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PREDATION AND THE LOGIC OF THE AVERAGE VARIABLE COST TEST*

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ABSTRACT

This article explores principles for execution of the widely accepted Areeda-Turner test of predatory pricing. Defining an Areeda-Turner price as one that does not threaten to exclude any more-efficient supplier, I conclude that (1) any individual price that is not below average avoidable cost cannot be predatory; (2) thus, *average avoidable cost*, not *marginal cost*, is crucial in testing predation; (3) sets of prices of different products of the firm can violate the test if the revenues of any *combinations* of the firm's products fall short of the combined avoidable costs of those products; and (4) a firm's failure to maximize its profits during some relatively brief period is not by itself legitimate evidence of predation.

EVER since the appearance in 1975 of the classic Areeda-Turner article, average variable cost (AVC) has played a key role in adjudication of charges of predatory pricing. This is so despite the conclusion by Phillip Areeda and Donald Turner that it is *marginal cost* (MC) rather than any form of average cost that constitutes the defensible borderline between a price that is predatory and one that is not.¹ As in their article, the courts have accepted the view that marginal cost is exceedingly difficult to determine in practice, so that, *faute de mieux*, one must apologetically accept average variable cost as an imperfect proxy, even though one knows full well that the magnitudes of the two costs can differ substantially.

I have previously suggested that, in taking this position, those authors and their followers had undervalued average variable cost itself as an independent and perfectly legitimate test for the purpose.² This article presents what I believe to be even stronger grounds for that position and for the more unorthodox view that some variant of the AVC test is more to the point than one based on marginal cost.

* I am extremely grateful to Holly J. Gregory of Weil, Gotshal and Manges for her very valuable comments. I must also thank the C. V. Starr Center for Applied Economics, New York University, for its support of the preparation of this article.

¹ Phillip Areeda & Donald Turner, *Predatory Pricing and Related Practices under Section 2 of the Sherman Act*, 88 Harv. L. Rev. 637 (1975).

² William J. Baumol, *Superfairness: Applications and Theory* 126–27 (1986).

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Perhaps the more important objective of this article is to explore the principles that should guide proper execution of the Areeda-Turner test, thereby dealing with a number of issues that have been matters of contention in the courts.³ Starting from the premise that a proper Areeda-Turner price is one that does not threaten the existence (or at least the presence) of any equally efficient or more efficient supplier, this analysis leads to the following rules: (1) no price that equals or exceeds average avoidable cost can be predatory; (2) "average total cost" is a figure that is undefinable and unmeasurable in a multiproduct firm and must therefore be rejected as part of any legitimate test of predatory pricing; (3) the firm can violate the Areeda-Turner test not only if the price of an individual product is below average variable (avoidable) cost, but also if, at the prices in question, the revenues of any *combinations* of the firm's products fall short of the combined avoidable costs of those products; (4) the time period appropriate for use in an Areeda-Turner test is either the period during which the price at issue actually prevailed or the period during which it could, *ex ante*, reasonably have been expected to prevail; (5) where the firm practices differential pricing—for example, by negotiating different contract terms with different customers—sales of a product at different prices should be treated as sales of different products and subjected to combinatorial rule 3; (6) a firm's failure to maximize its profits during some relatively brief period is normal and beneficial business practice and is not legitimate evidence of predation; and (7) the average avoidable cost used in the Areeda-Turner test should include any opportunity costs incurred when proprietors of the firm supply inputs to the firm but should not include revenue forgone if the price at issue entails a reduction from some previous price because the previous price is irrelevant for determining whether the price at issue is a threat to the viability of an efficient competitor.

In all this it should be recognized that the problem of determining an

³ Thus, it is not the purpose of this article to reexamine the issue of predation in general and to review the large body of literature of the subject, encompassing such noteworthy contributions as John S. McGee, *Predatory Price Cutting: The Standard Oil (New Jersey) Case*, 1 *J. Law & Econ.* 137 (1958); Lester G. Telser, *Economic Theory and the Core* (1978); Oliver E. Williamson, *Predatory Pricing: A Strategic and Welfare Analysis*, 87 *Yale L. J.* 284 (1977); and Paul L. Joskow & Alvin K. Klevorick, *A Framework for Analyzing Predatory Pricing Policy*, 89 *Yale L. J.* 213 (1979). Moreover, this article makes no attempt to follow up on the view I have suggested elsewhere in William J. Baumol, *Quasi-Permanence of Price Reductions: A Policy for Prevention of Predatory Pricing*, 89 *Yale L. J.* 1 (1979), that there is much to be said for an intertemporal analysis of the process of predation, considering the sequence of deliberate losses by the predator, the exit of rivals, and the subsequent attempt at recoupment of the earlier losses as a useful basis for rules for the prevention of predatory acts. Here, however, my focus is on the widely adopted Areeda-Turner rule, its logic, and its proper execution.

appropriate lower bound for price, as the Areeda-Turner test of predatory pricing undertakes to do, is very much like the problem of selecting such a price floor as a criterion of cross subsidy. That is why much of the content of this article is apt to remind the reader of the literature on price regulation that clearly has suggested a number of the conclusions offered here.

I. IN PRAISE OF AREEDA-TURNER

Before getting to the substance of my discussion it is important for me to emphasize that nothing said here is intended in any way to undermine or even to criticize the Areeda-Turner test. It is easy, with years of afterthought, to quibble with details of their original argument, and that will occur here. But none of what is said is intended to belittle the authors' accomplishment or to advocate restriction of the use of their standard. In a world in which vigorous competition is all too easily mistaken for predation, and in which firms can unintentionally overstep the line, it is important to provide managers with guidelines as unambiguous as the issue permits, to enable them to tailor their decisions in a way that ensures compliance with the law and minimizes vulnerability to anticompetitive lawsuits intended to handicap vigorous competition. Of course, in the complex world of reality, one cannot hope to formulate a test that does so with perfection, but Areeda-Turner comes as close to success in doing so as could reasonably have been hoped, and more. There seems to be general consensus among informed observers that genuine cases of predation are very rare birds. As Areeda and Turner note, that does not relieve us of the necessity of guarding against those rare occurrences, of taking steps to prevent them and to rectify any damage they produce. But there is a painful trade-off here. Rules that make it excessively easy to secure conviction on charges of predation invite anticompetitive and rent-seeking litigation. Such rules tempt firms that cannot make it in the marketplace by virtue of superior products or greater efficiency and lower costs, to seek success over their more efficient rivals in the courts instead. There they can hope to constrain the vigor of rivalrous acts by competitors and to transmogrify the character of their rivals from energetic enterprise to timidity and hesitance. This can sometimes be accomplished by mere threat of a lawsuit, but if the lawsuit is indeed undertaken and won there is a rich additional bonus awaiting the plaintiff—trebled damages, which, in a total victory, can amount to many years of net earnings by either the plaintiff or the defendant. Long study of the subject has led me to the conclusion that litigation of this sort is a major handicap to the growth and competitiveness of the nation's economy. Thus, I con-

clude that Areeda and Turner have made a substantial contribution to our economic well-being by helping to reduce ambiguity in the concept of predatory pricing and decreasing the vulnerability of vigorous competitors to lawsuits that threaten to undermine the effectiveness of their competition and their entrepreneurship.

