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Minimum and Maximum Pricing Principles for Residual Regulation

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Recent moves toward abolition of regulation of prices in a number of industries bring with them some concern about the desirability of complete elimination of all constraints upon the price-setting process. Though many of the industries involved are actually or potentially highly competitive, none of them can by any stretch of the imagination be said to approximate a state of atomistic perfect competition. As a result, at least some of the prices which can be expected to emerge from their markets, if unimpeded by government interference, may well not exhibit the optimality properties described by our theoretical models of perfect competition. Is it not possible, then, in those markets in which there is little or no competition that some of the resulting prices will, in some sense, be "too high" or even "too low"? This suggests that one should consider the possibility of giving deregulated firms power to select their own prices, but constraining that freedom by a floor and a ceiling in markets in which competition is extremely weak.

In raising this issue I should not be misunderstood to be raising doubts about the desirability of deregulation. I continue to be a strong supporter of deregulation of air, rail, and truck transportation, and there are no doubts about other regulated economic activities that


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will serve the public far more effectively when their pricing decisions are freed from government control. More specifically, by examining reasonable criteria for the residual regulation of price floors or ceilings I am not implying that the adoption of such constraints will serve the general welfare. There are very strong arguments which suggest that the heavy efficiency costs of the regulatory procedures needed to oversee any such residual rules may far outweigh their benefits. Here I am merely inquiring whether there is any analytic basis for the formulation of such rules and, if so, to describe the nature of such rules. But, as will be seen, I have not succumbed in attaining even this limited objective. For while I believe that the rules I will describe are fully defensible in terms of the underlying theory, most of them are clearly too complicated to be used as they stand. Reasonable compromises and approximation procedures will be required to permit their employment in practice.

The rules which emerge from the discussion will not be entirely unfamiliar. They are certainly related to some of the results that emerge from the marginal analysis and the theory of optimal pricing. However, their primary basis will not be the usual one—the rules of efficiency in resource allocation. While it is unusual in economics, equity rather than efficiency will serve as the main foundation for those principles, though I will show that they do promote economic efficiency as well.
1. Previous Discussions of Price Floor Criteria

Let us begin by turning for guidance to earlier discussions of minimum and maximum pricing rules. An unsophisticated but intelligent observer would naturally expect the most of these to be devoted to price ceilings designed to prevent the use of monopoly power to gouge consumers, for surely that is the immediate danger to the public welfare threatened by market power. It is therefore curious but not inexplicable that the vast preponderance of regulatory and antitrust pricing cases, and almost all of the pertinent discussions, have been devoted to limitation or elimination of price reductions rather than price increases.

There is a very simple explanation for this anomaly. A seller's high prices are likely to be harmful to his customers, but his low prices are apt to harm his competitors. The competitors (who themselves are often giants of industry) are in a far better position to organize an effective protest than are the consumers. Inscribing on their banners, "fairness in competition," "prohibition of predatory price cutting" and other equally persuasive motifs, they have not only succeeded in making headway among regulators, but they have even managed to provide an aura of respectability to their self-interested attempt to shield themselves from the rigors of competition. "It always is and must be the interest of the great body of the people to buy what they want of those who sell it cheapest," wrote Adam Smith. "The proposition is so very manifest, that it seems ridiculous to take any pains to prove it; nor could it ever have been called in question, had not the interested sophistry of merchants and manufacturers confounded the common sense of mankind" [1776, p. 461].

Two interrelated issues are cited by those who hold that floors upon the prices charged by firms with some degree of market power are needed. First, it is maintained that without such floors there is nothing to prevent one group of a seller's customers from benefiting at the expense of another. If the seller has market power he may, on this view, be tempted to sell, say, one of his products at a loss, and make up for it by a suitable overcharge of other customer groups. This issue is usually referred to as cross subsidy of one product's customers by another's. The second issue involves the relation between the seller and his competitors. We are told that the firm will wish to sell some of its products below cost if by this means potential entrants can be deterred from entering the market in that field. Current competitors can be forced not to rise in price or even be forced to leave the market. A variety of precautionary terms are used to describe this sort of practice, "predatory pricing" or "destructive pricing" being adhered to cross subsidy, though until recently one seems to have attempted to offer a definition for either term. As one of our leading courts has remarked, the use of the term "predatory" to describe conduct violative of the antitrust laws has left much to be desired. This court has noted, the term probably does not have a well-defined meaning in the context it was used, but it certainly bears a sinister connotation. [U.S. Court of Appeals, 10th Circuit, 1977]

