase in price were $n_x$, the amount of additional investment funds thereby obtained per
The pricing decision planning period would be $T_0$, and the implicit interest rate on these funds, $R_0$, would then constitute the coordinates for one point on the supply curve $S_0'$. If instead the price were $n$, the amount of additional investment funds obtained would be $F$ and the implicit interest rate would continue to vary in this manner, it is possible to trace out the full supply curve $S_0''$. This supply curve will indicate for any given quantity of additional investment funds, $A$, the implicit interest rate, $R$, thereby indicating the possible economic return in conjunction with the other factors. It is important to note that $S_0'$, the supply curve generated internally through the corporate levy, is merely the supply curve for additional investment funds generated for all additional investment funds generated internally through the corporate levy, whatever their source is. It is necessary to take into account the cost of external funds to the megacorp-pricing leader.

The implicit interest rate on these funds, $R_0$, would then constitute the coordinates for one point on the supply curve $S_0'$. If instead the price were $n$, the amount of additional investment funds obtained would be $F$ and the implicit interest rate would continue to vary in this manner, it is possible to trace out the full supply curve $S_0''$. This supply curve will indicate for any given quantity of additional investment funds, $A$, the implicit interest rate, $R$, thereby indicating the possible economic return in conjunction with the other factors. It is important to note that $S_0'$, the supply curve generated internally through the corporate levy, is merely the supply curve for additional investment funds generated internally through the corporate levy, whatever their source is. It is necessary to take into account the cost of external funds to the megacorp-pricing leader.
The cost of external funds. The megacorp-price leader can obtain additional investment funds externally by floating a new issue of either fixed-interest obligations or equity shares. If it is the former type of security that is to be relied upon, the cost of the additional investment funds will simply be the coupon interest rate on the bonds, adjusted for whatever brokerage fees are to be deducted from the principal sum. If, however, it is a new equity issue that is to be floated, the cost of the additional investment funds will be somewhat more problematical. On the one hand, the principal sum obtained will depend on the price at which the additional shares can be safely marketed, given the current price of the company’s shares on the stock exchange. On the other hand, the interest that must be paid on this principal sum will depend not only on the current level of dividends per share but also on the rate at which those dividends can be expected to increase over time. It is the price-dividend ratio derived from these two adjusted figures that is the equivalent of an interest rate on the new equity issue.

As previously suggested, fixed-interest obligations and equity shares can be viewed as substitutes for one another only in the long run. In the more immediate period, they are more likely to be viewed as complements, with the megacorp first determining its optimum debt-equity ratio based on the attendant risks and other relative disadvantages of the two types of securities, then using that optimum debt-equity ratio as a rule of thumb in its subsequent decision-making. The cost of external funds will thus be an average of the interest rate that must be paid on fixed-interest obligations and on equity shares, weighted by the current debt-equity ratio.

It should be noted, at this point, that the megacorp-price leader, in determining this cost of external funds, need not be significantly affected by current money market conditions. Only a minor portion of its investment expenditures will, in any case, need to be financed externally. Since the planning period for which investment decisions are made encompasses the normal business cycle, the megacorp-price leader can expect to arrange its financing in such a way that it will be able to tap the capital funds market for the marginal sums it may require during those phases of the cycle when the cost of borrowing will be at a minimum. Thus it is only the change in the lowest level of interest rates over successive business cycles, not the change in interest rates during any given business cycle, that is likely to alter the cost of external funds as the megacorp-price leader views that cost *ex ante.* This minimum cost during the most favorable phase in the business cycle is what is meant herein by the ‘permanent’ interest rate, *i*, on external funds. To the extent that the megacorp-price leader is able to obtain whatever quantity of additional investment funds it may desire at this rate – and
The pricing decision

this seems a reasonable assumption as long as the amounts required remain relatively small—the supply curve of external funds will be infinitely elastic. Of course, if at some point further reliance on external funds is likely to lead to an increase in \( i \), the supply curve will from that point on have an upward slope.

Only one last comment needs to be made about the cost of external funds. The megacorp-price leader may be reluctant to resort to outside financing for reasons that are not easily quantified and thus have not yet been taken into account. The reliance on financial intermediaries which the floating of a new securities issue entails will pose a certain risk to the control of the megacorp by the incumbent executive group. Any subsequent failure to meet the additional obligations, implicit as well as explicit, which the megacorp incurs by increasing its outstanding fixed interest and equity debt could lead to the replacement of the executive group. This danger can be avoided if, instead, the megacorp relies upon the corporate levy to obtain its additional investment funds. Thus the permanent interest rate on external funds may, in the eyes of the executive group, be somewhat higher than a simple weighing of the costs to the megacorp itself would suggest.\(^{43}\)

The total supply curve of additional investment funds, \( S_T \), can be obtained simply by combining the supply curve for additional internal funds, \( S_T' \), with the supply curve for external funds, based on the permanent interest rate, \( i \). This is done in figure 11. Up to the point

\[ R, T \]

\[ S_T' \]

\[ S_T \]

\[ \Delta F/p \]

\[ F_a \]

Figure 11
The pricing decision

In Figure 11, since \( R \) is less than \( i \), the megacorp-price leader can be expected to obtain any additional investment funds internally through the corporate levy. Over that interval, therefore, the \( S_i \) curve is coextensive with the \( S'_{i} \) curve. Beyond the point \( F_{a} \), however, since \( R \) is greater than \( i \), the megacorp-price leader can be expected to resort to outside financing for any additional investment funds it may need. Over this interval, the \( S'_{i} \) curve runs parallel to the horizontal axis at a height equal to \( i \). The total supply curve for investment funds having been derived in this manner, it is now necessary to consider the megacorp-price leader's demand curve for those same investment funds.