Still, there are a number of instances in which the odor of predation is strong, as when an entrant airline with its six-plane fleet, operating on almost as many routes, proposes to fly a route coveted by a large incumbent airline, whereon the latter announces that it will open for business (for the first time) along each of the most promising of the entrant's routes. Analogous examples in which predatory *pricing* is the issue are also easily imagined. There is reason to provide the entrant in such a scenario effective recourse against overaggressive acts by the large incumbent. Accordingly, the rules for proper execution of an average variable cost test that are described in this article are designed not to offer undue protection to the firm suspected of predatory pricing. Indeed, we will see that some of those rules facilitate the task of the plaintiff, by making clearer what that entity must prove, just as an Areeda-Turner type of rule makes clearer to the firm making a pricing decision what it must do to ensure that its choice of price is free of any taint of predation.

II. TWO POSSIBLE ROLES OF COST TESTS OF PREDATORY PRICING

Discussions of the subject can generally be interpreted to imply that there are three necessary conditions that must be satisfied before a price can legitimately be deemed to be predatory. Indeed, one can, perhaps, *define* a price to be predatory if and only if it meets all three of the following conditions. First, the choice of that price must have no legitimate business purpose.⁴ Second, that price must threaten the existence or the entry of rivals that are at least as efficient as the firm (call it "firm F") that has adopted the price at issue ("price *P*"). Third, there must be a reasonable prospect of recoupment of at least whatever initial costs to firm F were entailed in the company's adoption of the price in question, that recoupment taking the form of monopoly profits made possible by reduction (as a result of price *P*) in the number of competitors facing F.

⁴ In an article in the *American Lawyer*, Roger Parloff takes issue with my views on legitimate business purpose, saying, "There is, of course, no 'legitimate business purpose' exemption in the antitrust laws" (Roger Parloff, *Fare's Fair*, 65 *Am. Law.* (October 1993)). But, then, the laws, so far as I know, also provide no exemption for prices that exceed AVC, yet many courts clearly accept that criterion. Moreover, the courts have, I believe, repeatedly emphasized that normal business acts undertaken in pursuit of profit constitute no violation of the law, even if they *happen* to harm rivals incidentally. But that is just what I mean by legitimate business purpose.

Here, I will not be concerned with the third of these necessary conditions for pricing to be deemed predatory—the prospect of recoupment. Rather, I will focus on the other two necessary conditions, to which I will refer, respectively, as *legitimate business purpose* and *threat to efficient rivals*. I will suggest that the *cost* tests of predatory pricing have generally been interpreted to direct themselves to the first of these two requirements, while, in my view, they throw light far more dependably on the second. If this is granted, I will show that it is to AVC, or one of its close relatives, rather than to MC, that we must turn for guidance.

III. AREEDA-TURNER AND LEGITIMATE BUSINESS PURPOSE

The original Areeda-Turner article never seems to come down squarely on one of the two roles as primary justification for the test. However, one comes away with the distinct impression that legitimate business purpose is a foundation on which the authors propose to rest their argument. This seems implicit in their criterion of predation that rests on the relationship between price and marginal cost where, I note for later discussion, marginal cost (as well as marginal revenue) must, of course, include the present values of the effects of today's decisions on future costs (or revenues). It is implied that a price as low as marginal cost is legitimate business practice because, in equilibrium in a regime of perfect competition (the economist's theoretically ideal—if practically unattainable—state of affairs), the firm will always adopt a price that is equal to marginal cost, and “a higher price would result in a reduction in output and thus deprive some buyers of a commodity for which they were willing to pay the cost of production.”⁵ At the other extreme, the monopolist will maximize profit by selecting an output at which marginal cost is equal to marginal revenue. Since, as is well known, when the demand curve is downward sloping, as is normally assumed, price will necessarily exceed marginal revenue, that price will always exceed marginal cost as well.⁶ And, it may be added, if the demand curve, though downward sloping, is nearly horizontal (a small rise in price reduces quantity demanded substantially) price, marginal revenue and, hence, marginal cost will all very nearly be equal. Thus, even for the monopolist, a normal pricing act will entail $P > MC$, though possibly by a very small amount. In contrast, “[b]y definition, a firm producing at an output where marginal cost exceeds price is selling at least part of that output at an out-of-pocket loss. It could eliminate that loss by reducing its output.”⁷ The authors

⁵ Areeda & Turner, *supra* note 1, at 702.

⁶ *Id.* at 703.

⁷ *Id.* at 712.

go on to note, "A monopolist may attempt to justify prices below marginal cost by claiming either that the price is being used for promotional purposes or that he is simply meeting an equally low price of a rival. We conclude, however, that these justifications are either so rarely applicable or of such dubious merit for a monopolist that the presumption of illegality for prices below both marginal and average cost⁸ should be conclusive."⁹

To sum up, the argument seems to be that in normal and legitimate business transactions price will at least sometimes exceed marginal cost by only a very small amount but that it will only very rarely fall short of marginal cost in transactions that are clearly legitimate. The inference that seems to be drawn from this is that marginal cost is the knife-edge border between pricing that constitutes legitimate business practice and pricing that can be presumed to constitute acts of predation.

Yet the choice of marginal cost as the borderline between price as legitimate and illegitimate business act is not altogether convincing. It is at once too permissive and excessively demanding. At the one extreme, suppose demand for the product at issue happens to be brisk and that it is clearly profitable for the firm to price 50 percent above MC. Is it then normal and legitimate business practice for the firm to eschew this profit opportunity and select a price that exceeds MC by, say, only 2 percent? Such a decision does not imply that the choice is predatory, but it also does not constitute proof that it constitutes legitimate business practice. In contrast, it is hard to imagine a firm that has never found it expedient or even necessary to sell products for at least a brief period at a price below marginal cost, for reasons ranging from product introduction to distress sales of products that are perishable or subject to obsolescence. Thus, on the one side, we cannot casually accept the unsupported assertion that sales at prices below marginal costs constitute a presumption that the act is without legitimate business purpose. On the other side, we cannot confidently conclude that any sale at a price above marginal cost has a legitimate business purpose.