Implicit in discussions of concepts such as predatory pricing are somewhat elusive concepts like "intention" which in practice are not easy to measure or perhaps even to define. But many of the discussions seem to adopt or at least to flirt with the notion that a sincer letter should be affixed to any price which lies below some floor regarded as the boundary of the region of cross subsidy. A price higher than that borderline is considered acceptable on that score, while a price below that floor stands condemned, at least in the absence of unusual exonerating circumstances.

Almost all commentators agree that in designing such a floor a critical role must be assigned to the cost of the product whose price is in question. The problem, however, is which cost datum should be assigned this determinant role, and just how that cost figure should be used in the calculations process. Three basic approaches have been considered. They may be called the full-cost test, the marginal-cost pricing test, and the test of net-incremental contribution. The meaning of the first two may seem self-evident, though we will see as we discuss them that this appearance is deceptive. The third is rather less familiar and will later be described somewhat more carefully.

2. Full-Cost Price Floors

Fall cost, alias fully allocated costs, alias fully distributed cost, is a concept closely associated with the more routine procedures of the accountants. The basic idea underlying its use as a standard for pricing is that a price below that cost level must condemn the supplier to a financial loss. In a single-product firm full cost is merely a synonym for average combined cost, that is, it is equal to the sum of total fixed and variable cost divided by output. Since that cost figure is calculated so as to include a normal rate of return on capital, pricing in this way means that the firm should earn normal competitive profits on its investment, no more and no less. Even in the single-product firm of the elementary textbook there are some files in this sentiment. For wishing does not always make things so. As early as 1908 Gustav Cusell pointed out that a rise in the price of a commodity in an attempt to get it up to the full cost of current output will reduce the quantity sold and that this in turn can lead to a rise in the full cost figure itself. He tells a tale of a railroad whose average cost is a decreasing function of output and whose price initially is below full cost. Successive attempts to raise price to the full cost level only lead to successive reductions in volume of traffic, each accompanied by such a rise in full cost that the supplier is saddled with greater and greater losses. Thus, he concludes, full-cost pricing is not the guarantee against loss that it seems to be.

However, the really serious problems that beset full-cost pricing arise in a multi-product firm, that is, in any firm one can expect actually to encounter in the real world. In any such firm some expenditures (the salaries of its officers, if nothing else) are inevitably expended on behalf of several of the company's products simultaneously, with no identifiable portion of such expenditures being attributable to any one of the products. Now, to calculate on a rational basis the average or "full" cost of any one product in such a firm it is necessary to be able to do the...
impossible, to divide up the firm's total cost so that each of its products is assigned its appropriate share. But unattributable common costs are precisely what their name implies: they are simply unattributable to particular products on any sensible economic basis. At this point accounting conventions undertake to come to the rescue. Using admittedly arbitrary procedures for the apportionment, total supplier costs are simply divided among the firm's different products. These accounting rules are not unimportant, because there is so much to be gained or lost by the choice of apportionment criterion. If a railroad line carries three products—steel, feathers, and platinum—the steel shippers can be relied upon to fight against the use of weight as a basis for assigning "cost responsibility." The feather shippers will combat the use of volume for that purpose, and the platinum shippers will fight tooth and nail against market value as the criterion of cost allocation.

Most economists have long been passionate in their rejection of the full-cost pricing criterion. There are many reasons for the strength of our feelings on this matter of which only three will be mentioned here: the arbitrariness of the criterion, the resource misallocation it is likely to produce, and its tendency to understate the competitive process at the consumer's expense.

Of course, everyone recognizes that arbitrary decisions are sometimes unavoidable and that arbitrariness can occasionally be superior to complete indecision. Perhaps the most irritating practice of full-costers in this regard is their propensity to adopt cost procedures which give the allocation process a spurious appearance of rationality. Costs of common facilities are allegedly allocated on the basis of the "relative use" of those facilities by different products. But this veneer is easily stripped away. The preceding railroad example shows how different the results of the calculation can be, depending on whether weight, volume or market value is used as the criterion determining the relative use of the roadbed and tracks by the different goods transported along it. The appearance of reasonableness imparted by a "relative use" criterion only increases the danger of full-cost procedures because it lulls its advocates and even some uncommitted observers into overlooking the arbitrariness of the calculation and the very serious consequences which can result from the choice of allocation procedure.

