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Quasi-Permanence of Price Reductions: A Policy for Prevention of Predatory Pricing

William J. Baumol*

> The use of the term "predatory" to describe conduct vio-
> lative 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."[1]
> Pricing is predatory only where the firm foregoes short-
> term profits in order to develop a market position such that
> the firm can later raise prices and recoup lost profits.[2]

While no one has succeeded in providing a satisfactory definition
of the term "predatory pricing," the issue is real and important.
Areeda and Turner,[3] Scherer,[4] and Williamson[5] have made substan-
tial contributions in their analyses of the issue and in their formula-
tion of criteria for use in the evaluation or prevention of predatory
behavior.

This Article seeks to go one step further, both in the discussion of
the problem and in the formulation of such a criterion. I will pro-
pose a simple rule that enjoys significant optimality properties with
respect to economic efficiency. Equally important, the rule is rela-

1. Pacific Eng'r & Prod. Co. v. Kerr-McGee Corp., 551 F.2d 790, 795-96 (10th Cir.),
cert. denied, 434 U.S. 879 (1977) (quoting Telex Corp. v. I.B.M. Corp., 510 F.2d 894, 927
(10th Cir.), cert. dismissed, 423 U.S. 802 (1975)).
2. Janich Bros. v. American Distilling Co., 570 F.2d 848, 856 (9th Cir. 1977), cert.
denied, 439 U.S. 829 (1978).
3. See Areeda & Turner, Predatory Pricing and Related Practices under Section 2
of the Sherman Act, 88 HARV. L. REV. 697 (1975).
4. See Scherer, Predatory Pricing and the Sherman Act: A Comment, 89 HARV. L. REV.
869 (1976).
5. See Williamson, Predatory Pricing: A Strategic and Welfare Analysis, 87 YALE L.J.
284 (1977).

tively easy to administer, permits full and fair competition by both entrants and established firms, and encourages enduring, rather than temporary, price cutting, in order to serve consumers' interests over the long-run. In short, I believe that the proposed approach offers substantial advantages: consumer benefits; the stimulation of true competition; efficiency of resource allocation; and greater effectiveness of antitrust and regulatory policy. The proposal, it should be noted, is not intended to be a substitute either for regulation or for antitrust programs, but rather to be a new instrument for both of these. It is intended not to replace market forces, but to permit those forces to work more effectively.

Much of the discussion of rules for the prevention of predatory pricing has focused on economists' *static* analysis of allocative efficiency and the maximization of consumers' and producers' surplus. However, this static analysis of the issue of predatory behavior, illustrated, at its best, by the Areeda-Turner approach,[6] is inadequate, not because such analysis is irrelevant, but because it draws our attention away from some of the most pressing issues that are involved.

The problem has recently been dramatized by the entry of Laker Airlines into the transatlantic passenger air-travel arena with a great reduction in fares. Predictably, established firms quickly sought permission to respond by matching and, in fact, offering better terms than Laker's. The obvious alternatives for policymakers who had to pass on the applications seemed uniformly distasteful:

a) Rejection of the competitors' responsive proposals would have been tantamount to granting a protective shield to Laker, the first step toward establishment of a cartel in which effective competition is prevented by public policy, even though the survival of each "competitor" is artificially preserved. This is an invitation to inefficiency and, ultimately, to poor customer service and perhaps to higher prices.

b) Approval of the proposed responses carried the danger that established firms would have succeeded in driving Laker out of the market and that the low fares offered by the established carriers would have been withdrawn after the competitive threat had passed.

In such a case the regulator finds himself confronted with the choice between Scylla and Charybdis, apparently with no safe middle course. Neither the creation of a cartel nor the sanctioning of the destruction of the entrant is an appealing prospect. Both are incompatible with effective competition and neither serves the long-run interests of consumers.

6. *See* Areeda & Turner, *supra* note 3, at 703-20.

Williamson has identified the nub of the problem in his emphasis on the intertemporal aspect of the situation.[7] The difficulty is that a firm seeking to prevent entry by others need not confine itself to a single price move. Instead, it may choose to cut price temporarily when entry occurs, raising price again after the threat recedes, or it may undertake a more complex sequence of price changes, responding step by step to each change in an entrant's decisions. The resulting threat to competition and to the general welfare is not a function of the relationship between prices and costs, but rather a matter of the responsiveness of pricing to changing competitive developments.[8] Thus, it seems appropriate to look beyond the Areeda-Turner test, which evaluates matters solely in terms of the relation between the established firm's prices and its marginal costs or average variable costs.

It should be noted that even those courts that have been most unqualified in their support of the Areeda-Turner test have expressed the same reservation.[9] As one court stated:

7. *See* Williamson, *supra* note 5, at 289-304.

8. In addressing the problem of predatory pricing, Williamson has proposed a set of rules, the basic component of which is the stipulation that "Dominant firms that expand their (demand adjusted) output in the face of new entry will be deemed to be engaged in predatory behavior—even if the resulting market price exceeds the dominant firm's average variable cost." Williamson, *supra* note 5, at 334. The object of the rule is to prevent the incumbent firm from forestalling entry by flooding the market when competition threatens. Moreover, if the incumbent cannot expand its output, it cannot maintain a low price because doing so would only cause demand to exceed supply and thus make it easier for the entrant to establish itself by serving the unsatisfied demand on favorable price terms analogous to the high black-market prices that accompany shortages under rationing. Williamson observes that a demand forecast must be used to set the admissible level of output for the dominant firm; in a growing market the incumbent must be permitted to increase output along with market demand, but no faster. *Id.* at 305. Williamson believes that the need for such a forecast should not pose a serious problem. *Id.*

One clear advantage of the Williamson proposal is the incentive it provides for anticipatory expansion of output by the incumbent; consumers receive the advantages of lower prices and increased volume well before entry threatens. On the other hand, if entry nevertheless does occur, the rule prevents it from serving the purpose for which it is normally advocated: under the rule, entry cannot force competitive price reductions upon the incumbent. Furthermore, Williamson's rule inhibits price wars among large incumbent firms, who are constrained, in effect, to retain their initial market shares, at least for the immediate post-entry period. In addition, in an industry expanding rapidly as a result of a recent innovation, the Williamson rule well may run into difficulties in selecting an output constraint to impose upon the innovator. Moreover, the required demand forecast may not be as simple and objective a process as Williamson suggests.

I am grateful to Professor Dennis Mueller of the University of Maryland for suggesting some of the preceding ideas to me.

9. *See, e.g.,* Janich Bros. v. American Distilling Co., 570 F.2d 848, 856 (9th Cir. 1977), *cert. denied,* 439 U.S. 829 (1978); Hanson v. Shell Oil Co., 541 F.2d 1352, 1358 (9th Cir. 1976), *cert. denied,* 429 U.S. 1074 (1977); International Air Indus., Inc. v. American Excelsior Co., 517 F.2d 714, 723 (5th Cir. 1975), *cert. denied,* 424 U.S. 943 (1976); Murphy Tugboat Co. v. Crowley, 454 F. Supp. 847, 854 & n.8 (N.D. Cal. 1978); Weber v. Wynne, 431 F. Supp. 1048, 1059 (D.N.J. 1977).

> To demonstrate predation, [the plaintiff] had to show that the prices charged by [the defendant] were such that [the defendant] was foregoing present profits in order to create a market position in which it could charge enough to obtain supranormal profits and recoup its present losses.[10]

While ostensibly expressing adherence to Areeda-Turner, the court is in fact demonstrating its concern over the intertemporal issue, which unavoidably involves considerations going beyond the atemporal Areeda-Turner test.

I. Quasi-Permanence of Responsive Price Reductions

So far it has been assumed implicitly that the dilemma of the policymaker, illustrated by the Laker case, permits only two possible reactions: either the erection of a protective umbrella over the entrant or freedom for the established firm to raise and lower prices subject only to cost constraints. But there is a third possibility: the established firm can be left free to cut prices in order to protect its interests, without being permitted to *reraise* those prices *if the entrant leaves the market* or if the firm wants to subsidize price cuts of other products that are then threatened by competition. In short, such price reductions can be made quasi-permanent.