The problem with use of marginal cost as the criterion for testing legiti-

⁸ As I presently show, the concept "average cost" in a multiproduct firm is treacherous nonsense. Because costs that are fixed and common are characteristically substantial, and because they can only be allocated among the firm's different products on a totally arbitrary basis, they have always been subject to manipulation by "creative accounting procedures" and have commonly been used to inhibit competition.

⁹ *Id.* at 713. A curious feature of the Areeda-Turner article is its exclusive focus on the two polar cases of monopoly and perfect competition, with little said about anything in between. This is particularly surprising since (hardly by accident) litigation on predatory pricing usually arises in industries composed of a multiplicity of firms whose number can be fairly small.

macy of business purpose is that it simply does not get at the issue. We can define an act by a firm to have a legitimate business purpose if it promises to yield a net addition to the firm's profits over the long run, a profit that does not depend on the exit of any at least equally efficient rivals or on prevention of entry of efficient firms. But there is simply no way in which one can infer from the fact that the firm adopts a price that exceeds MC that this will constitute a net addition to long-run profits relative to what the firm might otherwise have earned, nor can one legitimately conclude that a price that falls short of MC must reduce those profits in the absence of destruction of competitors or entrants. Promotional prices for new products are examples that are real and exceedingly common, and the temporary losses they entail are a feature they share with heavy outlays on innovation, or radical plant modernization and retooling, and a host of other patently legitimate business acts that are prime examples of productive entrepreneurship. Mere comparison of price and marginal cost is simply not very effective in discriminating between legitimate and illegitimate business acts.

IV. AREEDA-TURNER AS TEST OF THREAT TO EFFICIENT RIVALS

I will argue now that the Areeda-Turner test is entirely defensible as a criterion to determine whether the price at issue constitutes a threat to efficient rivals of firm F. But I will show that for this purpose it is average variable cost or a near relative, rather than marginal cost, that provides the requisite information.

Areeda and Turner do discuss the role of their criterion in helping to distinguish whether efficient rivals are threatened by price P . They conclude, quite correctly, that the marginal cost test performs this task imperfectly. They consider "instances where marginal cost is below average cost, a situation that will not occur unless the monopolist possesses 'excess capacity.' Only then will the monopolist's marginal cost price deprive equally efficient rivals, actual or potential, of 'normal' returns on their capital. Although narrowed, the problem remains: the equally efficient rival might be destroyed or dissuaded from entering. . . . Admittedly [this] poses some threat to competition in the long run. . . . However, we see no satisfactory method of eliminating this risk."¹⁰

There is, however, a method that is satisfactory, and, as a matter of fact, it is the method by which the courts have chosen to carry out the Areeda-Turner test. For there is a well-known principle in elementary economics telling us that a firm will minimize its losses (maximize its

¹⁰ *Id.* at 710–11.

profits) by exiting from a market (using the term in an economic rather than a legal sense) when and only when the total revenue it can obtain by remaining in that market falls short of its total *variable* cost. If that revenue exceeds the firm's variable cost it should nevertheless remain in the market even though by doing so it does not cover its *total* cost. Here, the term "variable cost" is defined to include all *fixed* costs that are not *sunk*, so that they can be escaped if the firm exits from the market.

To see this,¹¹ we must first examine the relation between cost and the incentive for exit that faces a firm. It will be recalled that costs are defined to be sunk if the firm cannot escape them in the short run, either because of a contract (say, with the landlord or the union) or because it has already signed a contract to buy the item whose cost is sunk (for example, a machine). If the firm stops producing, its revenue will fall to zero. Its short-run variable costs will also fall to zero. But its sunk costs—such as rent—will remain to plague it. If the firm is losing money, it will be better off continuing to operate if the resulting revenues produce *any* surplus above variable costs, thereby making *some* contribution to sunk cost. However, it should be obvious that, if the revenues the firm can earn by remaining in operation fall short of variable costs the shortfall will simply add to the losses resulting from its sunk-cost obligations.

The pertinence of all this for the Areeda-Turner test as a criterion of threat to efficient rivals follows from one more observation. Consider two firms, A and B, that are vying to serve as suppliers of a given quantity, Q , of some good or service. Which of them will be the more efficient supplier of Q ? The answer is that it will be the firm for which the supply of Q causes the smallest addition to cost. That addition to cost is what economists call the *incremental cost* of Q . For the moment, let us simply equate AIC (average incremental cost) with average variable cost (a subject to which we will return presently). Then, if $AVC(Q)_A$ is the average variable cost of Q when produced by firm A, and so on, firm B will be the more efficient supplier of Q if and only if

$$AVC(Q)_B < AVC(Q)_A.$$

But, then, if A charges a price P_A for Q that at least equals its average variable cost of Q production, then that price cannot possibly drive its efficient competitor B out of business because then

$$P_A > AVC(Q)_A > AVC(Q)_B.$$

¹¹ The next few paragraphs contain material that is obvious to an economist. However, since the point is central to my argument, and because a number of wise and erudite lawyers with whom I have worked have nevertheless wanted the matter explained, I have not excised the material altogether.

For, then, B can charge a price equal to A's or even a little lower, and still cover its own variable cost, which, as we have seen, ensures that exit is not the more profitable alternative for firm B. We obtain the generalized Areeda-Turner result:

RULE 1. Any price above the pertinent average variable cost for the output quantity in question cannot be predatory because it can never cause the exit (prevent the entry) of an efficient, profit-seeking rival.¹²

This rule is still vague in two respects. It has not yet indicated what output quantity is pertinent, and it has not shown what average variable cost is relevant. The latter, for example, entails the proper choice of time period (the pertinent short run) in which to calculate the cost. The output quantity issue is this: is the relevant quantity that of firm F, whose price is under investigation, or is it the output of its complaining rival? Perhaps surprisingly, I argue later that, at least for part of the role of the test, it is the output quantity of the rival that matters.

V. WHICH COST? AVERAGE VARIABLE COST? AVERAGE INCREMENTAL COST? AVERAGE AVOIDABLE COST?

Though average variable cost is the concept that seems to be used universally in carrying out the Areeda-Turner test, that cost is not well defined. It seems to refer to the variable portion of the total cost of production of the entire quantity of a commodity supplied by a firm divided by that output quantity. But this statement is not as clear-cut as it appears. First, it does not make clear what is to be done about outlays that have been called "product-specific fixed costs,"¹³ that is, costs that

¹² One can still object that a price that just equals or slightly exceeds the firm's average variable cost can be used to drive out a rival that is marginally less efficient than the incumbent. If the latter then is able to raise its price well above the competitive level, one may have good reason to conclude that the original price was predatory in its consequences. Elsewhere I have recognized the pertinence of such intertemporal pricing patterns and have proposed a criterion of predatory behavior to deal with them (Baumol, *supra* note 3). Such a possibility, however, affects every cost test that is designed to determine the borderline between a level of price that is predatory and one that is not. For any price that is above the selected borderline can nevertheless serve to drive out a firm so inefficient that it cannot meet the price set at that level. It seems to me that despite the valid concern raised here, the average variable cost criterion remains a legitimate borderline.