The demand for investment funds. The demand for investment funds by the megacorp-price leader arises from the need to finance those expenditures which, though unrelated to current output, will nonetheless lead to the growth of the corporate levy over time and thus to the growth of the firm itself. The extent to which a particular type of expenditure results in a subsequent increase in the total corporate levy realized relative to the amount of expenditure required is the marginal efficiency of investment, \( r \), for that particular type of expenditure.\(^{46}\)

It should be noted that under oligopolistic conditions, with price competition virtually ruled out because of its potentially destructive effect,\(^{47}\) a megacorp will grow and prosper depending on how well it allocates the investment funds obtained through the corporate levy. It should also be noted that while the individual firm is constrained by the \( \text{ex ante} \) savings rate which the industry as a whole has chosen - this \( \text{ex ante} \) average savings rate being the margin above costs, or average corporate levy, implicit in whatever price level is currently being maintained by the various members of the industry - it is not so constrained with respect to the rate of investment. The rate of investment for the individual firm may diverge from the industry average,\(^{48}\) and the capital outlays themselves may take different forms. This greater degree of freedom on the investment side gives rise to the non-price competition so characteristic of oligopoly. Indeed, one can say that, under oligopolistic conditions, competition through investment will replace competition through price. This will be as true for the price leader as for the other megacorps in the industry.

Assuming for the moment that technological change is entirely capital embodied,\(^{49}\) a megacorp-price leader interested in but a single industry will be faced with a choice among four types of investment expenditures, each of which can be expected to affect the growth of the corporate levy in the long run and each of which will thus have its own marginal efficiency of investment schedule. These four types of investment...
expenditures can be categorized as follows: (a) the purchase of new
plant and equipment, (b) the differentiation of the industry’s product
more sharply, (c) the erection of higher barriers to entry, or (d) the
creation of a more favorable public image. The varying additional
amounts, $ΔF/p$, that can be spent on each of the four categories at
varying prospective rates of return, $r$, is what defines the megacorp-price
leader’s overall marginal efficiency of investment schedule. This overall
MEI schedule, in turn, is what constitutes the megacorp-price leader’s
total demand curve for investment funds, $D_p$.

**The purchase of new plant and equipment.** As previously suggested,
the optimization of long-run market share - the prerequisite generally
for maximizing the growth of the corporate levy over time in a single
industry - requires that a megacorp have sufficient capacity to supply
whatever demand for its product is likely, within certain limits, to manifest
itself in the foreseeable future. This means that a megacorp, particularly
one that is a price leader, must plan ahead. First, it must anticipate
what the demand for its product is likely to be at the end of the next
planning period, the time required to bring a new plant or plant segment
into operation; and second, it must arrange to have the necessary
additional capacity built and ready to begin production by that date.

The first part of this planning function is generally the responsibility
of the firm’s operations research or a similar staff group. This planning
body within the megacorp can be expected to have estimated the income
and population elasticities for the particular product supplied by the
industry. Since an oligopolistic industry is likely to be a relatively mature
one with growth determined by aggregate conditions, these elasticities,
together with projections of national income and population, should
provide the best estimate of total industry demand over the next planning
period and perhaps even beyond. The estimates can, of course, be
improved upon by taking into account whatever other factors may affect
the demand for that particular industry’s product - for example, the
growth rate of another industry which is a principal customer, the trend
of imports, etc.

From these extrapolations of future industry demand with respect
to time, the operations research or planning group will attempt to derive
the individual megacorp’s own growth curve. Since the share of the
market which the megacorp is presently supplying is the share it is
likely to continue supplying, the industry estimates need only be reduced
by that percentage to obtain estimates for the firm. Of course, if there
is reason to believe that the megacorp’s share of the market will increase
in the future, the appropriate percentage will be somewhat larger.
However, given the strong interdependence that exists in an oligopolistic
industry, any such upward revision is apt to be a relatively minor one,
especially if based on a realistic assessment of the possible shift in market shares.

It is in light of the projected growth curve supplied by the operations research or planning body that the megacorp's executive group will decide how much new plant and equipment should be added to the existing capital stock. With this growth curve indicating the most probable level of sales at the end of the current planning period, the executive group can determine how much productive capacity will be required at that point in the future not only to meet the expected demand for the megacorp's product but also to provide an adequate reserve. Comparing this amount with the existing capacity, the executive group can then authorize expenditures for whatever additional plant and equipment will be needed. No precise calculation of probable rates of return will be necessary since, if the firm is to maintain its long-run market position, that level of expenditures is essential. The purchase of new plant and equipment to meet future anticipated increases in industry demand will, therefore, be given first priority in the formulation of an investment strategy by the megacorp's executive group. Of course, once plans have gone forward and subsequent experience reveals that the sales projections have been either overly optimistic or unduly pessimistic, the actual expenditures can be stretched out or speeded up, depending on what the situation calls for.