A. *The Proposed Rule*

The quasi-permanence of price reduction proposal can be readily illustrated by the Laker parable.[11] Suppose established firms had been told they could reduce their own fares as far as they wished, subject only to some sort of cost floor. But suppose the established firms had also been informed that if Laker should cease to operate, they would not be permitted to withdraw these low rates in the future except in response to independent changes in costs and market demands.[12] Under such an arrangement, the established firm would

10. Hanson v. Shell Oil Co., 541 F.2d 1352, 1358 (9th Cir. 1976), *cert. denied*, 429 U.S. 1074 (1977).

11. Civil Aeronautics Board Commissioner Elizabeth E. Bailey has suggested that the Laker case is in fact a poor example for the proposed principle since the airline industry is potentially very competitive because of low entry costs. Telephone conversation with Elizabeth E. Bailey, October 1978 (notes on file *Yale Law Journal*). If upon deregulation, with full freedom of entry and exit, the airlines prove to be effectively competitive, then nothing can be gained by pricing that is predatory. In such a case, quasi-permanence will be an unnecessary encumbrance upon the market mechanism.

12. If the entrant is alive and well, there seems no reason to prevent the established firm from rescinding a price cut unless the price is raised to help the incumbent counter another price cut by an entrant. After all, such a rise in the established firm's price can only be to the advantage of the entrant.

be put on notice that its decision to offer service at a low price is tantamount to a declaration that this price is compensatory, and thus, that it can be expected, in the absence of exogenous changes in costs or demands, to offer the service at this price for the indefinite future.[13]

The consequences are clear. A quasi-permanent pricing arrangement does not raise a protective umbrella over the entrant; the established firm is left free to respond.[14] However, it will no longer be free to respond without fear of long-term repercussions. The established firm only will adjust its price if the value of the resulting competitive gain exceeds the long-run cost of a permanent reduction in price. True competition is thereby unleashed,[15] and the consuming public is offered the rewards accompanying a durable price reduction.[16] Moreover, the chances of the entrant's survival are increased; he can expect to survive if his costs are at least as low as those of the established firm—that is, if he is entitled to survive on the merits of his relative efficiency. Thus the intertemporal side of the problem

13. Although it may appear that the Williamson proposal is very similar in its effects to those of quasi-permanence of price reductions, in fact, the two proposals are very different. Williamson proposes that a ceiling be set on the output of the established firm when entry occurs. As a result, market price may not fall as much as it might have otherwise. The same may be true of the price reduction that will occur under quasi-permanence. But there the similarity ends. Under the Williamson proposal, many output and price choices are, in effect, forbidden to the firm. Under quasi-permanence there are no such prohibitions unless the prices fail a test of cross subsidy. *See* p. 10 *infra*. Moreover, under the Williamson proposal, price can rise again, if and when the entrant leaves the market, so that consumers may receive no long-term price benefit. That, of course, is precisely what quasi-permanence prohibits. Furthermore, there are additional advantages for quasi-permanence in terms of allocative efficiency. *See* pp. 24-25 *infra*.

14. Note, however, that the firm is not permitted to readjust a price upward in order to permit a cut in the price of another product threatened by a new price reduction by an entrant. The established firm is thus inhibited in responding, move by move, to each price change by the entrant. Rather, it must choose carefully the prices it originally adopts in response to entry, taking into consideration possible future moves by the entrant. This requirement that the firm adopt a price strategy appropriate to deal with future price moves by the competitor is what forces the established firm to adopt prices that promote economic efficiency.

15. That is, competition results to the degree permitted by scale economies and other influences making for monopolistic elements within the industry. Obviously, if monopolistic influences are not a relevant problem, the industry is not an appropriate subject for antitrust measures. Thus, the entire issue leading to the quasi-permanence proposal does not arise. If, for example, an industry is obviously composed of a number of small firms, none of which has sufficient market power to make the industry an oligopoly, the firms' pricing decisions need not be subject to the quasi-permanent pricing rule.

16. In economics jargon, the quasi-permanence principle will promote "X-efficiency," in that it forces firms to prevent waste, to search for innovation, and to avoid the "laziness" that a protective price umbrella encourages. *See* Leibenstein, *Allocative Efficiency vs. 'X-Efficiency,'* 56 AM. ECON. REV. 392 (1966). This type of efficiency is different from the efficiency in resource allocation usually addressed by economists. I also make a strong claim, however, for quasi-permanence as an instrument to promote efficiency in resource allocation. *See* pp. 10-24 *infra*.

is dealt with; if the entrant's costs are lower than those of an established firm, but the latter chooses to undercut him nevertheless, it will be left with the burden of a continuing drain upon company profits even when no competitive advantage from the low prices remains.[17] Managements of established firms will surely think twice before entering upon such a commitment.[18]

B. *Practical Issues in Implementing the Rule*

Several practical issues must be addressed in considering the application of the proposed rule. How can permanence of price cuts be enforced in an inflationary world? What if the established firm makes a mistake in its price calculation? How can such a principle be used in antitrust policy?

Inflation and other autonomous changes in costs and market de-

17. The claim that ambiguity arises because of the likelihood that after some time has passed it will become difficult to distinguish the entrant from an established firm causes no difficulties for the proposed principle; an entrant should be subject to the same rule as the incumbent. If Laker succeeds in driving Pan Am out of its market, it, too, should not be free to raise its fares at will. Thus, while the discussion has emphasized the special role of the entrant, the quasi-permanence pricing rule should apply to any firm whose low prices are suspected of having driven its competitor from the field, whether or not that competitor was a recent entrant.

18. It should be pointed out that Areeda and Turner did consider the problem raised by temporary price reductions and considered several means of dealing with it, including the quasi-permanence rule. Areeda & Turner, *supra* note 3, at 708-09. They concluded that they could find "no satisfactory method of control." *Id.* at 707. While the quasi-permanence rule was "perhaps the most feasible," *id.* at 708, Areeda-Turner later indicated that they "were inclined to reject it." Letter from Professor Donald F. Turner to Professor William J. Baumol, Sept. 28, 1978 (on file *Yale Law Journal*). Among their reasons were the following: (1) the difficulty of adapting the rule to changing market conditions—such as rising costs and shifting demand—a subject to which I will return in the next section; (2) the possibility that the rule might "have adverse effects on the established firm's incentive to reduce price in response to entry"; and (3) the certainty that the rule would "put the courts into a 'quasi' price regulatory role—which they have regularly shunned and for good reasons." *Id.*

Clearly, Areeda and Turner are right in arguing that the rule will inhibit price cutting to some degree. But the object of the quasi-permanence rule, like that of the Areeda-Turner rule, is precisely to inhibit price cutting that is legally and economically unacceptable. The quasi-permanence rule does so by encouraging firms to cut prices only when they believe they can live with the consequences, even after the entrant has departed. A price cut that the incumbent cannot afford to retain is neither "honestly industrial" nor likely to improve resource allocation. Finally, I agree that examining price adjustments to ensure that they are justified by changing costs or shifting demands involves the courts in a quasi-regulatory role. However, this chore is no more demanding than is the task assigned the courts by Areeda-Turner. In a multiproduct firm, comparison of price with marginal cost or average variable cost is a matter of technical economics that has long been a major preoccupation of our regulatory agencies. I also argue that the proposed criterion involves calculations less exacting than it may appear to require. *See* p. 7 *infra*. But any sensible criterion for determining predatory conduct inevitably involves difficult considerations that the courts or the regulatory agencies can avoid only by refusing to address the issue.

mands pose no insuperable problem for the administration of the proposed program. Of course, the established firm that has instituted a price cut of fifty percent should be permitted to adjust that price upward when, for example, there is a five percent rise in fuel prices. But the firm should only be permitted a rise that brings in additional revenue sufficient to cover the rise in fuel cost, starting from its new, low price. Such an independent rise in costs does not justify or necessitate the elimination of all restraints upon price increases by the established firm. It should still be held to the stipulated arrangement: its underlying price cut is permanent, with adjustments permitted only when the firm can demonstrate they are required by autonomous changes such as subsequent inflation.[19]