¹³ There is considerable confusion in the literature about two pertinent concepts, fixed costs and sunk costs, which are really very different. There are, in fact four types of cost that are relevant here, and they can be defined thus: *fixed costs* are costs that must be incurred in a lump in order for any output at all to be provided, and they do not vary when the magnitude of output changes. These costs are not variable either in the short or the long run. Any cost that is not fixed is defined to be *variable*. A *sunk cost*, however, is a cost that cannot be avoided for some limited period of time, but after that period it becomes *avoidable* or *escapable*. A cost that is fixed may or may not be sunk, and a cost that is sunk may not be fixed. For example, one cannot operate an airline between, say, New York and Milwaukee without investing in at least one airplane, an outlay whose amount

are incurred *exclusively* on behalf of one particular product but whose magnitude is not increased when the output of that product rises.

The economist's concept, average incremental cost, is unambiguous on this subject. The average incremental cost of any given increment in output always includes *any* product-specific outlay (that is, any outlay that does not serve several products in common) that is caused by the output increment in question. It seems clear that, if one is testing whether price P is in some sense compensatory, such incremental costs must be included in the calculation, even if they are fixed in character. But that is not quite the answer we seek. The issue, in terms of the notation of the preceding section, is whether P_A , the price charged by firm A, can drive an efficient firm, B, out of the field of endeavor. The pertinent cost here is what may be thought of as the decremental rather than the incremental cost to firm B if it decides to exit. That is, the issue is the cost that B can *escape* or *avoid* by leaving. Thus P_A will not be able to drive firm B from the production of X (or some portion of the production of X) if it exceeds AAC_B , firm B's average avoidable cost (AAC) incurred in producing the pertinent increment of X (in the discussion that follows, the terms "avoidable cost" and "escapable cost" will be used interchangeably).

Now, it will generally be true that $AAC \leq AIC$ for any given quantity of output. That is, when expanding output X by a given increment, it is necessary to incur some sunk outlays (that are typically quite substantial and) that cannot entirely be escaped or avoided except in the very long run. So AIC includes those sunk outlays, but AAC does not. Thus, a price that exceeds the average incremental cost of some output can confidently be expected to exceed its average avoidable cost. Thus we arrive at:

RULE 2. The proper AVC figure to be used in the Areeda-Turner test to determine whether some price constitutes a threat to an efficient rival is the average avoidable cost of the pertinent output increment (decrement). If the average incremental cost is used instead, and the price nevertheless passes the test, one can be confident that the price is not predatory, because in general $AIC \geq AAC$. The AAC figure must, how-

does not vary with number of passengers until capacity is reached. Thus, this cost is fixed, and does not become variable even in the long run, because one cannot run an airline on the route with zero airplanes. In contrast, this cost is not sunk because, if traffic between New York and Milwaukee declines drastically, the plane can be shifted to serve another route. A large factory with a 10-year useful life, however, constitutes a cost that is sunk for that period, but it need not be fixed because at the end of 10 years it may be desirable to produce less than before, using a smaller factory whose investment cost is lower. The distinction is not mere semantics—the two types of cost have very different implications for market performance and economic efficiency.

ever, include all pertinent portions of the product-specific fixed but avoidable costs, that is, all portions of such costs that can be escaped in the pertinent period of time.

VI. DIGRESSION: NONEXISTENCE OF AVERAGE TOTAL COST IN MULTIPRODUCT FIRMS

Since the concept of “average total cost” (ATC) intrudes so often in discussions of predation, it is worth noting briefly that in the case of a multiproduct firm it violates all economic logic. Outside a textbook, there probably exists no such thing as a single-product firm, and all multiproduct firms have fixed costs incurred in common on behalf of two or more of their products. There is, however, no economically defensible way of dividing such costs up among the firm’s various products. As is well known, all methods for the allocation of common fixed costs are arbitrary.

Before the courts or regulatory agencies, ATC (fully allocated costs) are always manipulated to produce whatever answers are desired by the party that puts them forward. Moreover, as I show elsewhere,¹⁴ the amounts by which these contrived cost figures can easily be manipulated is enormous. Thus, though to economists it may seem obvious, for practitioners in the antitrust arena it is hardly redundant to suggest:

RULE 3. Any conclusion about the predatory character of a price that is based on a calculation of average total cost must be disregarded. The ATC numbers can offer absolutely no substantive economic information, and they are apt to constitute an invitation to anticompetitive action.

VII. PRODUCT COMBINATIONS AND THE AVC TEST

How, then, should fixed and common costs be dealt with? Are the fuel bill and the pilot’s salary simply to be ignored in a test to determine whether air fares are predatory? Surely, those costs are avoidable. By canceling a flight the fuel expenditure can be avoided and perhaps also the salary of the pilot. Economists have, indeed, worked out a rigorously defensible way to take them into account. To make the procedure clear one must begin the explanation, as it were, one step earlier. We must start off with the incremental cost (or the avoidable cost) of the individual services supplied by the airline—in this case, the two services: first-class transportation and economy transportation. The point is that for *neither*

¹⁴ See William J. Baumol, Michael F. Koehn, & Robert D. Willig, How Arbitrary Is Arbitrary?—or, Toward the Deserved Demise of Full Cost Allocation, 120 *Pub. Util. Fortnightly* 16 (September 3, 1987).

of these services does the incremental cost or the avoidable cost include any of the pilot's income or any (substantial) part of the fuel bill. If the airplane is to fly in order to transport the economy passengers, it adds little or nothing to either of those costs to fly the first-class passengers as well. The same argument holds for the incremental (avoidable) cost of flying the economy passengers. Thus, none of the common fixed cost enters the incremental cost of any *one* individual service.

However, matters are quite different if we consider the cost of the two services together, which, it will be remembered, are assumed to constitute the full set of services offered by our hypothetical airline. The incremental cost of transporting both first-class and economy passengers combined clearly includes both pilot compensation and fuel outlay on the flight, and much of that combined cost could be avoided if the airline chose not to serve first-class and economy passengers alike, and simply canceled the flight. Thus, these common fixed costs must be included in their entirety in the incremental cost of the *combination* of the two airline services, and whatever portion of those costs is escapable in the pertinent period must be included in the avoidable cost of the service combination.