The likelihood that full-costing will produce a misallocation of resources follows at once from the assumption that the full costs are not the slightest reason to expect that the prices emerging from a full-costing process will bear the slightest resemblance to those we know to be necessary for efficiency in resource utilization. Whether one deals with the Hotelling rule (1938), or the Ramsey rule (1927), or any other optimality principle, it is clear that marginal rather than fully distributed cost is involved in the relevant test. Price based on fully distributed costs will almost certainly be inconsistent with efficiency in resource use and so will be harmful to the general welfare. Some reservations which will emerge in the next section must be expressed about this argument. But no such doubts need be felt about the remaining argument against full-costing and its substantial handicap upon efficiency which the discussion will point out.

In practice, the role of fully distributed cost has been a burning regulatory issue because competitors of the firm under attack almost inevitably use it to claim that the prices of the products in direct competition with their own are uncompensatory—that they are financed by cross subsidy. In this way, fully distributed cost is normally used as a protectionist instrument preventing buyers from benefiting from price reductions which suppliers are willing to offer them. Competitions battle for a high floor under the regulated firm's prices in order to make life easier for themselves. Since the rules of full costing are arbitrary, the results can always be skewed, deliberately or unconsciously, to maximize the competitive handicap imposed upon the regulated firm, and one can generally rely upon the complaining competitor to try to do so.5 Regulators are regularly persuaded to bow to this position in the belief that, unless such a full cost floor is imposed to protect competitors, they will be unable to survive. But thereby, in protecting inefficient competitors who could not otherwise fend for themselves, the regulators obviously succeed only too well in underestimating the competitive process. Customers are forced to pay prices higher than they otherwise would, ostensibly in their own best interests. The extreme distortions shown by most economists for the full cost arguments is, thus, not very difficult to explain.

3. Marginal Cost Criteria

The notion that price should be permitted to be set as low as marginal cost seems to follow in an obvious way from the principles of welfare economics. As every economist knows, optimality of resource allocation, as achieved under pure competition, requires the prices of all commodities to be set equal to their respective marginal costs. It would seem an easy inference that any rule which prevents prices from reaching marginal costs is an indefensible source of inefficiencies. Economists have long flirted with this sort of argument, though the position most of them have ended up with is somewhat different. Their conclusion nevertheless remains altogether marginalist in logic, as we will soon see.

Most recently the marginal-cost pricing criterion has been espoused, with considerable influence upon the judicial process, by two eminent lawyers, Professors Phillip Areeda and Donald Turner. In a widely cited article [1975]—which deals, actually, with antitrust law rather than regulation—they took the position that no price which equals or exceeds short-run marginal cost should be considered predatory. Conversely, they assert, any price which falls below short-run marginal cost can be presumed to be predatory. They note, in addition, that in practice, it will sometimes be difficult to estimate the value of short-run marginal cost, and that in these circumstances average variable cost can be used as an acceptable proxy. Thus, the Areeda-Turner criterion effectively approves of any price that can be shown to exceed either of these cost figures, or both. This criterion has, in the past few years, been cited with approval by a growing number of counts.6 The Areeda-Turner position is extremely attractive despite the questions I will raise about their argument. Among the reasons I find the rule attractive is my belief that the adoption of any...
such testable criterion is an enormous contribution to the general welfare; without it decision makers must act without knowing whether they will be running afoul of the law, and the resulting indecisions, delays and needless litigation are enormously wasteful. Moreover, I shall argue later that in proposing the adoption of a test based on average variable cost, Areeda and Turner have done better than they thought. Rather than being only a poor cousin of marginal cost, average variable cost turns out to be a very reasonable criterion in its own right.

One can complain that the Areeda-Turner discussion seems never to have explained clearly why it advocates the use of short-run rather than long-run marginal cost. In fact, the authors seem never to have defined precisely what they mean by the term "short-run marginal cost." Their "average variable cost." We will see later the nature of the ambiguity in the latter concept.