At first blush this would seem to put the courts in the position of regulatory agencies, requiring them to undertake delicate calculations comparing price and cost increases in order to evaluate the appropriateness of the former in light of the magnitude of the latter. This appearance is deceptive, however, because courts need not determine what precise price increase is called for by a particular rise in costs. All that is necessary is to verify that the two are similar in order of magnitude so that there are no grounds for believing that the firm has used a five percent rise in costs as an excuse for rescinding a fifty percent price cut. That is, under a quasi-permanence rule, the incumbent firm should be expected to provide convincing evidence that any price rise that takes place after the withdrawal of an entrant was of the same order of magnitude as the cost change that led to the increase. Price changes attributable to other exogenous changes such as shifts in demand should also be required to be supported by evidence that they are appropriate in general magnitude. However, they need not be tested on the basis of any knife's-edge criterion of ideal pricing that would require precise evaluations of demand elasticities, marginal costs, or other economic variables, the magnitudes of which would be difficult to estimate.

The case of miscalculation by the established firm is another matter. In the free market it is always the stockholders who bear the penalties of miscalculations by management. This is appropriate because otherwise the firm would have little incentive to take into account the risks of its decisions. The proposed rule should con-

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19. Under the proposed arrangement the firm would still be free to change its prices in response to any changes in the pertinent economic variables with the exception of the specified changes in the state of competition in the market. The point is that the burden will be on the firm to show that any price change was a response to a pertinent economic development other than the exit of a competitor.

stitute no exception to this principle. If management makes an ill-advised price cut on the basis of erroneous cost estimates, stockholders should bear the resulting losses.[20] Otherwise it would be too tempting to undercut entrants on the basis of calculated "miscalculations."

Of course it will be difficult politically and practically to hold the established firm permanently to price levels that subject it to a continuing financial drain. Therefore, it may be impractical to require the price cut to be literally permanent, even in the absence of autonomous changes in costs or market demands. That is why the policy is termed "quasi-permanent" pricing; a specified, finite period, perhaps on the order of five years, will no doubt suffice to achieve its goals. The choice of time period is, of course, a matter to be worked out in light of experience and considerations of practicality.[21]

A regulated firm is most easily subjected to a policy of quasi-permanence of any reductions in prices it undertakes in response to entry. Since its rate revisions are always subject to regulatory approval, a price cut made in the presence of recent entry or the threat of entry can be approved only on the condition that upward revisions be precluded for a stipulated and substantial period, except as required by demonstrable autonomous changes. Thus the proposal is entirely consistent with continued regulation of certain industries and should not be interpreted as a substitute for it.

The proposed rule can also be applied to an industry that is not subject to rate regulation. Areeda and Turner have proposed that prices below marginal or average variable costs should constitute evi-

20. A possible exception is a firm subject to rate-of-return regulation whose profit ceiling prevents stockholders from obtaining any gains from a felicitous managerial decision. Here symmetry, as a condition of fairness, may call for stockholders to be protected from managerial miscalculations as a counterpoise to the arrangement that prevents them from benefiting from a particularly fortunate managerial act.

21. In the final analysis, the choice of any particular period will be arbitrary to some degree. However, this is true of other proposals as well. *See, e.g.,* Williamson, *supra* note 5, at 296 (the output-restriction rule should be imposed for a "period from twelve to eighteen months [because that is ordinarily] sufficient to allow the entrant to realize cost economies and establish a market identity"). The period must be sufficiently long to bear significant weight in the pricing calculations of the incumbent firm and to offer significant benefits to its customers, but it must not be so long as to threaten to strangle that firm because of actions that have become ancient history. While in theory it may be desirable to vary the period from case to case depending on the circumstances of the individual firms involved, in practice this should be avoided. One of the great benefits of the Areeda-Turner rule is an injection of a clear and uniform standard into an arena previously characterized by vagueness and uncertainty. The economic costs of indecision by those who cannot judge whether a contemplated act will run afoul of the law are high. Adoption of a clear and uniform standard is desirable wherever that is possible without intolerable consequences.

dence of illegal behavior under the antitrust laws.[22] Williamson has proposed the same for increases in excess of trend in an established firm's output following entry of new firms into the industry.[23] Surely, a similar arrangement can apply to the proposal that a price cut following entry or the threat of entry not be withdrawable.[24] Should a firm being sued under the antitrust laws be accused of violating this principle, the burden would be on that firm to provide convincing evidence that the price increases being challenged were justified by cost increases or by other autonomous developments.[25]

C. *On the Role of Supplementary Cost Tests*

It is necessary to consider whether a policy of quasi-permanence of price reductions requires supplementation by a set of cost criteria designed to ensure that prices never be set unacceptably low and, if so, just what cost test is appropriate. Even Williamson, whose basic antipredation rule is a maximum-output restriction that does not mention price directly, feels it appropriate nevertheless to supplement this rule with a cost test.[26] A case can be made for the proposition that no such cost test is really needed under a policy of quasi-permanent price reductions by arguing that the principle can be left to take care of the problem automatically. The reasoning is simply that a noncompensatory price will be very costly to the firm

22. *See* Areeda & Turner, *supra* note 3, at 712-13, 716-18.

23. Though an oversimplification of Williamson's position, this characterization is sufficient for our discussion. *See* Williamson, *supra* note 5, at 297-99.

24. This clearly means also that the firm should not withdraw the low-priced product from the market after the rival exits. I do not suggest, of course, that the quasi-permanence principle should be applied retrospectively to acts undertaken before the proposal was offered.

25. This shifting of the burden of proof is common in antitrust litigation. For example, under the Robinson-Patman Act, 15 U.S.C. §§ 13-13b, 21a (1976), three affirmative defenses are available to rebut a prima facie case of price discrimination: meeting competition, cost justification, and changing market conditions. *See* F. ROWE, PRICE DISCRIMINATION UNDER THE ROBINSON-PATMAN ACT 207-329 (1962).

26. Williamson's use of the term "average total cost," *see* Williamson, *supra* note 5, at 321-22, 332, injects some ambiguity into his proposal. By average total cost, he surely does not mean fully allocated cost, which is a mare's nest of arbitrary calculations parading as substantive information. In reality, the single-product firm is probably nonexistent, and it is normally impossible to define, much less to measure, the average cost of any output of a multiproduct firm because of the difficulty of subdividing nonincremental common costs. Williamson, of course, is well aware of all this. Consequently, I assume that when he requires the price of a good in the long-run to exceed its "average total cost," he defines the latter to mean the average incremental cost of the product including any fixed cost outlays required to provide the item. That is, the average incremental cost of product X is defined as total company cost minus what the total cost of the company would be in the absence of production of X, all divided by the quantity of X being produced. Total costs refer to those that would prevail in the long-run with the output combinations specified.

if it cannot be rescinded after it has served to deter entrants; there-
fore, quasi-permanence of price reductions attaches to the setting of
a price below cost an automatic penalty sufficient to make the es-
tablished firm voluntarily avoid predatory pricing.

This argument, however, may leave some observers uncomfortable:
they may well believe that the management of a very profitable firm
may prefer, even for long periods, to use some of the profits con-
tributed by other outputs as a source to subsidize socially unacceptable
low prices of products threatened by entry. Some analysts maintain
that some managements prefer the quiet life sufficiently to sacrifice
a substantial amount of profit in order to protect themselves from
the competition of entrants. Whether or not this is likely to happen
in practice is a matter for empirical investigation. But whatever the
outcome of such a study, it may be prudent to have available, as it
were, a stand-by cost test to determine whether a particular price
has been set so low as to require the product to draw cross sub-
sidies from other outputs of the same supplier. Thus, policymakers
may want to supplement a policy of quasi-permanence of price re-
ductions with a test like the Areeda-Turner test to determine whether
a particular price involves cross subsidy. This would avoid injustice
both to the entrant and to the purchasers of those products of the
established firm that are the potential source of cross subsidy.