It is easy to see now that the price of first-class service can exceed its average avoidable cost, and the same can be true for the economy fare, yet the two together may fail to cover their combined avoidable cost. A numerical example will make that clear. Suppose that the incremental food, ticketing, and other avoidable costs for the trip in question is \$50 for each of the 200 economy passengers and \$80 for each of the 40 first-class passengers, and that the escapable portion of the fuel and pilot costs amount to \$15,000. Then an economy fare of \$60 and a first-class fare of \$100 will clearly cover their average incremental (avoidable) costs, which are \$50 and \$80, respectively. But at those prices the total incremental revenue yielded by the flight is $200 \times \$60 + 40 \times \$100 = \$16,000$, and hardly covers the total escapable cost whose amount is $200 \times \$50 + 40 \times \$80 + \$15,000 = \$28,200$. For the individual fares together do not contribute enough to cover the common escapable costs.

The implication of all this is the following. The price of an individual product may fail what we may call the *generalized Areeda-Turner test* if it does not cover the average avoidable cost of that product alone. But it can also fail the test if the incremental revenues provided by that service together with that of any subset of the company's other services are insufficient in total to cover the avoidable costs of that combination of services. Thus, a firm that supplies, say, five different services can fail the test on the basis of the price of some individual service, or because it fails the corresponding test for any pair of the firm's services, or because it does so for any triad of the firm's services, and so on.

Of course, it is totally impractical, and an unreasonable burden, for a defendant to be required to supply an estimate of the avoidable cost for each and every combination of such services. Indeed, such a requirement would invite anticompetitive “fishing expeditions” by prospective plaintiffs. However, this combinatorial feature of the generalized Areeda-Turner test does offer that plaintiff a very legitimate advantage. As is done in regulatory arenas that use such combinatorial criteria to determine whether prices are compensatory, the plaintiff is required to specify, *in advance*, what service or what one combination of services he believes to have predatory prices, and the plaintiff and defendant alike are expected to provide avoidable cost information about the one service or the one combination of services that has been deemed predatory in the complaint. Sometimes this test can, in practice, be extended to encompass several services or service combinations, but that set is always required to be small, and the procedure is, consequently, entirely manageable, as experience in regulation has demonstrated. This leads to:

RULE 4. The proper Areeda-Turner test to determine whether a firm’s prices constitute a threat to an efficient rival must extend to combinations of the firm’s products. The price of each product by itself must equal or exceed that item’s average avoidable cost. Moreover, any combination of the firm’s products must be priced so as to yield an incremental revenue that exceeds the avoidable cost incurred by that combination of products. In practice, a plaintiff should be required to specify in advance what products or product combinations it has reason to believe will fail this criterion, and litigation should take into consideration only the avoidable costs of the preselected products or product combinations.

VIII. SEQUENCES OF TIME PERIODS AND THE AREEDA-TURNER TEST

Just as the generalized Areeda-Turner test must logically be extendible to combinations of products, it must also be extendible to sequences of time periods. The issue arises because the magnitude of avoidable cost for a product or combination of products varies with the time period under consideration. Generally, the longer the pertinent time period, the greater the total avoidable cost and average avoidable cost figures will be. The reason is that as time passes, the larger the set of costs that were formerly sunk now become escapable. A firm may have signed a 2-year lease for a building, for example. At the end of the 2-year period, if the firm wants to remain in production, it will have to continue the rent payments. But only then, if it decides to cease production, can it escape those outlays altogether. Similarly, as time passes the firm has more of an opportunity to sell or lease redundant equipment, thus avoiding part of the cost which it cannot escape in a shorter period.

Since the longer the period considered, the higher we can expect avoidable cost to be, in a predation case we can expect the plaintiffs to press for a long period as the time interval suitable for the cost calculation, while the defendant can be relied on to argue for a brief period. The choice, however, is not arbitrary, and the principle for its selection follows unambiguously from the use of the Areeda-Turner criterion to determine whether a price or a combination of prices is a threat to an efficient rival. The answer, simply, is that, if the price at issue is in force for, say, 3 months, the period pertinent to the cost calculation is 3 months. For if that price alone is to drive a competitor from the arena, it then has just 3 months in which to do so. And on the principle explained in an earlier section, it will be capable of driving a rival from the field only if that price is less than the per-unit cost that a rival can escape in that period—it is the average avoidable cost calculated for a 3-month horizon. Logic permits no other answer.

However, that is not the end of the story. Suppose that the defendant adopted a \$50 price for 3 months, a \$52 price for the following 2 months, and a \$47 price for the 5 months following that. Suppose, moreover, that the three prices in combination are claimed to be predatory, on the hypothesis that no one of them or no pair of them could have driven out an efficient rival but that, by persistently proffering such a sequence of low prices, the rival allegedly could be forced from the arena. This is clearly a tenable hypothesis that can justify examination on its merits. And this can be done in a manner analogous with the procedure for combinations of outputs. That is, one must compare the incremental revenue provided by the sales that occurred at those prices to the firm that charged them, with the costs escapable over the entire period during which the prices prevailed. That is, one should compare the discounted present value of the incremental revenues with the discounted present value of the costs that could have been escaped, taking each such cost avoided to occur at the date at which the escape could reasonably be expected to occur. We then have:

RULE 5. The time horizon pertinent for the calculation of the AAC for an Areeda-Turner test is the time period over which the price in question prevailed or could reasonably have been expected to prevail. Where a sequence of prices is alleged to be predatory in combination the pertinent horizon is the end of all the time periods during which those prices prevailed, and the test should require that the present value of the incremental revenues for this extended period equal or exceed the present value of the avoidable costs. Once again, it should be the obligation of the plaintiff to specify in advance what pertinent time period or sequence of time periods it is challenging.

IX. THE SIZE OF THE PERTINENT INCREMENT (DECREMENT) UNDER DIFFERENTIAL PRICING

Up to this point I have spoken of a comparison of *the* (unique) price of the product in question with the average avoidable cost entailed in continued production of that good or service. In practice, however, firms often do not charge the same price for a given product to all customers. For example, if the product serves primarily as an input to the production processes of a number of large business customers, each of the buyers may negotiate its own contract, with its purchase price dependent on the outcome of the negotiations and possibly quite different from the prices paid by other purchaser firms. This is said to entail *differential pricing*. It is also referred to as "price discrimination." Because differential pricing is so widespread in industries with scale economies, and arises so often in regulatory arenas, in the next section I will digress once more to see why such differential pricing may be necessary for the achievement of economic efficiency. That is, the discussion in the next section will show why one cannot solve simply by prohibition of differential pricing any special problems related to predatory pricing that may arise because differential prices are present. Here, however, we will simply recognize the existence of such prices and see what they imply for the choice of output increment to be used in the calculation of AAC for use in the Areeda-Turner test.

