PREDATION AND THE LOGIC OF
THE AVERAGE VARIABLE COST TEST

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This paper seeks to sharpen the formulation of the average variable cost form of the widely—accepted test for predatory pricing proposed by Areeda and Turner. It is shown that average variable cost, the criterion usually used by the courts in carrying out the Areeda—Turner test, is actually more pertinent than the authors' preferred marginal—cost criterion, if the object is to prevent elimination of more efficient rivals. The paper also examines such issues as the pertinent time period for the cost calculation, the relevance of the test to combinations of outputs, and a number of issues that must be settled in carrying the test out in practice. On several of these matters it is concluded that current practice in use of the test requires sharpening or modification, and the nature of the appropriate modifications is described.

Predation and the Logic of the Average Variable Cost Test

William J. Baumol*

Ever since the appearance of the classic Areeda–Turner article [1975] average variable cost (AVC) has played a key role in adjudication of charges of predatory pricing. This is so despite the conclusion by Areeda and 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 _faut 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 had 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 paper 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. The theoretically ideal form of the AVC test will also be considered. While, as is usually true, it will probably prove necessary to make use of simpler approximations to this ideal in practice, fuller

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[1]Phillip Areeda and Donald Turner, "Predatory Pricing and Related Practices Under Section 2 of the Sherman Act," Harvard Law Review, 88, 1975, 637–733.
[2]W.J. Baumol, Superfairness: Applications and Theory, Cambridge, Mass: MIT Press, 1986, 126–27.

understanding of the underlying analytic structure may be necessary for evaluation and improvement of such approximations.

I. In Praise of Areeda Turner

Before getting to the substance of my discussion it is important 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 management 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.

More than that. 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 tradeoff 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 market place 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 conclude 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, whereupon 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. First, the choice of that price must have no legitimate business purpose.[3]

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. Here, we will not be concerned with the

third of these necessary conditions for pricing to be deemed predatory —— the prospect of

recoupment. Rather, we will focus upon 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 A—T 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 upon which the authors propose

to rest their argument. We are told that in equilibrium in a regime of perfect

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[3]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." ("Fare's Fair," The American Lawyer, October 1993, p. 65). 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.

competition, the economists' 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." (p. 702). 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 (p. 703). 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, "By 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..." (p. 712). The authors 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 cost[4] should be conclusive." (p. 713).[5]

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[4]As will be shown presently, the concept "average cost" in a multi−product 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 proceedures," and have commonly been used to inhibit competition.

[5]A curious feature of the A−T 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.

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's 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. On the other hand, 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 legitimate sales at prices below marginal costs are sufficiently rare to constitute a presumption that any such sale does not constitute an act with legitimate business purpose. On the other hand, 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 legitimacy 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 upon 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 we 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.

A—T 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." (pp. 710−11).

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. To see this we must first examine the relation between cost and the incentive for exit that faces a firm. For the story I turn to my Principles textbook[6] from which the following paragraphs (slightly modified) are taken.

To understand the logic of the decision between shutting down and remaining in operation, we must return to the distinction between costs that are sunk and those that are variable (avoidable) in the short run. 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 bought 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, sometimes it will be better off continuing to operate until its obligations to pay sunk costs expire; but sometimes it will do better by shutting down and producing nothing. Two principles govern the decision:

Principle 1. The firm will make a profit if total revenue (TR) exceeds total cost (TC). In that case, it should not plan to shut down either in the short run or in the long run. **Principle 2.** The firm should continue to operate in the short run if TR exceeds total short—run variable cost (TVC).

The first principle is obvious but the second is a bit more subtle. Suppose TR is less than TC. If our unfortunate firm continues in operation, how much will it lose? Clearly it will lose the difference between total cost = total sunk cost (TSC) + total variable cost (TVC)] and total revenue (TR); that is:

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[6]W.J. Baumol and A.S. Blinder, Micoeconomics: Principles and Policy, Fort Worth: the Dryden Press, 5th edition, 1994, 228—29.

Loss if the firm stays in business = [TSC +TVC] − TR.

However, if the firm stops producing, both its revenues and short−run variable costs become zero, leaving only the sunk costs to be paid:

Loss if the firm shuts down = total sunk cost (TSC).

Thus, the firm will not find it profitable to exit from the market unless this results in the lower net loss, that is, unless TSC + TVC − TR > TSC, in other words, unless TVC > TR.