II.   Economic Efficiency, Stationary Limit Pricing, and
Quasi-Permanence of Price Reductions

Different proposals addressed to the problem of predatory pricing
have been evaluated on the basis of their ability to promote allo-
cative efficiency. Areeda-Turner, using the tools of economic analysis,
conclude that their pricing rule will have desirable efficiency con-
sequences.[27] Williamson counters by arguing that his output-restriction
rule will perform still better.[28] But neither Williamson nor Areeda-
Turner are able to claim that their proposal is consistent with the
requirements of allocative efficiency.

In contrast, a quasi-permanence pricing policy is similar to a policy
—known as stationary limit pricing—that can be shown to pass at
least the theoretical tests of allocative efficiency. Stationary limit pric-
ing refers to a policy under which the established firm adopts a single

27. *See* Areeda & Turner, *supra* note 3, at 709-12; Areeda & Turner, *Williamson on
Predatory Pricing*, 87 YALE L.J. 1337, 1338-45 (1978).
28. *See* Williamson, *supra* note 5, at 306-12.

set of prices designed to protect it to the extent possible from the incursions of entrants and leaves those prices unchanged (or changes them only because of exogenous developments such as rises in input prices). Such a policy is distinguished from responsive limit pricing, under which the established firm seeks to frustrate entry by continually readjusting its prices to meet each move of an entrant.

Although quasi-permanent pricing is not identical with stationary limit pricing, it is sufficiently similar that it approximates the optimality properties enjoyed by stationary limit pricing. However, demonstration of the efficiency benefits of such a pricing scheme rests upon a body of economic analysis that is quite new and unfamiliar in its approach. For this reason, and because this literature is potentially useful for antitrust analysis, I digress at this point to provide a relatively nontechnical summary of some of its results.[29] Using this material, I will be able to demonstrate the desirable properties of stationary limit pricing and quasi-permanent pricing.[30]

A. *Weak Invisible Hand Theorems*

1. *Criteria of Natural Monopoly*

Generally, an industry is said to be a natural monopoly if production by a single firm is the cheapest way to produce the combination of outputs supplied by the industry. One of the conclusions of the new analysis is that if an industry is *not* a natural monopoly, that is, if several firms can produce its output at least as cheaply as one, then a policy of stationary limit pricing will be impossible for an incumbent monopolist. Thus, no fixed prices will exist that can be adopted by the monopolist's firm that can cover its costs and yet prevent the entry of competitors.

Because the concept of natural monopoly is at the heart of the issue, our discussion must begin with an examination of some of the properties of a natural monopoly. The notion of natural monopoly al-

29. Section IIA provides a relatively theoretical analysis of the efficiency properties of the quasi-permanence principle and can be omitted by the reader uninterested in economic theory. However, the theory is pertinent to a number of issues in antitrust law.

30. The discussion is formulated in terms of pricing by a monopoly firm; however, most of the conclusions also apply to oligopolies. Since most issues of predatory pricing arise in oligopolistic rather than competitive industries, the extension of the analysis to the oligopoly case is a pressing matter. Unfortunately, as is well known, the oligopoly case has not proved nearly as amenable to analysis as that of pure monopoly. It is, therefore, perhaps a bit of luck that the following propositions can, in general, be shown to be valid for the oligopoly case. The exceptions are Propositions I and II, which clearly refer only to monopolies.

ways has been associated loosely with the phenomenon of economies of scale, which exist when an x percent expansion in all input quantities (an expansion to scale) is capable of yielding an expansion in output that is greater than x percent. However, one of the basic theorems of the new analysis of natural monopoly is that the presence of scale economies is neither necessary nor sufficient for an industry to be a natural monopoly.

To show what conditions are directly relevant, we must turn to the definition of the concept itself. As we have already noted, an industry is said to be a natural monopoly at some given level of its output if that output combination can be produced more cheaply by a single firm than it can be by any multiplicity of different firms. When this is true, the cost relationship is said to be *subadditive,* meaning that the cost of total output (if all produced together by one firm) is less than the sum of the costs of producing it in any separate portions by different firms.

Thus, if an industry is a natural monopoly, then more resources will be required to produce its output if it is broken up into smaller firms. It is to be noted that this way of looking at natural monopoly comes closer to a commonsense view of the matter than does the notion of economies of scale. Subadditivity is, in itself, not a very complex or sophisticated notion, though its analysis is relatively complicated.

The following theorem[31] establishes what observable conditions are sufficient to prove that an industry is a natural monopoly, that is, that its cost structure is subadditive:

Proposition I:

> *Two pieces of evidence are* together *sufficient to prove that an industry is a natural monopoly as defined:*
> *i)* average costs decline *when all outputs increase by any given percentage (e.g., if a five percent increase in* all *the firm's outputs causes only a four percent increase in its total costs),*[32] *and ii)* the production of the different outputs supplied by the firm is

31. For a formal statement and proof, see Baumol, *The Proper Cost Tests for Natural Monopoly in a Multiproduct Industry*, 67 AM. ECON. REV. 809 (1977).

32. Note that economists agree that one cannot define the behavior of average costs generally in a multiproduct firm, because average cost is defined as total cost divided by total output; in a multiproduct firm, output can be totaled only by adding apples and oranges. However, in the special case where one is interested in what happens when all outputs increase or decrease by precisely the same percentage, there is no such problem because the quantity of any one of the products can then serve as a perfect index of the quantities of all other goods.

complementary *(that is, if the firm produces two items A and B, the cost of producing A and B together is less than that of producing them separately).*[33]

The first of these requirements corresponds roughly to economies of scale, though it is not quite as tough a requirement: a firm that does not have scale economies may, nevertheless, have average costs that decline when all outputs are increased by the same percentage. The second requirement is related to what have been termed "economies of scope,"[34] economies imparted not by the size of output of any one product of the firm but by the sheer number of different items it produces simultaneously. The role of these concepts is clarified by considering, in turn, the consequences of violation of our two conditions.[35] First, consider what is implied by violation of re-

33. More technically, the cost of producing, for example, 50 units of A together with 50 units of B is less than the average of the cost of producing 100 units of A all by itself or the cost of producing 100 units of B all by itself.

The two conditions just stated are not equivalent to subadditivity, however. Although the satisfaction of these two conditions implies subadditivity and hence natural monopoly, the converse is not true; subadditivity is a weaker concept. These two conditions are essential, however, for several crucial results that will be described below. *See* p. 22 *infra.*

34. *See* Panzar & Willig, Economies of Scale and Economies of Scope in Multi-Output Production (1975) (Bell Laboratories working paper).