But the main fact one can find with the Areeda-Turner discussion of their position is the basis on which they choose to eschew it. They argue the desirability of marginal-cost pricing on the welfare theoretic grounds which I have already mentioned. Unfortunately, there are at least three critical weaknesses in this position. First, the second-best theorem reminds us that there is no necessary advantage to satisfaction of some Pareto-optimal conditions when others are being violated. If prices are, say, above marginal costs in some sectors of the economy, it is not necessarily beneficial to bring prices into equality with marginal costs in the remainder. Indeed, one can easily see how a misallocation of resources will be produced in this way, with an excessive proportion of society's resources devoted to products whose demand has been stimulated by marginal cost prices, and an undesirably low proportion of the community's resources consequently going to the remainder of the economy. Second, welfare economics says nothing about the desirability of setting prices temporally equal to marginal cost and then re-earning them above marginal cost after competitive pressures have decayed. Yet such an intertemporal price pattern is perfectly compatible with the Areeda-Turner criterion. Third, whatever can be said on welfare grounds for the desirability of prices equal to marginal cost, there seems little particular allocative virtue to prices set at some unspecified level higher than marginal costs. Yet the Areeda-Turner criterion is impartial in its approval both of prices equal to and prices which exceed marginal costs.

Note of this is in any way meant to imply that the Areeda-Turner price floors are indefensible. The point simply is that while price floors, appropriately chosen, may help to promote efficiency, any price floor is simply too coarse an instrument to be of use by itself to achieve optimality in resource allocation.

4. Compensatory Pricing: Incremental Cost and Revenue

Since the 1880's economists have been proposing, at least by implication, the use of incremental cost, a close relative of marginal cost, in the setting of price floors. Incremental cost may be defined as the addition to the firm's total cost by a specified change in the output of each of the firm's products. Thus, marginal cost is simply the limiting case of incremental cost as the change in question approaches zero. Obviously, a similar definition applies to revenues.

Here, however, I will use incremental cost and revenue in a more restricted manner, to refer to what has been described as the incremental cost (revenue) of an entire product. This is the difference in the total cost (revenue) of the supplier of some specified vector of outputs and the corresponding total cost (revenue) of its output, if the one item whose price is in question were reduced to zero. I will be using two different incremental cost (revenue) which are best described symbolically.

Let $x$ = the quantity of some commodity $X$;

$y$ = the corresponding vector of outputs of all the firm's other products;

$y' = \Delta y$ = the vector of outputs of $Y$ which would be demanded if

\[ y' = \Delta y \]
output of $X$ were reduced to zero as a result of complementarity or substitution: $C(x, y) = \text{the total cost function}$.

Then we may define:

**Gross Incremental Cost of $X$**

$\text{Gross INcremental Cost of } X = C(x, y) - C(0, y)$ (1)

**Net Incremental Cost of $X$**

$C(x, y) - C(0, y + \Delta y)$ (2)

Gross and net incremental revenues are defined as the obvious analogues of (1) and (2).

It is then proposed to test the adequacy of the price of product $X$ by checking whether it equals or exceeds the corresponding average incremental cost, i.e., the incremental cost divided by output. Since the (gross) incremental revenue of $X$ at price $P_x$, if the price of $X$ equals or exceeds its (gross) incremental cost, the total incremental revenue of $X$ must obviously exceed its incremental cost; that is, if

$P_x \geq \frac{C(x, y) - C(0, y)}{y}$

then

$P_x \geq C(x, y) - C(0, y)$. (4)

This price is then said to be compensatory, or to involve no cross subsidy, on the grounds that under these circumstances the revenues contributed by purchasers of $X$ must at least cover the costs imposed upon the supplier in the course of serving them.

Indeed, particularly where the firm’s profits are effectively constrained by some ceiling, as they are intended to be under rate-of-return regulation, there is more to the argument. A price of $X$ which satisfies this rule can be shown to be Pareto-superior, from the viewpoint of all affected customers, to any higher prices which would cause the firm to lose all (or a substantial proportion of) the customers for product $X$. Thus, suppose the test criterion (4) is passed as a strict inequality. Then customers of $X$ must be making a net contribution to company profits. But if the prices, $P_x$, of goods in the vector $y$ were otherwise enough to bring profits up to the ceiling, this revenue contribution of product $X$ must put the company over the top. The firm must then reduce the prices of product $Y$ to a level we represent by the vector $P_y$ in order to comply with the ceiling. That is, let $P^*$ be a price which drives customers of $X$ from the market; then at any lower price, $P_y$, which satisfies (3) as an inequality and thus attracts the corresponding demand for $X$, consumers of $Y$ must also benefit as their prices are lowered from $P^*$. This argument goes back at least to the 1810s (Hadley, 1886, Chapter 6; Alexander, 1897, pp. 2–5, 10–11; and Ackworth, 1891, Chapter 3; see also Lewis, 1949, p. 201ff, for an excellent discussion). It is fundamentally valid, though, as we shall see, at least in principle it does require some amendments as it stands. But before coming to these, several observations are in order.