While the purchase of new plant and equipment to meet future anticipated increases in industry demand is likely to constitute by far the largest proportion of all expenditures on new plant and equipment, still, at the margin, there are apt to be other investment possibilities - to wit, the replacement of some portion of the existing capital stock with more efficient equipment - which provide the executive group with an option. Before a choice can be made among these alternatives, the probable rates of return will have to be determined. It is these marginal investment opportunities, small as they may be relative to the whole, that give the megacorp-price leader's demand curve for new plant and equipment, $D_n$, whatever negative slope it may have.

The differentiation of an industry's product more sharply. If the ability to obtain additional investment funds internally through the corporate levy is limited by the fear of losing part of the existing market to substitute products, it may be to a megacorp's advantage to see to it that the industry's product is differentiated more sharply from those of other industries. This can be done in several ways, the most important being advertising and research-and-development (R.& D). The effect of such expenditures will be to reduce the absolute value of the arc elasticities of demand for all subsequent time periods, whatever may be the percentage change in price decided upon. This reduction in the arc
elasticities of demand will enable the megacorp-price leader and the other firms in the industry to set a higher price without incurring any additional cost due to the substitution effect. The greater percentage increase in price thus made possible—the equivalent, other things being equal, to a greater percentage increase in the marginal corporate levy—will appear to the megacorp contemplating the increased expenditures on either advertising or R & D as a potential permanent yield of additional investment funds. These additional investment funds, taken as a percentage of the expenditures required to produce the reduction in the arc elasticities of demand, will determine the marginal efficiency of differentiating the industry’s product more sharply.

Each of the several ways of differentiating the industry’s product more sharply will have a separate marginal efficiency schedule, reflecting the particular characteristic of that type of differentiating mechanism. Advertising expenditures, for example, must be continuous or they soon lose their effectiveness (Eldridge, 1958; Jastrom, 1955; Palda, 1964, 1966). R & D expenditures, on the other hand, lead to returns that are highly uncertain if not entirely unpredictable (Scherer, 1967, pp. 359-63). Each of these separate marginal efficiency schedules, moreover, is likely to display decreasing returns—and even, at some point, at an increasing rate. This is because there is an ultimate limit to which a product can be differentiated, whatever the method chosen. As that limit is approached, further expenditures will be of decreasing efficiency. Thus each of the several ways of differentiating an industry’s product more sharply can be expected to give rise to a distinctive marginal efficiency of investment (MEI) schedule, one that is negatively sloped.

Though these MEI schedules will each be different, they can nonetheless be equated at the margin to determine the optimal mix or combination of expenditures to differentiate an industry’s product more sharply. If one method should offer a higher rate of return than another, the megacorp can be expected to shift its relative expenditures until the differential is eliminated. In this way, the marginal efficiencies of each of the several differentiating mechanisms are likely to become equalized over time. This, however, will necessarily mean that varying amounts are spent on each of the several differentiating mechanisms, the varying amounts representing the optimal mix or combination of such expenditures at that point in time. Because of the need to economize on decision-making, at least insofar as the executive group is concerned, such an optimal mix, once determined, is likely to persist for some time as a rule of thumb for determining relative expenditures on the several differentiating mechanisms.

Given this optimal mix, it is possible to derive a marginal efficiency of investment schedule for all expenditures to differentiate an industry’s
product more sharply, this composite MEI schedule being merely the
geometric summation of the separate MEI schedules for each of the
several differentiating mechanisms. Like any MEI schedule, it will be
negatively sloped, thus indicating that as total expenditures to differenti-ate
the industry's product more sharply are increased, the marginal efficiency,
r, of such investment will decline. This composite MEI schedule is
the megacorp's investment demand curve, D_{IP}, - that is, the demand
curve for expenditures to differentiate the industry's product more
sharply.

Expenditures by a megacorp to differentiate the industry's product
more sharply will, of course, benefit the other firms in the industry
as well. However, because of the interdependence which characterizes
an oligopolistic industry, the other firms cannot avoid making the same
types of expenditures themselves. Advertising and R & D, if undertaken
by some but not all of the firms in an industry, will probably lead
to a change in relative market shares. To guard against this possibility,
all the firms in the industry will be forced to match their rivals' expenditures on differentiating mechanisms, at least to the extent of
neutralizing whatever effect those expenditures may have on relative
market shares. In this way, the burden of differentiating the industry's product more sharply is shared to some extent by all the firms in the industry.

The erection of higher barriers to entry. If the ability to obtain additional
investment funds internally through the corporate levy is also limited
by the fear of losing part of the market to potential new firms, it may
be to a megacorp's advantage to see to it that the barriers to entry
are raised even higher. This can be done not only through advertising
and R & D but also through vertical integration or the establishment
of dealer-franchise systems (Bain, 1956; O. Williamson, 1963; Comaner,
will be to reduce the probabilities of entry for all subsequent
time periods, whatever may be the percentage change in price decided
upon. This reduction in the probabilities of entry will enable the mega-corp-price leader and the other firms in the industry to set a higher
price without incurring any possible additional cost due to the entry
factor. The greater percentage increase in price thus made possible -
the equivalent, other things being equal, of a greater percentage increase
in the marginal corporate levy - will again appear as a potential permanent
yield of additional investment funds to the megacorp contemplating those
types of expenditures. These additional investment funds, taken as a
percentage of the expenditures required to produce the reduction in
the probabilities of entry, will determine the marginal efficiency of erecting
higher barriers to entry.
The pricing decision

Here, too, each of the several ways of erecting higher barriers to entry will have a separate marginal efficiency of investment schedule, the relative efficiency of each depending on the economies of scale associated with that particular type of expenditure, as well as the applicability of the various barriers to the industry in question. These separate MEI schedules can also be equated at the margin to determine the optimal mix or combination of such expenditures. Given this optimal mix, it is then possible to derive a marginal efficiency of investment schedule for all types of expenditures to erect higher barriers to entry. This composite MEI schedule, also negatively sloped, is the megacorp's investment demand curve, \( D_m \), that is, the demand curve for expenditures to erect higher barriers to entry. Again, because of oligopolistic interdependence, it can be assumed that whatever is being spent by one megacorp for this purpose will be matched, pro rata, by the other firms in the industry.