To illustrate the point, suppose that the firm sells 7,000 units of commodity *X* at a price of \$500 and that, in addition, it sells 3,000 units of the same good at a price of \$375. What price, or what incremental revenue, is appropriately to be compared with what avoidable cost? The answer, in brief, is that the two sales should be treated as the sales of two different commodities sold by the same firm. That is, the appropriate rule for the generalized Areeda-Turner test for this case is rule 4 above. Thus, the \$500 sale of 7,000 units of *X* must cover its own avoidable cost, and the same must be true of the sales at the \$375 price. In addition, the combined sales must provide enough incremental revenue to cover their combined incremental costs. The reason is straightforward. Consider an efficient rival that is competing for one or both of our firm's customer groups. Since, by definition of efficiency, that rival firm must have avoidable cost no higher than our firm's, it follows that, if the prices at issue pass the generalized Areeda-Turner test procedure just described, that rival cannot be driven out of the competition for either customer group or from competition for their combined purchases.

Here a confusion can easily arise. If there are scale economies in the production of *X*, a rival that seeks to compete only, say, for the business of the \$500 customers will find itself at a cost disadvantage because it

seeks to produce only the 3,000 units demanded by those customers at that price, while our firm produces the 10,000 units demanded by the two customer groups together. But this simply means that the rival is *not* an efficient supplier of the 3,000 units of product by themselves. The issue for customers is which of the two sellers can provide them with good *X* more cheaply, regardless of the reason that explains why one firm happens to produce at a lower cost than the other. Superior efficiency may be attributable to harder work or greater ability, but it may also result from luck (for example, one of the firms happened to pick what later turned out to be a better location, say, one closer to a superhighway entrance that had not been constructed or even planned when the site was chosen). Similarly, large scale (or, sometimes, small scale) can give one of the firms a cost advantage. But all of that is immaterial to customers—they simply want the lower-priced supplier regardless of whether its efficiency was achieved by merit or happenstance, and the market mechanism parcels out its rewards accordingly. We obtain:

RULE 6. Where differential pricing is practiced, the generalized Areeda-Turner test should be carried out in accord with rule 4, treating sales of a given product at different prices as sales of different commodities supplied by the same firm.

Before leaving the subject of the pertinent increment (decrement) to be considered in the Areeda-Turner test, I note that one additional observation is appropriate, this time for the case where differential pricing is not practiced. The point to be made now is offered for analytical completeness, though in practice it will probably prove wise to disregard it. Consider a case in which the defendant, firm D, is producing 8,000 units of good *X*, while the plaintiff, firm P, is producing only 2,500 units. The efficiency issue entailed in the possibility that the plaintiff will be forced to exit is whether the public is better off if the 2,500-unit output continues to be produced by firm P or if that production is taken over by D. Obviously, the public will be better off when P stays in the business if P has the lower incremental cost of producing 2,500 units. Moreover, if the same is true of avoidable costs, a price by D that covers its own incremental or avoidable costs of producing the 2,500 units cannot threaten the existence of firm P. The point to be noted here is that the avoidable cost to be considered in the test is that of the defendant and that is the cost that has usually been examined in practice in carrying out the Areeda-Turner test. But the output quantity in question is not the 8,000-unit output of the defendant, *but the 2,500 unit output quantity of the plaintiff*.¹⁵ The reason for this rather surprising observation is that the pertinent

¹⁵ That is, the pertinent cost is the defendant's avoidable cost entailed in producing the 2,500 units after they are, hypothetically, added to its initial 8,000-unit output.

issue for the public interest here is who is the more efficient producer of the plaintiff's output because the choice of producer of the defendant's output is simply not at issue. Yet, as has been noted, this observation is probably only of theoretical interest. In practice, it will probably not be easy to determine the incremental or avoidable cost that would be incurred by the defendant if it were, hypothetically, to take over the production of the plaintiff, in addition to its own. Moreover, unless there are very sharp scale economies or sharp diseconomies in the production of the good at issue, the cost figure will not be affected much by the choice between the output quantities of the two firms as the increment in output to be used in the calculation. In any event, if average variable cost is being used to determine, not whether a particular price by firm Y is a threat to its competitor, but to investigate whether it is compensatory to Y and, hence, a legitimate business decision, then it is clear that it is the output of Y, and not that of a rival, that is pertinent.

X. DIGRESSION: DIFFERENTIAL PRICING AND ECONOMIC EFFICIENCY

Let us pause to see now why it is not in the public interest to rule out differential pricing altogether. For simplicity, the discussion of this section will deal with the imaginary case of single-product firms. I will show that a role arises for differential (that is, discriminatory) prices if, as is widely considered to be the normal case, the firm's average cost¹⁶ curve is U-shaped. Figure 1 represents a case of two-firm production (by firms 1 and 2) with a U-shaped AC curve for each of the firms. The graph is a bit unusual in that the horizontal axis does not measure physical output but instead measures the share of total industry output that accrues to each firm. For example, the 60 percent point on the x -axis means that at that point firm 1 produces 60 percent of total industry output, so that firm 2 produces the remainder, 40 percent, of that output. At the left end of the axis, there is the 0 percent point at which firm 1 produces nothing, and so firm 2 produces 100 percent of industry output, while at the right end of the axis, at the 100 percent point, the opposite is true. The purpose of this somewhat unusual construction is that it enables us to compare the costs and sales of the two firms directly. For firm 1, rising output share means moving from left to right on the graph, in the usual manner. For firm 2, however, rising output share means moving from right to left.

Clearly, the allocation of the task of production will be efficient at point b on the horizontal axis, where the marginal costs of the two firms are

¹⁶ Note that here we are entitled to talk about average costs (or average total costs) because we are dealing with single-product firms for which there can be no unattributable common costs (see Section VI *supra*).