First, this is not primarily an argument based on grounds of efficiency of resource allocation. Rather, it is founded first and foremost on considerations of distributive equity among different groups of the supplier’s customers. The test is intended to assure that the customers of each product bear the costs imposed by them and do not shift any portion of these costs to buyers of other company products. In other words, by implication, each customer group then bears its contribution to total company costs. Moreover, since such prices pass a test of Pareto improvement it follows that the gains from such pricing policy are shared among the company’s customers.

Second, while I have emphasized the interpretation of the incremental-cost criterion as a test of fairness, its role as an inducement of efficiency must not be overlooked. If for price were to violate the rule it would exclude potential entrants who are more efficient producers of the product in question. If $AC^*$ and $AC^U$ are, respectively, the unit incremental costs of the incumbent and the potential entrant, then the item should at least partly be supplied by the entrant if $AC^* < AC^U$. However, if the incumbent’s price is $P^* < AC^U$, then this (cross-subsidized) price will obviously exclude the more efficient producers of the item. Thus, the incremental cost floor is a necessary condition for economic efficiency.

Third, we may note that the incremental cost test is directly related to the second Arrow-Debreu criterion—the comparison of price with average variable cost. For it is natural to define average variable cost as the right side of expression (3), that is as the amount per unit of $X$ by which the firm's total cost varies as a result of the decision to supply $X$ units of $X$. Then (3) or (4) become identical with the average-variable-cost test of Arrow and Debreu. We conclude that, from being defendable only as some sort of approximation to the ideal marginal-cost criterion, there are strong grounds for advocating the average variable cost test as something with validity of its own. Note also that, as I have indicated earlier, this view provides a foundation for the Arrow-Debreu test quite different from the

one they themselves offer, one which I believe is considerably stronger than theirs.

Let us turn next to the ways in which it has more recently been proposed to amend the incremental cost criterion. Here two such modifications will be described. First, it has been proposed that the test require a comparison not between gross incremental cost and revenues but between their net counterparts. That is, from the revenue contributed by $X$ one should subtract any revenues lost by other company products as the result of the availability of $X$, if the two goods happen to be substitutes. The reverse is proposed in the case where they are complements, and similar adjustments for cross elasticity effects are suggested on the cost side. The argument for this position is self evident. Product $X$ should be credited with all revenues it contributes directly or indirectly and debited with any indirect revenue losses it causes, and the same is true on the cost side. Along this line, it is easy to show that the Pareto improvement argument is valid for the incremental cost test only if net cost and revenue figures are used in carrying out the test. For suppose that the price of $X$ were to satisfy the gross criterion but fail the net test. Then a moment's thought confirms that the company's net profits will actually be reduced by the supply of product $X$ and so, under an overall profit ceiling, consumers of its remaining products, $Y$, may well be required to make up the deficiency.

The second amendment that has been proposed (see Faschlicher, 1975) is that the compensatory pricing of product $X$ is not proved if only $P_y$ is shown to satisfy the criterion

net incremental revenue = net incremental cost.

(5)

Rather, to show that their prices are compensatory, it is held necessary to show that each and every product of the company, taken
separately and in combination, also satisfies criterion (5). If the firm produces X, Y and Z, each alone must satisfy (5); but in addition this must be shown for the four combinations: \((X, Y), (X, Z), (Y, Z)\) and \((X, Y, Z)\). The reason is, once more, made clearest by example. Suppose \(X\) and \(Y\) are the only two goods shipped along a particular railroad route which is constructed and maintained specifically for the purpose. Then the incremental track construction cost of product \(X\) by itself will be zero since that track must, in any event, be built if any \(Y\) is to be transported along the route. Similarly, the incremental track construction cost of \(Y\) must also be zero. However, if the two products each contribute revenue just sufficient to pay for their own incremental costs nothing would be available for replacement of track, and accordingly it would make little sense to describe that set of rates as compensatory. In this view it follows that, in order to pass an appropriate test of compensatory pricing, the incremental revenue of each product and every combination of products must contribute net incremental revenues which equal or exceed the corresponding net incremental costs, including the cost of any associated incremental capital and the normal rate of return on that incremental capital.