The creation of a more favorable public image. If the ability to obtain additional investment funds internally through the corporate levy is, finally, limited by the fear of meaningful government intervention, it may be to a megacorp's advantage to see to it that it creates a more favorable public image. This can be done through 'institutional' advertising as distinct from product advertising, through basic research as distinct from applied research or through the erection of aesthetically pleasing office buildings and similar public relations gestures. The effect of such expenditures will be to reduce the probability of meaningful government intervention, whatever may be the percentage change in price decided upon. This reduction in the probability of meaningful government intervention will enable the megacorp-price leader to set a higher price than it would otherwise be able to do, given the upper limit imposed on the industry price by the fear of such intervention. The greater percentage increase in price thus made possible - the equivalent, other things being equal, to a greater percentage increase in the marginal corporate levy - will in this case, too, appear as a potential permanent yield of additional investment funds to the megacorp contemplating the increased expenditures. These additional investment funds, taken as a percentage of the expenditures required to produce the reduction in the probability of meaningful government intervention, will determine the marginal efficiency of creating a more favorable public image.

Again, each of the several ways of creating a more favorable public image will have a separate marginal efficiency of investment schedule. Again, too, an optimal mix of such methods can be determined and from this optimum mix the marginal efficiency of investment schedule derived for all types of expenditures to create a more favorable public image. This composite MEI schedule, also negatively sloped, is the
The pricing decision

The megacorp's investment demand curve, $D_i$, - that is, the demand curve for expenditures to create a more favorable public image. However, since expenditures to create a more favorable public image are not likely to affect relative market shares and since the megacorp-price leader is more likely to be vulnerable to meaningful government intervention, one cannot assume that whatever is being spent by one megacorp for this purpose will necessarily be representative of what the other firms in the industry are spending.

The total demand for investment funds by the megacorp, $D_i$, is simply the sum of the four schedules, $D_{h1}, D_{h2}, D_{h3}$ and $D_{h4}$. Alternatively, $D_i$ can be viewed as the sum of the demand curves for new plant and equipment, advertising, R & D and other types of expenditures designed to shift the $S_i$ curve outward. While the latter taxonomic scheme has the disadvantage of blurring important analytical distinctions, it is based on the categories actually used by business firms and hence on categories that lend themselves more readily to empirical investigation. However formulated - whether on the basis of the types of expenditures to be made, for example, advertising and R & D, or on the basis of the purposes to be served by the expenditures, for example, to differentiate an industry's product more sharply and to erect higher barriers to entry - this composite curve, $D_i$, indicates the varying amounts of investment funds that can be spent at varying rates of return. As such, it represents the megacorp's overall marginal efficiency of investment schedule.

If the current level of investment is subtracted from this marginal efficiency of investment schedule - each category of current expenditure from its corresponding category of possible investment - one has the megacorp's total demand curve for additional investment funds, $\Delta F/P$. This schedule indicates the differing amounts of additional investment funds, $\Delta F/P$, that can be expended at differing rates of return, $r$.

Adapting, R & D and the like as investment. While economists have long been accustomed to viewing expenditures on new plant and equipment as part of a firm's investment outlays, expenditures to differentiate the industry's product more sharply, to erect higher barriers to entry and to create a more favorable public image are a different matter. In fact, there is likely to be serious objection to treating them as forms of investment. This questionable inclusion of $D_{h1}, D_{h2}$ and $D_{h4}$ as part of the overall $D_i$ can be defended and reconciled with customary usage, however, once the distinction between investment in a social sense and investment in a private sense is recognized.

The latter can be defined as a decision by some private entity, whether it be a household or a business firm, to allocate resources so that the benefits from the allocation are received by the private group qua private group, for a time beyond some arbitrarily defined current period. Under
The pricing decision

such a definition, the use of funds to increase the barriers to entry, to create a more favorable public image and to differentiate more sharply the industry's product all qualify as private investment decisions.

Economists, however, have generally been unwilling to define as investment those types of allocation decisions which are not also investment in a social sense - that is, which provide benefits to society as a whole. Such allocation, they have felt, represents only a transfer of claims on resources, not new capital formation. This attitude has been predicated, in part, on the assumption that capital formation itself necessarily consists of the accumulation of physical goods capable of facilitating the production process (cf. Bonner and Lees, 1963). With capital formation so defined, it stands to reason that investment in a private, but not a social, sense can take place only by a transfer from one group in society to another of the physical goods that have already been accumulated, that is, the resources that have already been invested in a social sense. The sale of securities on a stock exchange would be an example of such a purely private form of investment, and as already indicated, economists would not regard it as a true case of investment.