35. Several graphs may make clearer the substance of Proposition I. Figure 1 simply shows the range of outputs of two products of an industry, call them cars and trucks.
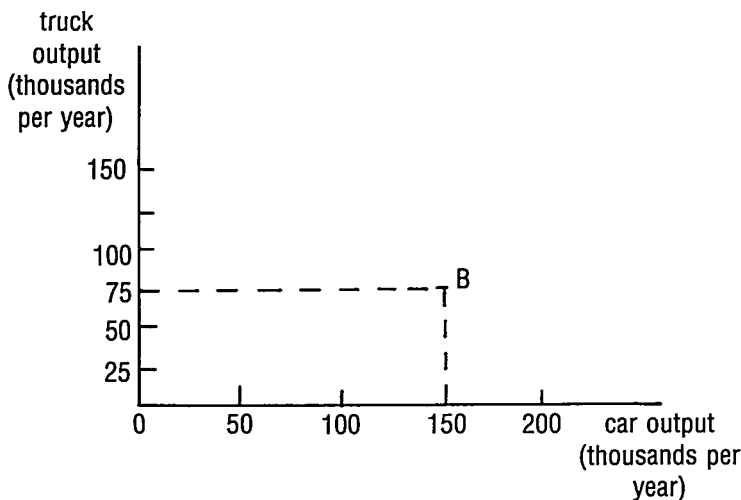

Figure 1
A Point in Output Space

quirement (i): suppose average costs were not to decrease when output expanded proportionately. This would mean that two firms each producing half the outputs of a monopoly firm would have unit

For example, point B in the figure indicates that the industry is producing an output of 150,000 cars and 75,000 trucks per year. Figure 2 is a three-dimensional diagram in
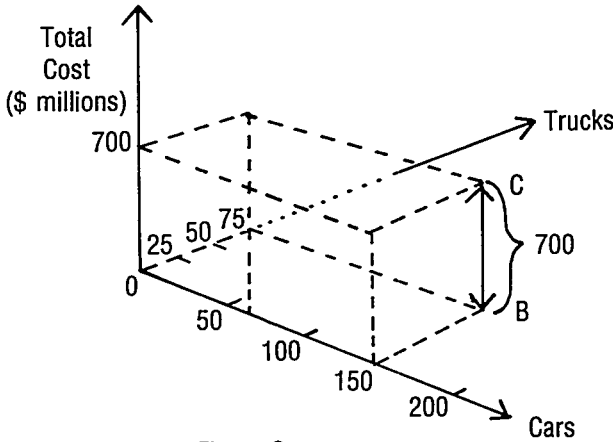

Figure 2
A Point on the Cost Surface

which a third axis has beeen added to the two axes in Figure 1. The third axis indicates how many dollars are required to produce any combination of cars and trucks depicted in Figure 1. For example, point B in Figure 2 represents again the production of 150 cars and 75 trucks (the thousands henceforth will be omitted). Then the length of the vertical line BC above point B will indicate the cost of producing output combination B, in this case $700 million per year. If such a total cost figure is determined for every output combination in the graph, the locus of all those points will constitute what is called a cost surface. See note 37 infra (Figure 9).

Next, observe what happens when all outputs are increased or decreased proportionately. In Figure 3, point A represents a 33⅓% increase in both outputs over point
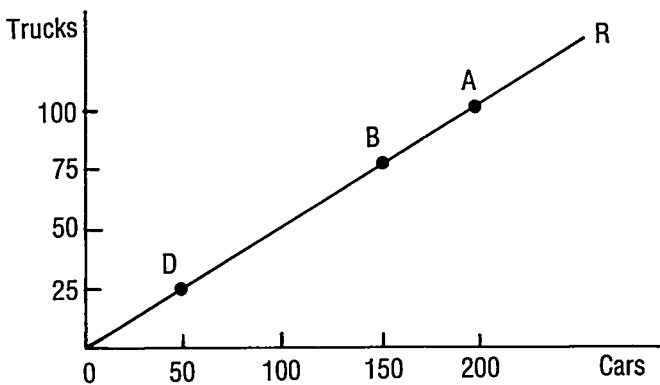

Figure 3
The Floor of the Cost Diagram:
Expansion to Scale

costs no higher than the monopolist's. Therefore, society would lose nothing (in terms of costs) by breaking the monopoly into a set of smaller firms, each with a minireplica of the monopolist's product line.[36] Next, consider the implication of violation of requirement (ii): suppose the firm's outputs were not complementary in production, so that it was as cheap (or cheaper) to produce them in isolation as to make them together. Then, society would lose nothing if the (multiproduct) monopoly were to be broken up into a set of more spe-

B (200 rather than 150 cars and 100 rather than 75 trucks). Similarly, it is obvious that point D represents a 66⅔% reduction in both outputs. All three points lie along the same straight line through the origin, OR. A straight line through the origin is called a ray, and one can prove that any equal percentage expansion or contraction of every output must involve a movement along a single ray. (Proof: if $y =$ number of trucks and $x =$ number of cars, then always expanding or contracting y and x by the same percentage means that y and x must satisfy $y/x = $ k (constant) or $y = $ kx. That is the standard equation of a straight line through the origin.) We now can examine in the next two footnotes the two sufficient conditions for natural monopoly that are given in Proposition I.

36. We first examine *Condition (i)* of Proposition I. *Condition (i)*: Average costs must decline when all outputs increase by the same percentage. We have just seen that an equal percentage increase in both outputs is represented by a movement along a ray in Figures 1 and 3. We now will see in a three-dimensional diagram analogous to Figure 3 what happens to costs as a result of such a change. Figures 4 and 5 both show shaded cross
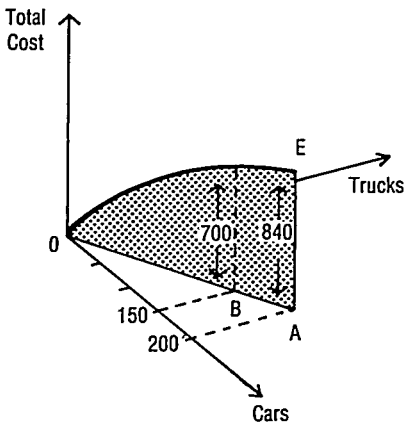

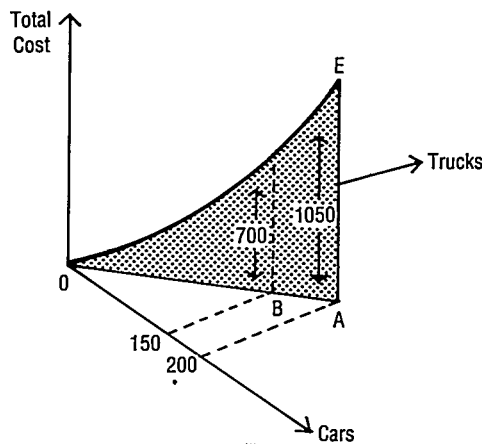Figure 4: Passing test (i)   Figure 5: Failing test (i)

sections OAE of the area under the cost surface; Figure 4 satisfies condition (i) while Figure 5 violates it. How do we know this? First, note that our cross sections are taken above a ray because we are investigating the cost effects of equal percentage changes in all outputs. In Figure 4 we see, for example, that when we move from B to A, so that a 33⅓% increase occurs in both outputs, total cost rises by only 20%, from $700 to $840. Clearly, average cost must be declining. On the other hand, in Figure 5, the same percentage increase in outputs from B to A raises total cost by 50% from $700 to $1,050. Thus, average cost must be rising, as all outputs increase by the same percentage; condition (i) of Proposition I is violated.

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cialized firms.[37] Therefore, only if both conditions (i) and (ii) can be proved to be valid for a particular industry can we be sure that the industry is a natural monopoly:

37. Next we examine *Condition (ii)*: Figures 6 and 7 show corresponding situations
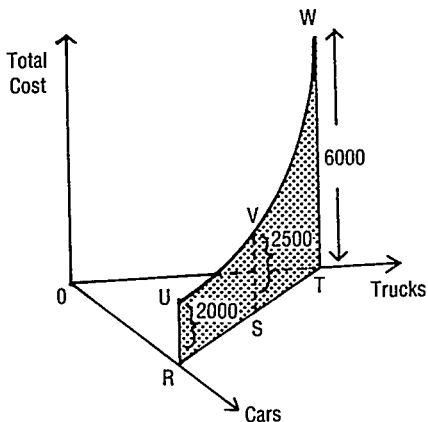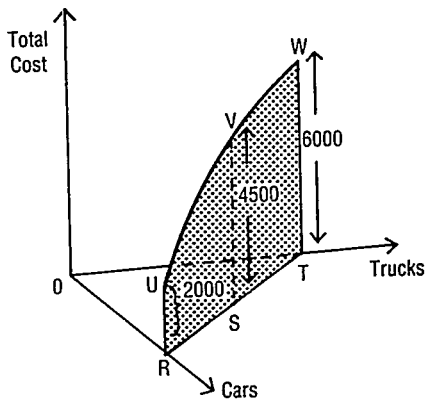