This definition will also prove relevant later when we turn to a discussion of an appropriate maximum price criterion. We may also note that the preceding test must be passed by the totality of the firms' products, i.e., in terms of our three-product example it requires that the incremental revenue of all three company products, \(X, Y\) and \(Z\), together cover their total incremental cost. This last requirement implicitly assures us that the prices of the firm's products cover all of the company's costs including a normal return to its capital. If, in addition, these returns are constrained to be no higher than the normal yield of capital, this amounts to assurance that the firm's price vector yields revenues that just exactly cover its total costs and bring in what regulators sometimes call a "fair rate of return."  

It may even be maintained as a result, albeit somewhat perversely, that these prices correspond to a full allocation process. But, of course, it is only so in retrospect. No accountant has been asked to perform the voodoo rites involved in assigning the unassignable costs. Rather, the price-setting process, as constrained by the market, has yielded a set of prices which, together, cover total costs. If, as a matter of aesthetics, one then wishes to allocate company costs in proportion to the revenues yielded by these prices, it is possible to maintain that the result constitutes a full allocation of costs and that the prices are consistent with that full allocation. Anyone who derives pleasure from such an exercise should of course not be deprived of it.

This completes my discussion of appropriate criteria for price floors. So far as these are considered desirable either for regulated or deregulated industries, it must only be added that the last criterion, the compensatory pricing test, seems to be the preferable criterion in terms of theory. In practice one must, of course, be prepared to compromise when such a test imposes unreasonable and unrealistic data and calculation requirements. I once wrote of the desirability of optimally imperfect decision criteria which balance off the cost and feasibility of a more demanding decision process against its benefits. Clearly, granted the desirability of any such criterion, one which is usable in practice will be preferable to one which is not. The main task before us, then, is the design of reasonable approximations to the ideal criterion of compensatory pricing which do not impose impossible or even excessive demands upon those who want to use them.

5. Toward a Reasonable Criterion for Price Ceilings

Though common sense would seem to suggest that in the presence of market power price ceilings are rather more to the point than price floors, I will have much less to say about the former than I did about the latter. In part, this is because so much less analysis seems to have been devoted to appropriate criteria for the setting of ceilings; in part it is a result of the inherent difficulty of the problem.

One way to get around its difficulties is simply to follow the dictates of Ramsey theory, requiring each regulated price to be set at a level that maximizes consumers' and producers' surplus subject to a profit constraint. One might, for example, just require prices, as an approximation, to obey the famous inverse-elasticity rule, under which the percentage deviation between price and marginal cost is inversely proportionate to the elasticity of the demand for the item in question.

In practice this solution will not do, first, because, as we have already noted, it applied only to a small subset of the economy's prices it loses its welfare-theoretic standing. More important, the immediate objective of deregulation is to broaden management's range of freedom in making economic decisions, not to narrow it further, let alone extinguish it altogether. One is therefore led to seek a permissible range within which management can exercise its judgment in setting price, but beyond which it will not be permitted to go in markets in which competition is ineffective. It can be argued that by permitting this degree of freedom, and by making the bounds of the permissible range as specific and observable as possible, one contributes to the scope and incentives for the exercise of aggressive entrepreneurship.

What then can one propose as an appropriate upper bound upon price? The one criterion which seems to have been suggested most upon Faulkner's concept of stand-alone cost. The (average) stand-alone cost of a particular service is the minimum amount per unit it would cost to provide if it were offered by a single-product supplier. That is, it is the amount the customers would have to pay if they were, in effect, to secede from their implicit association with the buyers of the supplying firm's other products.

It is to be noted that a price equal to stand-alone cost does deprive the customer of any share in the economies of scope derived from simultaneous production of the other items in the firm's product line. But like the price floors we have discussed, its justification rests primarily (but not exclusively) on an equity principle—the view that it is unfair to extract more from a customer group than it would cost that group to serve itself.