Still, it has to be recognized that resources can also be allocated so that benefits are derived over time from non-material sources as well. The use of scientists and engineers to advance a field of technology would certainly be an example of this type of investment. But while it might be recognized that the stock of knowledge was thereby being augmented, providing benefits both to private groups and to society as a whole, economists would nonetheless be troubled by the fact that nothing tangible remained as a physical replica - like a building or a piece of machinery - of the resources that had been allocated. On the one hand, the physical goods involved - the material things required to keep the bodies and souls of the scientists and engineers together - would already have been used up. On the other hand, the benefits from the allocation - the new technology produced - would be extremely difficult to disentangle from the physical goods in which they were embodied, and would thus be extremely difficult to measure. It is for these reasons that economists have been unable - if not unwilling - to include increases in not only technology but also individual skill in their computations of capital formation.33

With respect to the definition of investment, it is thus possible to present the matrix shown in the accompanying table. One box still remains to be filled in, this being the type of investment which provides benefits to private groups only, from non-material sources. It is in this box that $D_t$, $D_h$ and $D_c$ as defined above fall. Insofar as these types of expenditures lead only to a more sharply differentiated product, higher
Types of Investment
Source of benefits

<table>
<thead>
<tr>
<th>Recipient of benefits</th>
<th>Material</th>
<th>Non-material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private groups and society as a whole</td>
<td>I. Purchase of new plant and equipment</td>
<td>III. Development of new technology</td>
</tr>
<tr>
<td>Private groups only</td>
<td>II. Transfer of ownership of plant and equipment</td>
<td>IV.</td>
</tr>
</tbody>
</table>

barriers to entry and a more favorable public image, they will result in benefits to private groups alone, in this case to the members of the oligopolistic industry. The further implications of this distinction will be taken up below, in chapter 8. Suffice it for now to note that these benefits accruing to the members of the oligopolistic industry will be derived in large part from non-material sources.

Which of these four variants of the definition of investment is the 'correct' one will, of course, depend on what is being investigated. To understand the cause of cyclical instability, for example, variant I alone may be sufficient. On the other hand, to delineate the sources of long-run economic growth, it may be necessary to include variant III along with variant I. The point here is that in order to provide a complete description of how prices are determined under oligopolistic conditions, the definition of investment must be broadened to encompass expenditures—such as those to differentiate an industry's product more sharply, to erect higher barriers to entry and to create a more favorable public image—that are non-material in form and benefit only the megacorp itself, not the rest of society. This means that none of the four variants of investment—and certainly not variant IV—should be excluded from the megacorp's overall MEI schedule. Indeed, all four variants constitute investment in the broad sense of discretionary income, the sense in which the term 'investment' will be used in chapters 6 and 7 to analyze the macrodynamic behavior of the economic system as a whole. However, even if all but variant I, the customary definition of investment, are eliminated, the model is not invalidated or even made indeterminate. It is merely less fully specified and gives rise to a slightly different solution.
The determinate solution. By placing the megacorp-price leader's demand curve for investment funds, $D_I$, on the same set of axes as its supply curve of investment funds, $S_I$, it is possible to determine what change in price, if any, will optimize the megacorp-price leader's long run market position. Assuming that the other firms in the industry will defer to the price leader's judgment - and if the price leader enjoys a cost advantage or possesses some other form of market power, the other firms will have little choice in the matter - this will be the change in price that will then prevail until at least the next pricing period. Of course, the other firms in the industry can let the price leader know, through the informal channels that are available to them, what change in price they would prefer on the basis of their own $D_I$ and $S_I$ curves. The price leader can then take these views of its fellow oligopolists into account to the extent that it wants or needs to in order to achieve, in Fellner's phrase, joint profit maximization.

Before proceeding with the analysis, one word of caution is necessary. What has been said so far and what now follows is not meant to imply that returns and costs are actually computed with the mathematical exactitude of a geometric curve. It is, in fact, possible that a megacorp, and in particular, a megacorp-price leader, will develop an investment strategy consisting of a variety of projects designed to further its long-range goals with no one project evaluated separately. The returns, or efficiency, of even the overall strategy may be only crudely estimated. Similarly, it is possible that the costs of a price increase will be only dimly perceived and very likely not precisely calculated. Nevertheless, the logic of its position will dictate that the megacorp-price leader act as though it were, indeed, governed by $S_I$ and $D_I$ curves such as those now being discussed. At the very least these curves will define the upper limit of rational behavior.

With this qualification in mind, it is possible to conclude that, as a new pricing period approaches, a megacorp may be confronted by any one of three possible pricing and investment situations, corresponding to the three situations depicted in figures 12 through 14. In the first situation, shown in figure 12, the $S_I$ and $D_I$ curves fail to intersect in the positive quadrant. This does not mean that investment will fall to zero or below. Even at the existing industry price, $P_o$, a certain amount of investment funds will be forthcoming from the corporate levy - an amount equal to $(ACL_o - Q_o)$. As long as the return from expending some part of these funds is positive, investment will continue. The failure of the $S_I$ and $D_I$ curves to intersect in the positive quadrant means simply that no additional investment funds will have to be obtained through an increase in the industry price.