Figure 6: Passing test (ii)   Figure 7: Failing test (ii)

for condition (ii) of Proposition I: economies of scope. Here, we take cross sections more or less perpendicular to those in Figures 4 and 5, because we are now comparing the costs of specialized production (cars alone or trucks alone) with the cost of multi-good production (non-zero output of both cars and trucks). In Figure 8, point R on the car axis represents production of automobiles alone (point R represents the production of
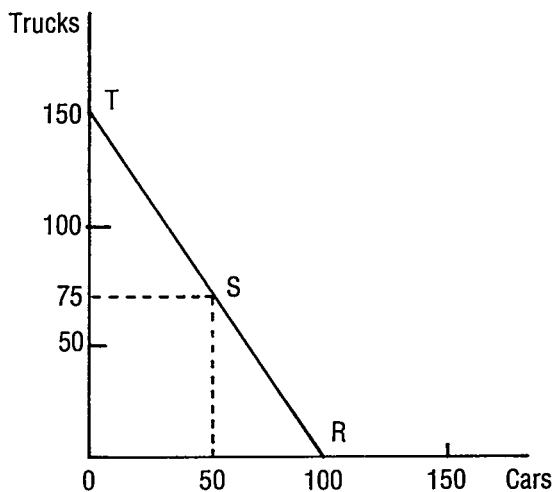

Figure 8:
The Floor of the Cost Surface:
Specialized and Nonspecialized Production

There is a second important feature of tests to determine whether an industry is a natural monopoly:

Proposition II:

> *To prove that an industry is a natural monopoly it is not sufficient to provide evidence that the two requirements of Proposition I are satisfied at the current output levels of the industry or the largest firms. These two requirements must be satisfied also at all smaller output levels.*

100 cars and zero trucks). For the same reason, point T on the truck axis represents specialized production of trucks alone. On the other hand, an interior point (a point not on either axis), such as S, represents non-zero production of both items. For example, midpoint S on the line connecting R and T represents the production of 50 cars and 75 trucks—exactly half as many cars as at R plus half as many trucks as at T. Returning to Figure 6, we see now why we have drawn a cross section above the line RST from Figure 8. We see that the production of 150 trucks by itself costs $6,000 (point W) (000's omitted). The production of 100 cars costs $2,000 (point U), but the production of the combination 50 cars and 75 trucks costs $2,500 (point V), which is less than the $4,000 average of the two types of specialized production. Thus, in Figure 6, multi-good production is relatively inexpensive, as is required for economies of scope (Condition (ii) of Proposition I). By contrast, in Figure 7, where the costs of specialized production are the same as in Figure 6, multi-good production at point S costs $4,500, which is more than the $4,000 average of the two specialized output costs. Thus, a cost relationship like that in Figure 7 fails Condition (ii). The shapes shown in Figures 5 and 7 are typical of cost relationships that fail the natural monopoly test, while the shapes shown in Figures 4 and 6 are typical of those that pass it. Finally, in Figure 9, both characteristics are combined to show the shape of the entire cost surface typical of an industry that can be classified as a natural monopoly.
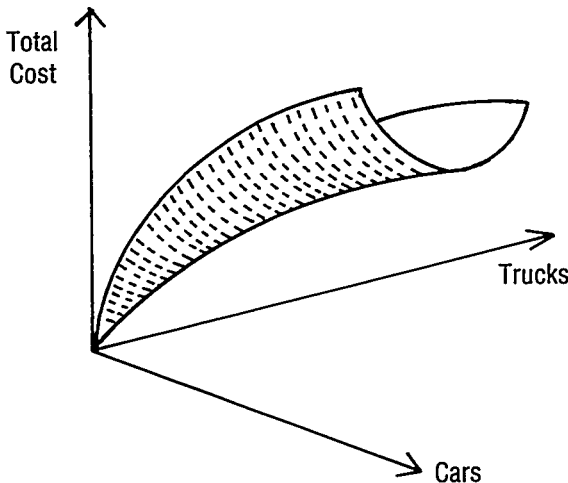

Figure 9
A Cost Surface Satisfying
Proposition I

To determine whether an industry is a natural monopoly, by the definition, one must examine whether it is cheaper to have production carried out by one large firm or by several medium-sized ones or, perhaps, even by many, very small ones. To decide this one must know not only about the cost of operation of the large firm, but also about the operating costs of a medium-sized and of a small firm.[38]

2. *Pricing and Entry in a Natural Monopoly*

The propositions described above permit us to examine the issues of pricing and entry that are our primary concern. We begin with a fundamental definition:

> *A set of prices of a monopoly firm is said to be* sustainable *against entry if at those prices the monopoly earns enough to cover its cost of capital, but no other firm can enter the industry offering to supply any or all of the monopolist's products and earn enough to cover its costs.*

Thus, to be deemed sustainable, a set of prices must be profitable for the monopolist and unprofitable for any possible entrant. If a monopolist's prices are sustainable, he need not change them when entry is attempted; he can sit back and await the entrant's financial failure. Hence, a set of sustainable prices may also be described as *stationary limit prices*, that is, prices that can prevent entry without changing in response to an attempted entrant's moves.

However, it is possible that the monopoly firm will not be so lucky as to have available the option of a set of sustainable prices. The preceding discussion of natural monopoly can be related to the availability of a sustainable pricing option as follows:

Proposition III:

> *No sustainable prices are possible for any monopoly that does not meet the cost conditions for natural monopoly, or for any other*

38. It may thus be necessary to estimate the behavior of costs at scales of operation outside the range of currently available experience. For instance, suppose an industry is initially operated as a monopoly; all the available cost data will apply then to only the large outputs of the monopoly firm. There will be no direct statistical evidence about the cost of operation of a small firm in that industry since no small firm may have operated in it recently enough to provide usable information about current costs. In such a case there are indirect ways of providing the required evidence about the costs of smaller firms. Thus, although the requirements of Proposition II, in general, are not impossible to fulfill, they are demanding requirements. The point of Proposition II is that it is insufficient for proof that a monopoly is natural to analyze merely the cost experience of the large firm, even if no other cost information is directly available.

set of firms that does not constitute the cheapest form of organization for the production of the industry's output.[39]

If the monopoly cannot justify its existence on the grounds that it offers costs lower than any combination of smaller firms, it cannot use a set of sustainable prices to protect itself from entry. For public policy, this amounts to the conclusion that if such a monopoly is precluded by law from responding through price changes to the actions of entrants, then the monopoly is doomed in the long run. It will be vulnerable to successful entry if deprived of the weapon of responsive price moves. For if the firm is not a natural monopoly, it follows by definition that a combination of entrants can produce among them the (former) monopolist's output more cheaply than that monopolist can. At any prices that bring the monopolist enough revenues to cover his higher costs, entrants can undercut him and still cover their lower costs.

Unfortunately, the converse of Proposition III is not true. Although sustainable prices will never be available to the "undeserving monopolist," they may also be unavailable to some "deserving" (i.e., natural) monopolists. That is:

Proposition IV:

A firm may have a cost structure that satisfies the requirements for natural monopoly but precludes the possibility of any prices sustainable against entry.[40]

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39. Formal proof for the monopoly case is provided in Baumol, Bailey, & Willig, *Weak Invisible Hand Theorems on the Sustainability of Prices in a Multiproduct Monopoly*, 67 AM. ECON. REV. 350 (1977). The corresponding theorem for the oligopoly case or for the case where the industry is composed of a larger number of firms is proved in just the same way as that for the monopoly.

40. Faulhaber, *Cross-Subsidization: Pricing in Public Enterprise*, 65 AM. ECON. REV. 966 (1975). This result is easily proved. To prove a theorem of this form, one needs only a single example of the type claimed to exist. The following illustration is very similar to that originally discovered by Faulhaber. Consider three nearby communities, all of which want fixed and equal amounts of electricity. Suppose it will cost $120,000 per month to serve any one of them by itself out of its own generating station, $190,000 to serve any pair of them out of a single plant, and $300,000 for a single plant to serve all three communities simultaneously. This is a natural monopoly, because if the three communities were each served by separate firms, the total cost would be 3 times $120,000 = $360,000, while if any two of them were served by one firm and the third community were served by another, the total cost would be $190,000 + $120,000 = $310,000. Thus, the total cost of any other arrangement would be more than the $300,000 cost of service by a single monopoly firm. Therefore, the costs are subadditive, and the industry is a natural monopoly.