The lowest price that keeps the firm from shutting down can now be shown by introducing one more short−run cost concept: the **average variable cost** (AVC). Why is this cost relevant? Because, as we have just seen, it pays the firm to remain in operation if its total revenue (TR) exceeds its total short−run variable cost (TVC). If we divide both TR and TVC by quantity (Q), we get TR/Q = P and TVC/Q = AVC, so this condition may be stated equivalently as the requirement that it pays the firm to exit (or to avoid entry) if and only if price is below AVC.

The pertinence of all this for the A−T 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 (IC) 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 A, etc., 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

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

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.

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 will 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: AVC? AIC? Average Avoidable Cost?

Though average variable cost is the concept that seems to be used universally in carrying out the A—T 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."[7] Suppose that supply of product X requires installation of a widgetator that is not useful for the supply of any other company good or service, but that, once installed, the widgetator (for which there is a second—hand market) has a huge capacity that suffices for the production of twice the firm's current output of X. Is the price of the widgetator to be classed as a variable cost or a fixed cost? Certainly, production of X bears responsibility for that outlay, since in the absence of X production the firm would not have expended these funds. Further, they are, strictly speaking, variable, since the expansion of output from zero to one unit requires widgetator outlay to rise from zero to the market price of one widgetator. But similar things can also be said about any fixed cost.

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[7]There is considerable confusion in the literature between two pertinent concepts, fixed costs and sunk costs, that are really very different. There are, in fact four types of cost that are relevant here, and they can be defined thus: <u>Fixed costs</u> 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 <u>variable</u>. A <u>sunk cost</u>, on the other hand, is a cost that cannot be avoided for some limited period of time, but after that period it becomes <u>avoidable</u> or <u>escapable</u>. 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 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. On the other hand, 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 ten—year useful life, in contrast, constitutes a cost that is sunk for that period, but it need not be fixed, because at the end of ten years it may be desired 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.

The economists' 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. In the preceding example, suppose a widgetator has capacity sufficient to permit supply of one million units of X, but that any further increase in output requires the acquisition of a second widgetator (whose price is W). Then, if the firm is producing 800,000 units of output, the average incremental cost of the entire output includes the W dollar price of the one widgetator. However, expansion of output from 800,000 to 950,000 requires no additional purchase of this equipment, so the average cost of that increment of output includes no widgetator component. Finally, an increase in X output from 800,000 to 1,200,000 units does force the firm to acquire a second widgetator, and so a W dollar component must be included in the calculation of AIC for this increment in output.

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 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 (which are typically quite substantial) and which 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 confidentially be expected to exceed its average avoidable cost. But that avoidable cost is, nevertheless, apt to include some portion of the product−specific fixed cost. For example, if the widgetator can be sold, even if only at a considerable loss, in the second−hand market in the pertinent period, then some amount of the product−specific fixed cost can clearly be escaped, and should be included in the AAC figure used in employing the A−T test to determine whether the price at issue constitutes a threat to any efficient rival or prospective rival. Thus we arrive at

Rule 2. The proper AVC figure to be used in the A−T 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, however, 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 ATC in Multi−Product Firms

Those who use any "average total cost" figure for a multi−product firm, whether aware of it or not, are guilty of a high crime and misdemeanor against all economic logic. Since the concept intrudes so often in discussions of predation it is well to remind the reader why this is so.

Several observations are pertinent here. First, it may be suspected that, outside a textbook, there exists no such thing as a single−product firm. Certainly, I have never encountered one. Second, all such firms have fixed costs incurred in common on behalf of

two or more of their products. The compensation of the chairman or the president is the most obvious example. Third, there is no economically defensible way of dividing such costs up among the firm's various products.

It is this last observation that is implausible to those who have not studied the issue, and more than a century of accounting practice seems to contradict it. Yet, a simple example will show its inescapable truth.

Assume for simplicity that an airline has only two fares along a given route: first class and economy, and that one of those fares has been attacked as predatory. If that fare is to be compared with average total cost (ATC) how is one to divide up the salary of the pilot and the cost of the fuel? The standard answer is "in accord with relative use." But that avoids the issue. If the plaintiff in the case is an entrant airline that seeks to specialize in luxury service, one can be sure beforehand that its complaint will be about the defendant's first—class fare, and that its accounting calculations will interpret relative use in terms of revenue contribution, thus weighting each first—class passenger at a substantial multiple of the weight assigned to an economy passenger. On the other hand, if the plaintiff is a "no—frills" airline, one can be sure beforehand that it will be the defendant's economy fare that is attacked, and that relative use will be defined in the complaint on the basis of sheer number of passengers, weighting first—class and economy passengers equally. In this way ATC (fully allocated costs) are always manipulated to produce whatever answers are desired by the party that puts them forward. Moreover, they have been used characteristically for the anticompetitive purpose of impeding the setting of low prices, on the claim that those prices do not cover a conveniently interpreted ATC.