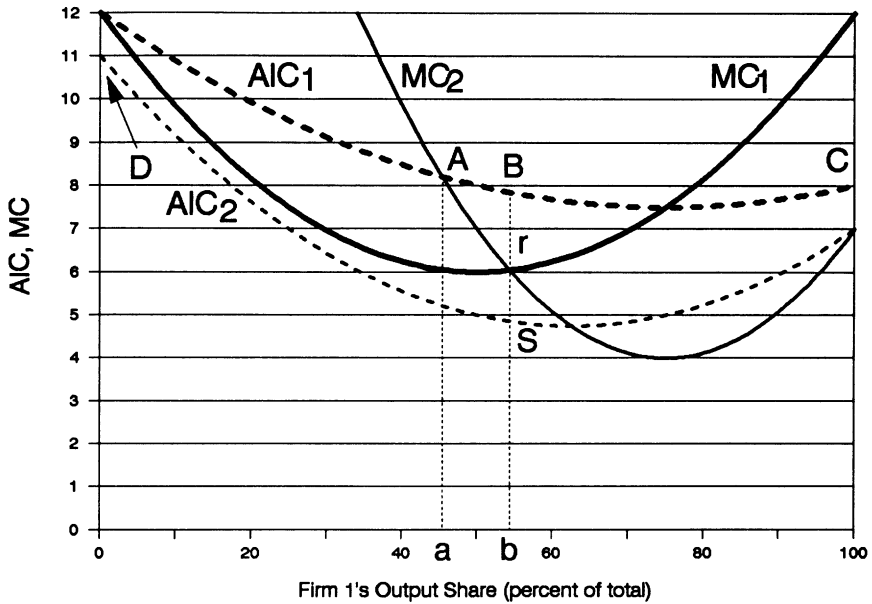


FIGURE 1.—Differential pricing required for efficiency

equal (point r). For in this case sharing of the output task clearly results in lower total output cost than production of the entire product by either firm alone. This is clear because at efficient output share b the average cost of firm 1 (point B) is lower than when firm 1 serves 100 percent of the market (point C), and the same is true for firm 2 (point S is substantially lower than D).

Yet there is no undifferentiated price that will lead to efficiency. It is true that a fixed price equal to the common marginal cost at point r will lead both firms to select the outputs that place them at the efficient output-share point, b . But since r lies below B , it is clear that this price will be below the average cost of firm 1. This means, most obviously, that firm 1 will be unable to survive at the marginal-cost price, so that, even though it is inefficient, the industry will be driven to monopoly, or a price will have to be set at some level above r —a level that is incompatible with an efficient allocation of output between the two firms. Moreover, even if firm 1 is able to survive a price equal to r by virtue of some form of subsidy, that price can exclude a third firm more efficient than firm 1; that is, it will exclude a third firm whose average cost of producing firm 1's output at point b is less than 1's average cost, B , but higher than the marginal-cost price, r .

Differential pricing can, however, solve all these problems. For example, firm 1 could charge different prices for its product to 10 different customer groups, with each group's price set to pass the Areeda-Turner test for the increment in firm 1's production constituted by that group's purchases. In this way, one group could be charged a price very close to the common marginal cost level, r , while the incremental revenues from all customer groups together cover the total costs of firm 1. Because the prices are set so as to pass the generalized Areeda-Turner test, no more-efficient firm can be excluded by them. Moreover, if there is no third firm available that is more efficient than firm 1, at those prices the latter enterprise will be able to survive indefinitely, and without the aid of any subsidy.

It should be recognized that this need not be a rare and pathological example. It can easily be true of any product that is produced most efficiently by several firms, in which the number of enterprises is small. That is why economic efficiency would not be served by a rule that simply prohibited differential pricing.¹⁷

XI. ON SHORT-RUN PROFIT MAXIMIZATION CRITERIA OF PREDATORY PRICING

Two ancillary topics remain to be dealt with here. One is the role of short-run profit maximization in a test of predatory pricing, an issue that has arisen in several discussions. The second is the proper role of opportunity cost in the generalized Areeda-Turner test.

The notion that failure to maximize short-run profits is somehow associated with predation has arisen in the Areeda-Turner discussion from the very beginning. Thus, Areeda and Turner themselves remark, "A necessary but . . . not sufficient condition of predation is the sacrifice of short-run profits."¹⁸ However, the U.S. Court of Appeals, Fifth Circuit, has gone well beyond Areeda-Turner on this matter. It has asserted that, to prevail in a complaint of predation, "a plaintiff must at least show that either (1) a competitor is charging a price below his average variable cost in the competitive market or (2) the competitor is charging a price below its short-run, profit-maximizing price and barriers to entry are great

¹⁷ It should be noted that the famous Ramsey pricing rule, which is the recognized rule for efficient pricing in circumstances where prices equal to marginal costs are incompatible with survival of the firm, uses differential pricing to obtain its optimality results. That is, Ramsey analysis shows that, where marginal-cost prices are not feasible financially, then differential pricing is required for optimality. On all this see, for example, William J. Baumol & J. Gregory Sidak, *Toward Competition in Local Telephony* ch. 3 (1994).

¹⁸ Areeda & Turner, *supra* note 1, at 703.

enough to enable the discriminator to reap the benefits of predation before new entry is possible.”¹⁹ This would seem to imply that in the circumstances noted, failure to maximize profit is also *sufficient* to prove predation.

Now, there is a sensible interpretation of this short-run profit-maximization test, and there is also one that makes no sense. If one means by it that normal business behavior requires the firm always to seek the price that maximizes the profits that the firm will earn before some nearby horizon date, then the proposition is, indeed, nonsense. Every rational and successful firm has at some time forgone near-term profits in the expectation that the temporary sacrifice constitutes what amounts to an investment that will later pay off in spades. Rare is the firm that did not lose money during the weeks or months after it was first established. Every firm that decides to shut down a factory in order to retool and modernize deliberately elects to sacrifice short-term profits in the sense we are now using the term. Every firm that undertakes to invest heavily on an innovation whose payoff is expected only several years in the future is making a similar choice. It is not only silly but destructive of effective exercise of entrepreneurship to determine that such an act is suspect. As said, if this view were accepted, there would be few if any firms that would not qualify as suspects.

There is, however, a second interpretation of the term, “failure to maximize short-run profits.” This sensible connotation is the adoption for some limited period of a price that reduces the present value of the firm’s future profits. Here, the term “short-run” pertains to the limited period of time the price is in force. It places no time constraint on the period during which any resulting effects on the profits that are earned can be taken into consideration. In this sense, a new product price that will last for 2 weeks, and that entails \$10,000 in net costs during those 2 weeks, but which is expected eventually to stimulate demand sufficiently to make up for this outlay many-fold, need not be a departure from short-run profit maximization. Only if that 2-week outlay cannot reasonably be expected to be made up in the future, or if it can be made up only through later monopoly profits after rivals are driven from the field by the price cut, is that requirement violated. There is, indeed, some reason to suspect predatory behavior if short-run profits are deliberately satisfied in the second of these senses, but not in the first. These observations can be summarized as:

RULE 7. There is absolutely nothing predatory about a price decision

¹⁹ *International Air Ind. Inc. v. American Excelsior Co.* 517 F.2d 714, 724 (5th Cir. 1975); *Adjustors Replace-A-Car v. Agency Rent-A-Car, Inc.* 739 F.2d 884, 889–90 (5th Cir. 1984).

by a firm that fails to maximize the profits it can expect to earn during some brief proximate time period, provided that this price passes the (average variable cost) Areeda-Turner test and that this act can be expected to yield returns in the future that make up for whatever has been sacrificed in this way.