All that remains to be shown is that no prices sustainable against entry are available to this natural monopolist. This argument is also straightforward. With a total cost of $300,000 (including return on capital) for the three communities, suppose the monopolist

While the possibility of a natural monopoly with no sustainable prices available to it is important for analytic purposes, for a very significant class of cases such sustainable prices do always exist. But before proceeding toward this discussion, it is important to examine one other characteristic of sustainable pricing:

Proposition V:

> *If a monopolist (or any other firm) charges for any of its products a price less than the marginal cost of that product, then the firm's prices will not be sustainable against entry.*[41]

The importance of this theorem for policy is that if a monopolist is prohibited by law or regulation from changing prices in response to the threat of entry or to the behavior of entrants, then in seeking stationary limit prices he will consider only prices satisfying the Areeda-Turner criterion. In other words, a policy requiring quasi-permanence of price reductions incidentally will promote behavior that does not violate the Areeda-Turner rule.

On an intuitive level, if a firm were to sell product x at a price below marginal cost, an entrant could, by selling less of product x than the incumbent does, actually earn *more* money than the incumbent earns from this product. For if the marginal cost of the product is, say, \$6, while its price is \$4, for every unit that the entrant's sale of this product falls short of the incumbent's, his net profit will come out \$2 ahead of the incumbent's. Thus, the incumbent must be prepared to change its prices if it is not to lose its market to the entrant; the initial prices cannot be sustainable.

3. *Digression on Ramsey Pricing*

Before explaining the main theorems, it is necessary to digress briefly and explain the nature and meaning of what are known as

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proposes to be impartial and charge \$100,000 to each. In that case an entrant can propose to serve two of the communities, call them A and B, at a price of, say, \$97,000 each, and undercut the monopolist's price, while earning \$194,000, which more than covers his \$190,000 cost. Can the monopolist defend himself by lowering his price to one or both of these communities? Suppose he offered community A a bargain price of \$94,000. Then to cover his remaining costs he would have to charge communities B and C together a total of \$300,000 — \$94,000 = \$206,000. Then, the entrant could undercut him by offering B and C prices of \$97,000 each, rather than making the offer to A and B. The lower the monopolist's price to any one community, the more he must charge the other two in order to cover his costs and the more vulnerable he becomes to inroads by the entrant. Thus, there is no set of fixed prices that will protect this natural monopoly; we have proved Proposition IV by example.

41. For the proof, see Panzar & Willig, *supra* note 34, at 8-9.

Ramsey prices. Efficiency in the allocation of resources requires the price of each product in the economy to be set equal to its marginal cost. Only then will the marginal cost of a purchase to a consumer —its price—be equal to its true marginal cost to society in terms of the value of the inputs needed to produce the item. Thus, when prices are set equal to marginal costs, consumers' decisions designed to allocate their money as effectively as possible among alternative purchases will automatically allocate the community's resources as efficiently as possible.

The point may be brought out more clearly if we consider a case where prices are not equal to marginal costs. Suppose goods A and B yield equal consumer satisfaction, but A has a marginal cost of $5, while B has a marginal cost of $7 (that is, the production of B requires more valuable inputs). If A is priced, nevertheless, at $10, while B is priced at $9, consumers will buy B in preference to A, thus using more resources than necessary to achieve a given degree of satisfaction. It can be proved, more generally, that any departure of price from marginal cost gives the wrong cost signals to consumers, and thus leads to inefficiency in the sense of yielding less than the maximum total benefit to consumers from the quantities of inputs used.[42]

However, economists also recognize that the ideal of universal marginal cost pricing is chimerical; it cannot be achieved because pricing at marginal cost will not produce revenues equal to total production costs. In particular, where there are diseconomies of scale, marginal cost pricing will yield revenues that exceed total costs. In contrast, where economies of scale exist, setting price equal to marginal cost will not permit producers to break even, as marginal cost will be below average cost.

The question in these circumstances, then, is not whether price should be set equal to marginal cost; in general that will not be possible. Rather, the question is: What is the optimal deviation of prices from marginal costs? What prices will yield the most efficient allocation of resources, subject to the constraint that total revenues under the selected prices be sufficient to cover total costs? The solution, known as Ramsey pricing,[43] is more easily described by considering the simpler case in which cross elasticities of demand are

42. *See* Hotelling, *The General Welfare in Relation to Problems of Taxation and of Railway and Utility Rates*, 6 ECONOMETRICA 242 (1938).

43. The first to solve the problem was Frank Ramsey, a young Cambridge philosopher who produced his result in 1927. *See* Ramsey, *A Contribution to the Theory of Taxation*, 37 ECON. J. 47 (1927).

zero, that is, in which the price of one product does not affect the demand for another. In that case, it turns out that optimal pricing requires the percentage deviation of the price of a product from its marginal cost to be inversely proportionate to its own elasticity of demand. In other words, if the demand for product x is reduced severely by a given rise in price (the demand for product x is highly elastic), then the optimal price of that product will be very close to its marginal cost; the reverse will be true for another product whose demand is quite inelastic.

More explicitly, if Px, MCx, and Ex represent the price, marginal cost, and elasticity of demand, respectively, for product x, then we may define

% Deviation of Px from MCx = 100 $(P - MCx)/Px$.

Using this definition, then we have:

Proposition VI:

Optimal Ramsey prices Px and Py for any two products x and y with zero cross elasticities must satisfy

$$\frac{\% \ Deviation \ of \ Px \ from \ MCx}{\% \ Deviation \ of \ Py \ from \ MCy} = \frac{Ey}{Ex}$$

This result can be understood intuitively. If the result of marginal cost pricing is unattainable, the deviations in prices necessary to permit producers to cover their costs should be selected in a way that causes minimal distortion of demands. Thus, if prices have to be raised above marginal costs to sustain producers financially, then these prices should be raised most for products whose demand is least affected by a given price rise, that is, the products with the least elastic demand. That is precisely what the Ramsey rule of optimal pricing requires.

4. Basic Theorems on Prices Sustainable Against Entry

We come, finally, to the two basic theorems describing the character of prices that are sustainable against entry. The main theorem is:

Proposition VII:

If a firm is a natural monopoly, satisfying the two sufficient conditions for natural monopoly given in Proposition I, then if it selects as the price for each of its products the Ramsey price for that item, those Ramsey prices will be sustainable against entry.[44]

44. There are some minor additional stipulations that may be regarded as technicalities. This theorem, then, characterizes a broad class of cases in which a natural monopoly

This proposition states, in effect, that the monopoly firm can guarantee itself the fair rate of return and also remain invulnerable to entry by selecting the socially optimal prices satisfying the Ramsey conditions given in Proposition VI. That is, even the monopoly firm whose response to entry is constrained by a quasi-permanent pricing rule can protect itself against entry by instituting the Ramsey optimal prices. Thus, by serving the interests of society, the monopoly firm also serves its own, just as Adam Smith maintained to be true in the absence of monopoly.[45] Thus Proposition VII can be described as an invisible hand theorem for monopoly.[46]

However, Proposition VII is a *weak* invisible hand theorem because, usually, the Ramsey optimal prices will not be the only prices that offer the monopolist the reward of protection against entry. That is, there will generally be other prices that yield the fair rate of return, are sustainable against entry, and yet violate the Ramsey requirements of Proposition VI. These non-Ramsey prices will fail to achieve the maximum consumer benefit from the resources used by the economy, but will offer the monopolist the reward of protection from entry. Although we cannot be sure that the monopolist will pick the socially beneficial Ramsey prices rather than these less-efficient alternatives, two factors render Ramsey prices likely. First, in some cases there will be no sustainable prices other than the Ramsey prices; second, it will be difficult in most cases for the monopolist to determine whether or not sustainable non-Ramsey prices are available to him. Thus, we have the following result:

Proposition VIII:

> *To determine whether a set of prices other than the Ramsey prices is sustainable, it is not sufficient just to examine costs and consumer price responses at current output levels of the firm. One must also investigate what costs and demand responses would be if output levels were considerably smaller.*

The similarity between the phrasing of Propositions II and VIII is worth noting. In each case a difficult statistical task is required: making empirical calculations about material outside the range of

does have sustainable prices available to it, i.e., to which the Faulhaber exception of Proposition IV, *see* p. 19 *supra*, does not apply. Proposition I's two sufficient conditions for natural monopoly play the key role in characterizing the cases in which one can be sure sustainable prices exist.