The magnitude of the room for manipulation that these calculations make possible is not widely recognized. In one case which there is no reason to consider atypical my colleagues and I used real data to see how much one could swing the result by different

definitions of "relative use.[8]" For one typical year in our data one of the activities of our firm was shown to be vastly overpriced, yielding a rate of return on "ATC" of 247 percent. Yet using exactly the same numbers but a different and equally plausible method of cost allocation, the activity was shown to be horribly underpriced, yielding a negative rate of profit of minus 125 percent! Thus I arrive at

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 <u>neither</u> 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

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[8]See W.J. Baumol, M.F. Koehn and R.D. Willig, "How Arbitrary is Arbitrary? –– or Toward the Deserved Demise of Full Cost Allocation," <u>Public Utilities Fortnightly</u>, 120, September 3, 1987, 16—21.

(avoidable) cost of flying the economy passengers. Thus, none of the common fixed cost enters the incremental cost of any <u>one</u> 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 cost amounts to $15,000. Then an economy fare of $60 and of $100 for first class will clearly cover their respective average incremental (avoidable) costs that are $50 and $80, respectively. But at those prices the total incremental revenue yielded by the flight is 200 X $60 + 40 X $100 = $16,000, and hardly covers the total escapable cost whose amount is 200 X $50 + 40 X $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 <u>the generalized Areeda Turner test</u> 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 triplet, etc.

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 A−T 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.

VII. Sequences of Time Periods and the A−T Test

Just as the generalized A−T 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 two year lease for a building, for example. At the end of the two−year period, if the firm wants to remain in production it will have to continue the rent payments. But only now, 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 upon 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 A−T 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, three months, the period pertinent to the cost calculation is three months. For if that price alone is to drive a competitor from the arena it then has just three 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 that the per unit cost that a rival can escape in that period −− it is the average avoidable cost calculated for a three−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 three months, a $52 price for the following two months, and a $47 price for the five 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 which 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 are 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.

VIII. The Size of the Pertinent Increment (Decrement) Under Differential Pricing

Up to this point we have spoken of a comparison of <u>the</u> (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 <u>differential pricing</u>. 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 we will digress once more to see why such differential pricing may be necessary for the achievement of economic efficiency. That is, the discussion of 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 A—T 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 3000 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 A—T test for this case is rule 4, above. Thus, the $500 dollar sale of 7000 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 A—T 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 3000 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 3000 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 (e.g., 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 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 A−T 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 A−T test 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 is will probably prove wise to disregard it. Consider a case in which the defendant, firm D, is producing 8000 units of good X, while the plaintiff,

firm P, is producing only 2500 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 2500 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 2500 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 2500 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 A–T test. But the output quantity in question is not the 8000 unit output of the defendant, <u>but the 2500 unit output quantity of the plaintiff.</u>[9] The reason for this rather surprising observation is that the pertinent 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 even, if average variable cost is being used to determine not whether a particular price by firm X is a threat to its competitor, but to investigate whether it is compensatory to X and, hence, a legitimate business decision, then it is clear that it is the output of X, and not that of a

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[9]That is, the pertinent cost is the defendant's avoidable cost entailed in producing the 2500 units after they are, hypothetically, added to its initial 8000–unit output.

rival, that is pertinent.

IX. 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. It will be shown that differential pricing may not be needed if production of commodity X entails scale economies throughout the relevant output range, or if, instead, there are scale diseconomies throughout. However, we will see that such prices may be needed if, as is widely considered to be the normal case, the firm's average cost[10] curve is U shaped, that is, its average costs decline when output increases if the firm is small, then level off as the firm reaches an intermediate size and, finally, begin to rise after the firm's size becomes sufficiently large and unwieldy. I will deal with these cases in turn.

A. The declining average cost case (scale economies). If average costs decline throughout the pertinent output range it should be obvious that production of commodity X, the good at issue, will always be less costly to society in terms of the value of the resources used up in the process if the production is carried out by a single enterprise rather than by a multiplicity of firms. This is the classic case of pure natural monopoly. Here, a price equal to the average cost of the most efficient firm, including as one of the components the firm's cost of capital (what regulators call a "fair rate of return" to the firm's capital) will enable the firm to survive and prosper. Moreover, that price will keep out all less—efficient rivals, whose higher average costs will not permit them to survive at the price equal to the lower AC of the more efficient firm. Here, then, there is no need

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[10]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, above).

for differential pricing of commodity X in order to attain economic efficiency.