Of course, since the demand for investment funds is less than the
current supply, it might seem that a reduction in the industry price - or at least the margin above costs - would be called for. While this may well be what happens, it should be pointed out that there are several factors mitigating against a reduction in the price, and thus the margin above costs, in an oligopolistic industry. First, the benefits of a price reduction are not exactly the opposite of the costs associated with a price increase. The substitution effect and the entry factor may have a different value as well as a different sign when the price adjustment is downward. The fear of meaningful government intervention, meanwhile, is likely to disappear entirely. Second, a price reduction, if soon to be followed by a price increase, is best avoided in the first place since the difficulty of coordinating pricing decisions makes it desirable to hold the number of such price changes to a minimum. Thus, even if a decrease in the demand for investment funds is anticipated, the general inflationary trend of the economy is likely to cause a megacorp-
price leader to discount the value of a price reduction.

In the second situation that can be delineated - the one depicted in figure 13 - the $D_i$ curve intersects the $S_i$ curve at a point where the $S_i$ and $S_i'$ curves are coincidental, that is, at a point where $R$ is less than $i$. Under these circumstances, the demand for investment funds exceeds the amount already being obtained through the corporate levy, and a price increase is necessary. $F_a$, as determined by the intersection of the $D_i$ and $S_i$ curves, is the amount of additional investment funds required to optimize the megacorp's long-run market position, and $n_a$, as shown in the other quadrants, is the percentage increase in price that will make it possible to obtain those additional funds internally - at an implicit interest charge equal to $R_a$. It can thus be inferred that $n_a$ is the percentage increase in price (and, with costs assumed
The pricing decision

constant, in the margin above costs) which, in this second of the three possible situations, the megacorp-price leader will announce. It should be pointed out that the diagram indicates not the long-run equilibrium position toward which the industry will tend to move in time through trial and error but rather represents a summary of the subjective factors determining the single price adjustment permitted the price leader at the onset of a pricing period.

In the third of the three possible pricing and investment situations - that depicted in figure 14 - the $D_f$ curve intersects the $S_f$ curve at a point where the $S_f$ and $S_{f'}$ curves diverge from one another, that is, at a point where $R$ exceeds $i$. Under these circumstances, the demand for investment funds again exceeds the amount already being obtained through the corporate levy, and a price increase is necessary. However, not all the additional funds required to maximize the megacorp's long-run

Figure 14
market position, \( F_d \), will be obtained through the price increase. Only \( F_b \), the amount of additional funds for which the implicit interest charge is not greater than the cost of external funds, will be raised internally. The remaining portion, \( F_d - F_b \), will be obtained by tapping the capital funds market during the most advantageous phase of the current planning period, the cost of these as well as the other investment funds being equal to the permanent interest rate, \( i \). It can thus be inferred that \( n_b \), the percentage increase in price required to obtain \( F_b \) investment funds internally, is the percentage increase in price which, in this third of the three possible situations, the megacorp-price leader will announce. It should be noted with respect to this third possible situation that the availability of external funds at a cost equal to \( i \) enables the megacorp to undertake a larger amount of investment, \( F_d - F_c \), than would otherwise be possible.

In summary, then, regardless of where the \( D_t \) and \( S_t \) curves intersect, the price in an oligopolistic industry is determinate. It is determinate based on the price previously prevailing in the industry and the change in that price necessary to provide the megacorp-price leader with the additional investment funds it needs to optimize its long-run market position - provided that the implicit interest charge on those additional internal funds is not greater than the cost of external funds. These additional investment funds, when added to the investment funds already being generated internally, determine the new value for \( CL \) in the oligopolistic pricing formula,

\[
P = AVC + \frac{FC + CL}{SOR \cdot ERC},
\]

and hence the new price level, \( P_1 \), in figure 15. For with \( AVC, FC, SOR \) and \( ERC \) all held constant, \( \Delta P \) must necessarily be equal to \( \Delta CL \). That is,

\[
P_1 = P_0 + \Delta P = AVC + \frac{FC + CL}{SOR \cdot ERC} + \frac{\Delta CL}{SOR \cdot ERC}.
\]  \hspace{1cm} (3.9)

The change in industry price is, then, equal to the additional corporate levy planned for or required ex ante, divided by the anticipated level of sales \((SOR \cdot ERC)\). From this it follows, based on the preceding analysis, that, holding costs constant, any change in the price of an oligopolistic industry must reflect a change in either the marginal efficiency of investment for firms within that industry, the implicit interest charge on internal funds, or the 'permanent' cost of external funds. In other words, the change in price will depend on the demand for and supply cost of additional investment funds.