45. A. SMITH, THE WEALTH OF NATIONS 423 (Mod. Lib. Ed. 1937).

46. A similar result apparently can be formulated for a set of oligopoly firms that adopt Ramsey prices for their outputs and that constitute the cost-minimizing market form for the production of the industry's output. However, no rigorous proof of this extension has yet been constructed.

the available statistics derived from recent experience for the firm
or the industry. Proposition II, however, deals with what is essentially
a once-and-for-all test to determine whether an industry is really a
natural monopoly; Proposition VIII requires calculations that must
be carried out every time changing costs or market conditions call
for a reexamination by the firm of its prices. And the proposition
tells us that these difficult calculations are required to obtain a set
of sustainable non-Ramsey prices that will yield, after all, profits no
higher than those offered by the Ramsey prices.

The proof of the two weak invisible hand theorems, Propositions
VII and VIII, is too technical to describe here.[47] Suffice it to say that
the proofs are far more rigorous and definitive than the graphic ar-
guments that are employed by Areeda-Turner and Williamson to
support the more modest efficiency claims they make for the policies
they propose. But while the mathematical proofs are difficult, their
basic rationale is not. From society's viewpoint, a policy that does
not discourage stationary limit prices is desirable; it permits the es-
tablished firm to protect itself from entry only by making itself so
attractive to consumers in the first place that they will be left with
no motivation to switch to entrants. In the simplest example, if the
established firm offers products of high quality at low prices before
entry takes place, there will be little inducement for entry to occur.
Under stationary pricing, established firms must set their prices in
advance lest they be left vulnerable to entry later on. Thus, they
are forced to offer consumers the price-quality benefits of compe-
tition, even though competition has not yet materialized.

This effect is similar to the pressures besetting a multiproduct firm
whose products initially are not priced in proportion to their rela-
tive incremental costs. When this is so, the established firm invites
"cream-skimming" entry—the entry of competing firms into selected
portions of the industry that are most profitable because prices are
high relative to costs. To eliminate this cream-skimming opportunity
and prevent entry, the firm must realign its prices to correspond
more closely to relative costs. It is precisely such a realignment of
prices to eliminate deviations from relative costs that is necessary to
attain economic efficiency.[48]

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47. *See* Baumol, Bailey, & Willig, *supra* note 39, at 355-63 (proofs of Propositions
VII and VIII). The proofs employ a full, general equilibrium analysis, taking account
of the effects of prices throughout the economy, rather than only those in the industry
immediately concerned, as is done in the partial equilibrium analysis used by Areeda-
Turner and Williamson.

48. This general approach is entirely practical and in fact sometimes has been
adopted. A case in point is the pricing policy undertaken by AT&T for its private line

The logic underlying the virtue of stationary limit pricing is that it forces established firms to give consumers the advantages that true competition provides, because the firms must act in anticipation of competition.

B. Stationary Limit Pricing versus Quasi-Permanence of Price Reductions

The quasi-permanent pricing proposal is not identical to a policy of stationary limit pricing. The latter altogether precludes a case-by-case response to entry while the former permits it only once. Under quasi-permanence, the established firm is not inhibited from reducing its price whenever entry occurs; it is precluded only from rescinding such a price cut, at least for the stipulated period. Thus, quasi-permanence of price reductions may not be quite as effective in serving the public welfare as is stationary limit pricing, since it does not offer consumers the advantages of competition before entry occurs. However, in practice it often will be difficult to require established firms to prepackage their responses to any and all potential entrants; such a requirement is necessary for stationary limit pricing but not for quasi-permanence of price reductions.[49] Thus, quasi-permanence seems to be about as close an approximation to stationary limit pricing as we can expect to achieve through public policy. Moreover, it can be argued that the relative flexibility of the policy of quasi-permanence offers more assurance that entry will have an effect upon prices should it occur—a beneficial effect that might not be realized under stationary limit pricing if the established firm is unable to predict entrants' behavior accurately.

It is, of course, difficult to judge the comparative validity of such impressionistic arguments whose relative force may, in any event, vary from case to case. It is sufficient for our purposes to reempha-

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services as entry by competitors began. AT&T management, in a series of consultations with Alfred E. Kahn and this author, adopted, instead of a case-by-case response, a stationary pricing policy aligning prices to relative costs so as to reduce substantially the opportunities for cream-skimming. The new pricing program was named the Hi-Lo tariff, referring to the adjustment of relative rates to the lower costs of transmission over high-density routes and the higher costs over low-density routes.

49. The Laker example can be used to bring out the difference more explicitly. In this case, stationary limit pricing would require, presumably, that price reductions by Laker's competitors not be initially confined only to the route where Laker is now offering services. Rather, if Laker's extension to other routes is contemplated as a possibility for the future, these firms would extend the reductions to all other routes ultimately vulnerable to entry by Laker or its imitators. Stationary limit pricing implies that if the established firm chooses not to extend its price reduction simultaneously to all of these routes, it cannot later institute it route-by-route wherever and whenever entry becomes an imminent threat.

size the claim of allocative efficiency that can be made for the broad class of pricing policies that encompasses both stationary limit pricing and quasi-permanence of price reductions. Most important, quasi-permanent pricing creates a strong incentive for full and fair competition both by entrants and by established firms, providing neither artificial protection for the former nor room for hit-and-run tactics by the latter.

Conclusion

An attempt to provide a universally acceptable definition for a vague term such as "predatory pricing" probably can contribute little.[50] However, the term does relate to a problem that is real and significant—the design of means to permit full and fair competitive measures by the established firm, without foreclosure of entry. The problem clearly involves intertemporal behavior patterns that cannot be addressed adequately by the comparison of prices and costs at any single moment. A policy of quasi-permanence of price reductions is advocated because it promises to promote effective competition, to minimize interference with the decisions of both the established firm and the entrant, and to make contributions to general public welfare through low prices and economic efficiency.

50. Willig, Ordover, and I have attempted, however, to formulate a working definition that runs along the following lines: Suppose a new entrant establishes himself in an industry. His entry normally will increase the elasticity of the incumbent's demand curve and will call for some reduction in his price. Then any reduction in price beyond that called for by the increase in demand elasticity must be deemed predatory in that it can only benefit the incumbent through a reduction in the probability of the entrant's survival. In other words, any reduction in price, or any other decision, should be judged non-predatory if and only if it is profitable for the incumbent on the assumption either that the entrant is there to stay indefinitely or that the probability that the entrant will withdraw is fixed.

It will be noted that none of the three criteria that have recently been proposed—the Areeda-Turner criterion, the Williamson standard, or the quasi-permanence principle recommended in this article—corresponds with any degree of exactness to the preceding definition of predation. However, that is because this definition is not easily put to use in the complex world of reality where, for example, changes in demand elasticities are often hard to evaluate. The objective of a good rule should not be slavish pursuit of an unattainable ideal. Rather, it should constitute what I have elsewhere described as an optimally imperfect criterion—one that trades off social costs and difficulty of enforcement against the benefits it promises. See Baumol & Quandt, *Rules of Thumb and Optimally Imperfect Decisions*, 54 AM. ECON. REV. 23 (1964).