Here we must be careful to distinguish two interpretations of stand-alone cost which so far have implicitly been confused in my discussion. One way to measure stand-alone cost is in terms of what it would cost the current supplier to provide the product in question after divesting itself of all other items in its product line. The second interpretation is the cost of serving the customers if they were to form their own company in competition with the existing firm. An example would bring out the distinction. Suppose a railroad carries several different goods over a route through the only mountain pass between the origin and destination, so that any alternative route would be prohibitively expensive. Here the stand-alone cost of one of the freight items, that of an imaginary rival carrier, is obviously far greater than...
than the first stand-alone cost figure corresponding to the transportation of the one good by the existing railroad. It should be obvious that if this railroad were permitted to charge a price equal to the higher of the two stand-alone costs it would derive enormous profits attributable exclusively to the monopoly power it holds by having preempted the mountain pass. Clearly, in this case, the second stand-alone criterion is unacceptable;

But there are other cases in which it is to be preferred. Suppose the current supplier is inefficient and that a new firm could supply the affected customer group at a far lower cost. Surely there is no reason the incumbent firm, which by hypothesis possesses market power, should be permitted to extract the costs of its inefficiency from its customers. It would seem to follow that, in principle, the appropriate stand-alone cost figure is the lower of the two.

Granted, for the sake of argument, the acceptability of the stand-alone criterion, whose logic as an inhibitor of monopoly profit is indicated by the preceding mountain-pass example, let us turn last to the measurements it requires. This is obviously no trivial issue since it refers to a hypothetical arrangement which almost certainly will never have been observed in fact. The multiproduct firm simply will not have been observed, at least in recent history, providing any of its products in isolation, and so there will exist no data permitting a direct calculation of stand-alone cost.

One obvious possibility is an engineering calculation, attempting to obtain by simulation an estimate of what would be required to supply one product alone. There are obvious questions about the reliability of such a calculation which the engineers themselves are the first to emphasize. Its cost is also likely to be enormous.

There is a second way of going about this calculation which follows directly from the text of compensatory pricing. Here, the crucial result is due to Faulhaber, who proved that if a firm which earns no more than a normal return on its capital overall is guaranteed to earn no more than its stand-alone cost from the sale of a particular item, if it is also true that the prices of all other products are compensatory in the sense defined in the preceding section. In other words, the firm can prove that it is not exceeding the stand-alone ceiling over the price of product \( X \) by showing that it is earning normal profits in total, and that the prices of its remaining products, \( Y, Z, \ldots \), are compensatory.

The intuitive reason for this result is not difficult to describe. If a firm earns more than the stand-alone cost of item \( X \) (including a normal return on the capital involved), then \( X \) must, by definition, be contributing more than normal profits to the firm. This must then manifest itself in (at least) one of two ways: it must result in greater than normal profits for the firm overall, or some other product or products of the firm must yield enough of a loss to offset the excessive profit brought in by item \( X \). Thus, violation of the stand-alone ceiling on the price of \( X \) will always be accompanied either by an observable supernormal profit rate for the entire firm or by uncompensatory net prices for some of its other products. That, of course, is precisely what the Faulhaber theorem asserts. It follows immediately that a ceiling based on stand-alone cost is required for efficiency and not just for equity. For we saw earlier that noncompensatory prices lead to inefficiency by preventing the entry of more efficient firms. Thus, we conclude now, violation of the stand-alone ceiling means that the firm must either be earning profits that are inefficiently large and must involve a misallocation of resources (unless the earnings are pure rent) or it must involve uncompensatory and, hence, inefficient prices of some other products.

The preceding explanation of the Faulhaber theorem was deliberately loosely phrased, but it is easy to provide a simple proof for the case of the two-product firm to give the flavor of the argument. Supposing the firm produces exactly two goods \( X \) and \( Y \), that \( P_X \) the price of \( X \) is compensatory, and that the firm's revenues just cover its overall costs, including its cost of capital. I will prove that then the price of \( Y \) cannot exceed the stand-alone ceiling.