However, one can perhaps agree that a “necessary . . . condition of predation” is the adoption for some limited period of a price that will reduce the present value of the firm’s stream of expected future profits, constituting a short-run action by the firm that is inconsistent with maximization of the present value of present and future profits.

Some courts have taken the position that the preceding argument is troublesome. For it seems to allow a defense holding that short-run losses are acceptable if only they raise the present discounted value of the firm. However, this is precisely what rational predation does. How, then, does one distinguish between predation and its absence if short-run losses are considered unobjectionable? Surely, the average variable cost test is the appropriate way to deal with the dilemma. That is, a price that exceeds average variable cost as defined here cannot be predatory, even if it does not maximize short-run profit. For, as has been shown in Section IV above, no price by an incumbent that at least equals its average variable cost can force the exit or prevent the entry of any rival that is at least equally efficient in terms of the incremental cost of the output in question.

XII. ON THE ROLE OF OPPORTUNITY COSTS IN THE AREEDA-TURNER TEST

Economists agree that the type of sacrifice that they call “opportunity cost” is a legitimate part of any cost calculation. Indeed, they (including myself) assert that any cost calculation that totally ignores the opportunity cost component is likely to be illegitimate. The courts have not generally committed themselves on this issue in their dealings with the Areeda-Turner test. I show here that the matter is somewhat complex and that if the test is used to determine whether the price at issue constitutes a threat to the existence of an efficient rival, the opportunity cost component of avoidable cost must be treated in a particular way that will be spelled out presently.

The *opportunity cost* of an act such as the adoption of some price is defined to consist of any earnings implicitly or explicitly forgone as a result of that decision. For example, the opportunity cost of a student’s decision to attend college includes any earnings forgone because that decision prevents the student from accepting full-time employment. It is a real cost that must be weighed in the decision to attend college because, if that decision is not taken, the prospective student will be better off

financially by the amount of those wages. This, then, must be weighed in along with the other costs and the benefits of college attendance.

In business decisions, opportunity cost takes two primary forms that play an important and very different role in our discussion. The first is the opportunity cost of *owner-supplied inputs*, and the second is the cost of *revenues forgone* as a result of the decision in question. For example, suppose a single-proprietor firm decides to reduce the price of its product and this results in an increase in sales whose production requires some additional investment. If the owner supplies the funds out of her own savings, those funds cannot be considered to be free. The decision to tie them up in the company means that they cannot be invested in bonds where they would have earned, say, \$9,000 per year in interest. On this account, then, the proprietor is \$9,000 per annum poorer than she otherwise might have been, and failure to take this into consideration can clearly lead to an irrational decision.

The same price cut means that the goods that would otherwise have been sold at the previous higher price—say, 1,000 units of product at a price of \$30 per unit—will now be sold at the reduced price of \$25, for example, resulting in a forgone revenue of $\$5 \times 1,000 \text{ units} = \$5,000$. This loss of revenue, that is, this opportunity cost, too, must be weighed against the other gains and losses that can be expected to stem from the price cut before deciding whether or not the price reduction should be adopted.

Turning now to our central issue, suppose it is alleged that the price cut is predatory and that the new price should consequently be subjected to an Areeda-Turner test comparing the price with avoidable cost. Obviously, the inclusion of opportunity cost can only increase the avoidable cost figure and make the Areeda-Turner test more difficult to pass. Should all the opportunity costs be included in the calculation?

The answer, that may be unexpected to economists, is that if the Areeda-Turner test is used (as it is argued here it should be) to determine whether the price constitutes a threat to efficient competitors, then the opportunity cost of owner-supplied inputs *should* be included, but the revenues forgone as a result of the price cut *should not*.

The reason the cost of the owner-supplied income should be included is that any funds that our firm uses to produce its pertinent input must have their counterpart if that same output is instead produced by an efficient rival. If additional investment is required to provide that output, the rival, too, will have to provide such funds, either by borrowing or some other such means or by obtaining them from the rival's proprietors. If our firm's price does not cover the cost of its own invested funds, it is also likely to be unable to cover the rival's required investment cost,

even if the rival is the more efficient supplier and can carry out its production cost with a (slightly) lower investment. In other words, a price of firm F that does not cover the opportunity cost of that firm's avoidable investment can constitute a threat to a more efficient rival and should be considered to fail the generalized Areeda-Turner test.

In contrast, the revenue firm F forgoes by reducing its price has no relevance to determination of whether the new price constitutes a threat to the presence of an efficient rival. If, in our example, the new price of \$25 covers all of firm F's pertinent and avoidable input costs, both its opportunity costs and its other costs, then that price should by definition cover the corresponding costs of the lower input quantities needed by an efficient rival to produce the output in question. True, the higher revenue that the higher \$30 price would have offered might also have constituted a benefit to the rival, but it is irrelevant to whether the lower price, in itself, is or is not a threat to an efficient rival. That gives us, finally:

RULE 8. In carrying out the generalized Areeda-Turner test of a price or set of prices, it is essential to include all opportunity costs of owner-supplied inputs in the calculation of associated avoidable cost, but it is necessary to omit the opportunity cost of any revenue forgone if the price in question constitutes a reduction from an earlier price.²⁰

XIII. FINAL COMMENT: THE HETERODOX POSITIONS ON AREEDA-TURNER

This article has departed from standard views of the Areeda-Turner test in a number of ways. For example, the possibility that combinations of services can fail the modified Areeda-Turner test, even if all the individual services pass, seems not to have arisen in the literature. Still, it should be recognized that in practice courts do seem to have been willing to consider the prices of a set of outputs in combination or an intertemporal sequence of prices in predation lawsuits, just as my proposed rule on this subject requires. Similar comments apply to other rules in this article, such as that on the proper role of opportunity cost in the Areeda-Turner calculation. Perhaps the most novel element in the discussion is the proposed treatment of the Areeda-Turner test as a means to determine whether the price at issue constitutes (or constituted) a threat to efficient rivals, and my deduction from this point of departure that average vari-

²⁰ There are at least two cases in which the courts have explicitly rejected forgone revenues of profits as a type of opportunity cost that must be considered in a predatory pricing case. These are *Continental Airlines, Inc. v. American Airlines, Inc.*, 824 F. Supp. 689 (S.D. Tex. 1993) (in a predatory pricing case, rejecting forgone revenues as an opportunity cost that must be included in determining defendant's relevant costs); *In re IBM Peripheral EDP Devices Antitrust Litigation*, 459 F. Supp. 626 (N.D. Cal. 1978) (same).

able cost, interpreted as average avoidable cost, is really the pertinent criterion, and not merely an inferior proxy for marginal cost.

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