B. The increasing average cost case. Where average costs rises throughout, it is equally obvious that small is efficient. Thus, it will be efficient for a multiplicity of small enterprises to share production of the total industry output of X. With a price fixed by market forces, each firm will maximize its profit by producing an output quantity at which its marginal cost equals that price, because if price exceeds marginal cost the firm will add to profit with every additional unit of output it produces, and the opposite will be true if marginal cost is higher than price. Thus, with every firm's marginal cost equal to the same price the marginal cost of each firm must be equal to that of every other enterprise. But that also happens to be the necessary condition for and the standard test of efficiency in the apportionment of the industry's total output among the firms that produce it. That is, if the MC of firm A were $6 while that of firm B were $5 it is clear that production cannot be allocated efficiently between the two firms, since savings could be realized by a transfer of some production from firm A to firm B. Thus, efficiency requires outputs to be those that make the marginal costs of the two firms equal, and in such a market a fixed (non differential) price will automatically elicit decisions consistent with this efficiency requirement.

Moreover, as is well known, where average cost is rising, marginal cost must exceed average cost, so that with price equal to marginal cost in every firm, that price must pass any form of the Areeda−Turner test.

C. The case of U−shaped average−cost curves. 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 point on the x axis labelled 60 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 hand end of the axis we have the point labelled 0 at which firm 1 produces nothing and so firm 2 produces 100 percent of industry output, while at the right hand end of the axis, at the point labelled 100, 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 in the graph, in the usual manner. For firm 2, however, rising output share means moving from right to left.

From the discussion of case B in the paragraph preceding the last we see that 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 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 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 group, with each group's price set to pass the A−T 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 A−T 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.[11]

X. 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 A−T test.

The notion that failure to maximize short run profits is somehow associated with predation has arisen in the A−T discussion from the very beginning. Thus, Areeda and

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[11]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 firms, 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, e.g., W.J. Baumol and J.G. Sidak, <u>Toward Competition in Local Telecommunications, Cambridge, Mass.: MIT Press, 1993, Chapter</u> −−−.

Turner themselves remark "A necessary but...not sufficient condition of predation is the sacrifice of short—run profits." (p. 703). 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 enough to enable the discriminator to reap the benefits of predation before new entry is possible." [International Air Ind. Inc v. American Excelsior Co. 517 F.2d 714 (5th Cir. 1975) p. 724; Adjusters Replace—a—Car v. Agency Rent—a—Car, Inc. 739 F.2d 884 (5th Cir. 1984) pp. 889—890]. This would seem to imply that in the circumstances noted, failure to maximize profit is also <u>sufficient</u> 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 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 two weeks, and that entails $10,000 in net costs during those two 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 two−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 decision by a firm to fail to maximize the profits it can expect to earn during some brief proximate time period, provided 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.

XI. 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 the present author) 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 A−T test. I will 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 which 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 foregone 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. For the decision to tie them up in the company means that they cannot be invested in bonds where they would have earned, say, $9000 per year in interest. On this account, then, the proprietor is $9000 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, 1000 units of product at a price of $30 per unit, will now be sold at the reduced price of, e.g., $25, resulting in a foregone revenue of $5 X 1000 units

= \$5000. 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 A−T test comparing the price with avoidable cost. Obviously, the inclusion of opportunity cost can only increase the avoidable cost figure and make the A−T 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 A−T 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 foregone 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 A−T test.

On the other hand, 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 their opportunity costs and their other costs, then they 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 foregone if the price in question constitutes a reduction from an earlier price.[12]

XI. Final Comment: The Heterodox Positions on Areeda Turner

This paper has departed from standard views on the Areeda–Turner test in a number of ways. For example, its emphasis of the possibility that combinations of prices can satisfy the necessary cost requirement for them to constitute predation even if no individual price alone fails the A–T test 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 a predation lawsuit, just as the rule on this subject proposed here requires. Similar comments apply to other rules in this article, such as that on the proper role of opportunity cost in the A–T calculation. Perhaps the most novel element in the

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

discussion is the proposed treatment of the A−T test as a means to determine whether the price at issue constitutes (or constituted) a threat to efficient rivals, and its deduction from this point of departure that average variable cost, interpreted as average avoidable cost, is really the pertinent criterion, and not merely an inferior proxy for marginal cost.