Compensatory pricing of \( X \) requires by (5) and (2) that net incremental revenue of \( X - (P_X + P_Y) = [P_X + 1/2(Y + \Delta y)] > 0 \) net incremental cost of \( X - C(x, y) - C(y, y + \Delta y) \), or

\[
P_X + P_Y > C(x, y) - C(y, y + \Delta y) \tag{6}
\]

But if the firm is earning only its normal return, then

\[
P_X + P_Y = C(x, y) \tag{7}
\]

Subtracting (6) from (7), we have:

\[
P_Y (y + \Delta y) > C(y, y + \Delta y) \tag{8}
\]

which proves immediately that the total revenue that would be produced by price \( P_Y \) if \( X \) were not supplied (so that the demand for \( Y \) would rise to \( y + \Delta y \)) is no greater than the (stand-alone) cost of \( y + \Delta y \). But this is precisely what it was intended to show.

This, then, completes my discussion of an appropriate ceiling formula for products over which the residually regulated firm still retains some market power. No doubt, further analysis of the subject is still needed urgently. But the economic logic of the proposed stand-alone criterion seems clear, and its intimate connection with the criterion of compensatory pricing is one of its attractive features.

6. Concluding Remarks

In a sense, the preceding discussion may be characterized as an attempt to do something economists have with good reason attempted to avoid—to provide some substantive content to the decentralized concept of "just price." But, as I have said elsewhere, while there may be no unique price which can unequivocally be declared "just," it may be possible to determine ranges of prices all of which we will agree to be unjust. It is in this spirit that I have sought to deal with floors and ceilings, implicitly using them to define a range of intermediate prices each of which is to be considered acceptable in the weak sense that there appears to be no reasonable way to show it to be unjust.

I must end as I began, by protesting that it has not been my objective to advocate the desirability of price floors and ceilings, even for a small subset of markets in a deregulated industry in which there is no effective competition. The social costs of the associated regulatory process may or may not be justified by the likely benefits. But whatever one's judgment on this score, it seems clearly desirable, if price regulation is to be preserved, to minimize the administrative and resources costs of the process by spelling out the approved range of freedom of entrepreneurial decisions and making as specific as possible the boundary between acceptable and objectionable con-
duct. That has been the primary purpose of this paper.

References
Alexander, E. P. Railway Practice. New York, 1887.
U.S. District Court, Northern District of Californi
nia. 571 F. 2d 1000, SW, Ingles and Sons Baking Co. v. JTV Continental Baking Co. (October 2, 1978).

The Cost of Price Control in Banking*

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The banking industry in the United States is unique in its regulatory treatment in that, while banking has none of the characteristics of a public utility which would render competition socially wasteful, competition in banking is restrained under Federal law, both geographically, and in terms of the interest rates that may be paid on deposits. Geographic restraints on banking competition go back to the earliest days of our Republic and reflect a fear of concentration in finance. The followers of Hamilton wanted a strong national banking system which they felt was essential for the development of a vigorous manufacturing industry. However, the followers of Jefferson, the farmers and the people of the frontier states, felt that such a system would leave their destinies in the hands of Eastern money-center bankers. The Jeffersonians won the issue and the uniquely decentralized banking system of the United States resulted. The pattern in all other industrial nations is that ten or fewer commercial banks control 90 percent or more of commercial bank deposits. In the absence of restraints on competition geographically, there is little reason to suppose that our banking structure would have developed much differently.

The national political climate of concern about concentration in banking led to the primacy of the states in determining the structure of banking within their boundaries and to the passage of restrictive state laws, some of which had the effect of encouraging local monopolies. We have seen in recent years the beginnings of some new thinking in the Congress questioning whether, in seeking to avoid banking concentration nationally, we have allowed too many restraints on competition and whether a position somewhere between Jefferson and Hamilton might produce better results for the consumer of banking services. Politically, this issue is closely related to the issue of restraints on price competition in banking.

Restrains on price competition have a much briefer history, dating only to the early 1930s. They were the product, not of any social or economic philosophy, such as we find in the history of geographic restraints on competition; they were, instead, the products of reaction to crisis—the commercial banking crisis of the early 1930s and the crisis of 1966 in the case of the thrift institutions. A mythology developed during the 1930s to the effect that the massive bank failures of that era were caused by excessive price competition for deposits. The subsequent research on this issue has not lent support to this thesis. Nevertheless, myths have their uses. This one gave the Congress a basis for moving against our most fundamental eco-

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1Economists of these is Connecticut's Home Office Protection Regulation which prohibits any bank from establishing a branch in any town which is the home office of another bank.