There are two aspects to this determinate solution - even aside from
the collusive behavior assumed in and carried over from the preceding chapter - which may well leave some readers restive. The first is that only the change in industry price is explained, so that the price level itself becomes determinate only by taking into account the past pricing history of the industry. Why this aspect of the model should prove troubling to economists - as it has to some who have seen this treatise in earlier drafts - is itself an interesting point to ponder. After all, economists themselves have emphasized the importance of changes at the margin; and as serious social scientists they can hardly deny that the present set of possibilities is necessarily bounded by the past train of events. The disquiet on this point perhaps springs from the fear that, with the model able to explain only the change in price, and not the absolute level, economists may no longer be able to make the types of normative judgments which the more conventional neo-classical model, for all its other shortcomings, permits. That this is an unwarranted fear will be shown in chapter 8 below. Still, while similar types of judgments can be made based on the model of oligopolistic pricing just developed, the specific conclusions to which that model leads are quite different. Indeed, if the model did not lead to different conclusions, there would be little point in making such a fuss over it. One can only hope that it is not the policy implications so at variance with those of the conventional neo-classical analysis that economists find disturbing about a model that explains only the change in, and not the absolute level of, price.
The second aspect of the above model which may well prove troubling to economists is its seeming lack of symmetry. What has been emphasized are the factors which lead to an increase in the average corporate levy - or margin above costs. Little has been said about what causes a decline in that margin. Indeed, it has been pointed out that even if the marginal efficiency of investment should be so low that the expenditure of all the internal funds currently being generated is no longer warranted, the megacorp-price leader may still be reluctant to adjust the industry price downward and thereby reduce the size of the average corporate levy. Yet if the average corporate levy is not lowered - perhaps less frequently but still, over time, to the same extent that it is raised - the margin above costs will necessarily grow larger. This apparent implication of the model is, however, inconsistent with the historical evidence. While the margin above costs has over time varied in oligopolistic industries, there is no reason to believe that it has increased secularly. It is for this reason that any simplistic theory of inflation, based on the argument that megacorps merely exploit their market power to push prices upward, cannot withstand critical scrutiny.

Still, the pricing model developed above is not thereby invalidated. The failure of the average corporate levy to rise over time, despite the fact that the price in an oligopolistic industry is more likely to be raised than lowered, can be attributed to two factors. One, the less significant, is the possibility that at various points in time the community of interest which exists among the members of the industry and which permits the price leader to announce a rise in price confident that its fellow oligopolists will follow suit may break down. This possibility will be discussed in the chapter immediately following as one of the exceptions of the general oligopolistic pricing model. The other, more significant factor is that costs are not likely to remain unchanged over time. Thus the size of the average corporate levy, or margin above costs, may decline even as the price level itself rises. It all depends on the struggle over relative income distribution between the megacorp on the one hand and its several constituencies on the other. The analysis of this struggle must wait, however, until certain extensions of the oligopolistic pricing model have been explored.

Appendix to Chapter 3
Antecedent Formulations of the Entry Factor

As the main body of this chapter has tried to make clear, a determinate theory of oligopolistic pricing requires more than just an analysis of the entry factor - Bhagwati's suggestion (1970) to the contrary notwithstanding. Still, an analysis of the entry factor is a critical element in any fully specified model. Indeed, it is difficult to conceive of any true case of oligopoly without significant barriers
Appendix to chapter 3

to new entry. The purpose of this appendix is to indicate the relationship between
previous work on the entry factor and the approach adopted in this treatise.

The importance of barriers to entry has been recognized by a large number
of writers following Bain's pioneering work in this area. Bain's approach, since
it allows for the substitution effect as well as the entry factor, is more
comprehensive than that of most subsequent writers on the subject - the work
of Sylos-Labini (1962) and Wenders (1967) being notable exceptions. The
first requisite, then, for an adequate treatment of the entry factor is that it be viewed
as but one of several determinants (actually three) of the supply curve for
internally generated funds, this supply curve in turn being viewed as but one
of several determinants (again three) of any change in the industry price level. 
Not even Bain - and following him, Sylos-Labini and Wenders - employs so
comprehensive a model, however.

Although Bain recognizes the importance of the substitution effect in addition
to the entry factor, he nonetheless adopts a simple 'stay-out' or 'entry-limiting'
theory of oligopolistic pricing. In other words, he assumes that the fear of
possible entry by other firms sets only a specific upper limit on the price that
can be charged by the megacorp-price leader. This is the equivalent, in the
model set forth above, of assuming that the is equal to zero for any percentage
change in price below a certain fixed ceiling and that otherwise it is prohibitively
large. It implies that the supply curve for internally generated funds, , is
perfectly inelastic at a specific point, , as in figure 16a.

The objection to this approach, an approach adopted also by Sylos-Labini
(1962), Wenders (1967), Johns (1962) and Lydall (1955), is that it ignores the
probabilistic nature of new entry, especially when the percentage increase in
price is relatively small. This treatise, by allowing for the possibility that the
supply curve for internally generated funds may, because of an unacceptably
high risk of new entry, become inelastic beyond a certain percentage increase
in price, encompasses that part of the Bain argument which has validity. At
the same time, however, by positing that the supply curve for internally generated
funds will, up to that percentage change in price (or up to the percentage change
in price associated with an unacceptable risk of meaningful government intervention),
be somewhat elastic, the model developed above goes beyond a simple
'stay out' approach to oligopolistic pricing. One need only compare figure 16b
with figure 16a to see what difference this makes. The second prerequisite
then, for an adequate treatment of the entry factor is a proper recognition of
its probabilistic nature.

Sylos-Labini carried Bain's line of analysis one step further by considering
the likely effect of conjectural interdependence - that is, by considering what
the 'stay-out' price will be if the potential new entrant expects the firms already
in the industry to lower their price when entry is attempted. To assume that
the firms already in the industry will lower their price if and when entry by
a new firm is attempted has, in fact, been termed the Sylos postulate. It is
one of several factors which have been suggested by various writers as influencing
the probability of entry.

To the extent that the Sylos postulate is valid, it will lead to a smaller value
for and thus to the entry factor imposing less of a restraint on pricing discretion.
It is questionable, however, whether a potential entrant need fear that the industry
price will be lowered once entry is attempted. For one thing, as Leeman (1958)
has pointed out, any reduction in price is likely to prove more deleterious

...to the established firms, with their greater volume of output, than to the newcomer.
For another thing, it may bring down the wrath of the Justice Department’s
Anti-trust Division or even the Federal Trade Commission’s Bureau of Compet-
tition, especially if the established firms rank among the nation’s largest corpora-
tions. Finally, as noted in the main body of the chapter, a firm, once
it has committed resources to a particular industry, is unlikely to be driven
out of business simply because of lower prices; and the established firms, knowing
this to be the case, are unlikely to resort to the tactic. For all these reasons,
a potential entrant can reasonably assume that, whatever the industry price
level (or more precisely, the industry margin above costs), that price level is
likely to be maintained even after the firm enters the industry. Indeed, if prices
are subsequently cut, it will most likely be because the new firm has misjudged
the market and, in a desperate effort to gain sales, has itself initiated the reductions,
in price. The important point is that by this time it will be too late to remedy
the situation, either through price cuts or through some other means. The new
firm, despite its disruptive influence, will somehow have to be integrated into
the industry structure or organization. If price cuts are to discourage entry,
they must therefore occur before a firm commits itself to entering an industry,
and not after.

Whenever the barriers to entry may be, they will more easily be overcome,
it has been suggested by a number of writers, including Sylos-Labini (1962,
pp. 61-2) and Johns (1962), if industry demand is growing steadily (see also
Stigler, 1969a, p. 229; Pyatt, 1971; Gaskins, 1971). The argument, however,
is based on the questionable assumption that the firms in the industry will
not invest ahead of demand precisely to forestall that possibility. Indeed, investing
ahead of demand is standard practice for megacorps—and the existence of
substantial reserve capacity within the oligopolistic sector attests. Thus it is
only if industry demand is growing more rapidly than could have been anticipated,
more rapidly than the established firms are actually able to expand, that
entry will be facilitated. But neither of these two conditions is likely to be
approximated except in newer industries, those which have not yet settled down
to a stable oligopolistic pattern. This is a point which, because it is central
to the analysis of conglomerate expansion, will be returned to soon (chapter
4, pp. 118-22).

Lydall (1955) was among the first to stress a somewhat different offset to
the barriers which a new firm might face. An industry is more likely to be
entered, he noted, by a firm which is already established in another industry,
one which turns out a somewhat similar product (see also Hines, 1957; Kottke,
1966). Two quite different corollaries follow from this line of argument. The
first is that the probability of entry, \( \pi \), will be greater the higher is the
cross-elasticity of substitution with other products, there thus being a separate,
interactive influence when the entry factor and the substitution effect are
combined. The other corollary is that the probability of entry will be greater
the fewer are the restrictions placed on the movement by established firms
into different industries. This latter point also bears on the analysis below of
conglomerate expansion.

The probabilistic nature of the entry factor has been recognized by Dewey
(1969, ch. 6), O. Williamson (1963b), and Kamen and Schwartz (1971), among
others. For Dewey, the probability of entry depends on whether there is excess
capacity in the industry, this probability being close to zero when the established
firms have sufficient excess capacity to supply whatever share of the market
the potential entrant might hope to capture. In light of what has already been
Antecedent formulations of the entry factor

said about the existence of reserve capacity in oligopolistic industries, Dewey's argument collapses to little more than a slight elaboration of the simpler 'entry limiting' model.

Williamson's approach to the entry factor is closer to that adopted in this treatise. He not only treats the entry of a new firm as being probabilistic, he also views the established firms as being able to affect the height of the barriers which the new firm faces by the sums they are willing to spend on advertising. His approach nonetheless differs from that followed in this treatise in two ways: (1) he assumes that advertising is the only means of restricting entry which needs to be taken into account when analyzing pricing behavior, and (2) he assumes that the effects of advertising in restricting entry are felt only during the current pricing period, this making the decision of how much to spend on advertising co-determinate with the decision of what price to charge. A third prerequisite, then, for an adequate treatment of the entry factor is a proper recognition of the intertemporal effects on new entry, both of a change in price and of a change in the levels of expenditures for such activities as research and development, raw material acquisitions and product servicing, as well as for advertising.

Pashigian (1968), on the other hand, though he recognizes the intertemporal effects of new entry, nonetheless ignores its probabilistic character. This permits him to postulate a monopolistic situation in which the firm has no maximally acceptable risk of new entry. The result is that entry occurs continuously for some period of time until a stable oligopolistic market structure develops. Pashigian recognizes that the model explains only the emergence of oligopoly out of monopoly, and not the determination of price once the oligopolistic structure of the industry has stabilized (Pashigian, 1968, p. 177).

For Kamien and Schwartz (1971, p. 19), entry is not only probabilistic, its effects are also intertemporal. Indeed, their model comes closest to the approach adopted in this treatise. Still, there are important differences. For one thing, while Kamien and Schwartz recognize that new entry will cause a decline in revenues over time, they overlook the fact that the probability of entry will itself vary with time. Even more serious, they regard profit as being an end in its own right rather than just a means to a larger goal – that of achieving maximum growth. As a result, they fail to note the relationship between the intertemporal alteration in revenue flows caused by new entry and the implicit interest rate on internally generated investment funds which the alteration in revenue flows gives rise to. The fourth and final prerequisite, then, for an adequate treatment of the entry factor is to show how it relates to both the price and investment decisions.