ECONOMIC RATIONALITY AND THE AREEDA-TURNER RULE

May 12, 2014

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Abstract The Areeda-Turner rule in US antitrust jurisprudence limits predatory pricing cases to circumstances where prices are set below marginal costs. While not cast so, the rule reflects the view that predatory pricing is rarely attempted; and even where attempted is rarely successful; and even where attempted and successful, is difficult to identify. In this paper, we examine the theoretical and empirical foundations of this rule, and conclude that it is time to demote the Areeda-Turner analysis from the status of a rule to that of a potentially useful form of inquiry in predatory pricing litigation, but one which is neither necessary nor dispositive.

Keywords Predatory Pricing, Antitrust, Monopolization, Areeda-Turner Rule, Credibility, Subgame Perfection, Rationality, Chain-Story Paradox

JEL Numbers: K21, L41, L12, D43

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1. Introduction

The Areeda-Turner (1975) rule in US antitrust jurisprudence limits predatory pricing cases to circumstances where prices are set below marginal costs. While not cast so, the rule reflects the view that predatory pricing is rarely attempted; and even where attempted is rarely successful; and even where attempted and successful, is difficult to identify. Under this rule, courts are reluctant to take action against purported predators even under highly suggestive circumstances. In this paper, we examine the theoretical and empirical foundations of the rule, and therefore whether the current judicial antipathy towards predatory pricing actions deserves to be reconsidered.

At a theoretical level, The Areeda-Turner rule limits predatory pricing to circumstances where firms set prices

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1 Christopher Sagers identified 123 appellate and 191 Federal district court decisions between Matsushita (1986) and 2009. None were decided on the merits in favor of plaintiffs (2009 pp. 922, 923).
below marginal costs. At higher prices, firms receive safe harbor protection which effectively immunizes them from antitrust liability. The rule’s premise is that a rational profit-maximizing firm never sets prices below marginal costs in the absence of predatory purposes. For this reason, when such prices are actually observed, there is a strong suggestion of a predatory motive. This premise, of course, is correct only under simple static circumstances.

On the face of it, the Areeda-Turner rule does not imply that prices exceeding marginal costs cannot be predatory; but merely that they are ambiguous. With this ambiguity, Areeda and Turner would have courts find no liability in those circumstances. This recognition follows because most prices exceed marginal costs and are not predatory. But some prices above marginal costs are predatory, both in effect and intent. In practice, therefore, this rule discourages findings of predatory pricing. It rests on a judgment that predatory pricing is so rare that courts should tread lightly in dealing with

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2 Since marginal costs are traditionally difficult to measure, some accounting measure of average variable costs are often used in practice.
3 There is some disagreement about whether the pricing must be above marginal cost or above average total costs for the firm to enter the safe harbor. In any case, there is a presumption of legality, when prices exceed marginal costs. See Elzinga and Mills (2000-2001, p. 2483). Our analysis does not depend on this distinction.
4 See Aaron Edlin (2001).
above-cost pricing allegations. While not obvious on the face of it, applying the marginal cost test in practice is usually quite difficult. Requiring this analysis creates a further barrier to the successful prosecution of cases against predatory pricing, even when the Areeda-Turner criterion for predatory pricing is met.\(^5\)

The Areeda-Turner rule, like most policy rules, relies inevitably on the distinction between Type I and Type II errors. By enforcing this rule, a decision-maker seeks to minimize the presence of Type I errors: finding predation when in fact it is not present. However, the rule necessarily permits increased Type II errors: finding no predation when, in fact, it is present. Since both types of error are relevant for antitrust and other policy decisions, enforcing this rule makes sense only if there are few instances of predatory pricing, or alternatively if it is very difficult to determine when they are present, or both. If on the other hand, there are many and varied circumstances where prices are set for predatory purposes, then the premise underlying the rule is questionable, and there may be good reasons to reject or modify it. What then becomes critical is whether predatory pricing behavior

is common and detectable. Shedding light on that question is the purpose of this paper.

2. The Economic Literature

The relevant economic literature points in both directions. First and widely accepted during the antitrust revolution of the 1980s,6 there is the proposition that rational, profit-maximizing firms do not engage in predatory conduct because it requires the threat of irrational actions at some point in the future; so that firms being threatened will strongly discount the threat as not credible. The critical implication here is that potential predators will not generally make threats which require irrational actions.

An early statement of this argument appeared in John Magee’s influential paper on the Standard Oil Trust (1958). He contested the then-accepted position that Standard Oil had achieved and maintained its market power through predatory means, as resting on an irrational premise. The bulk of McGee’s paper consists of a detailed interpretation of the available evidence, mostly testimony, from the Standard Oil case. From that review, he concluded that

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6 See Lott’s judgment that “In 1980 the predominant view among economists was that predatory price cutting would rarely if ever be profitable” (1990, p.1).
“Standard Oil did not use predatory price discrimination to drive out competing refiners, nor did its pricing practices have that effect” (McGee 1958, p. 168).

Years later, McGee reaffirmed his conclusion that predatory pricing is rare. Noting that he had proposed a cost-based rule in 1965, predating the Areeda-Turner rule by ten years, McGee gave the rule a qualified endorsement (McGee 1980). There was also an important sympathetic legal decision in this vein by Judge Frank Easterbrook (A. A. Poultry, 1989). In large measure, the Areeda-Turner rule resulted from that early consensus.

3.1 The Game Theory Version of the “Predation is not Rational” Argument

A variant of this argument appears in the game theory literature. In that context, it is argued that rational conduct require subgame perfect behavior at all decision points (any subgame) in any interaction (Selton 1978). This construct offers an alternate means of reaching the same conclusion that because equilibria with successful predation are often not subgame perfect (in finite games),

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7 This complex form of multi-period rationality is often very both demanding and leads to poorer total outcomes for all players together.
predatory threats are therefore not credible.\footnote{This specific critique was levied at our earlier work. See Comanor and Frech (1985), comments by Schwartz (1987) and Mathewson and Winter (1987) and our reply (1987).} Carrying out such threats would then not be rational as they would lead to lower profits.

McGee’s early work on predatory pricing can be viewed as anticipating the more formal subgame perfection analyses of Selten. Understandably, a US Supreme Court decision from the 1980s is consistent with this view. Its stated conclusion is that “predatory pricing schemes are rarely tried, and even more rarely successful.” (Matsushita v. Zenith, 475 US 574, 589-90, 1986). That decision merely followed the related academic literature.

3.2 Theoretical Counterarguments

There are two main threads of counterarguments to the view that predation is irrational, and therefore will not generally be observed because only subgame perfect equilibria represent rational behavior. The two threads differ according to the level of information that is presumed.

3.2.1 Perfect Information
Even with perfect information, there are theoretical explanations as to why individuals would not behave in the narrow manner presumed by the requirement of subgame perfect equilibrium. Many of these arguments were developed originally by Selten in the same classic article entitled “The Chain Story Paradox,” (emphasis added) that provides the analytic foundation of the “predation is irrational” viewpoint. It is thereby worthy of some consideration.

That paper provides a stylized predatory pricing example. Consider a chain retail store operating in twenty local markets, holding some level of market power in each of them. It faces potential sequential entry in each market. In each case, the retail chain can choose between “accommodation” by maximizing profits while accepting the presence of the entrant, or alternatively “resistance” by setting lower prices with the aim of discouraging and perhaps even excluding the entrant. In the short run, “accommodation” is the more profitable strategy for it avoids the immediate cost of predatory actions. However, choosing “resistance” may deter entry in later periods which can lead to higher overall profits.

In the game theoretic result for which Selten’s paper is most remembered, he employs the solution concept of
backward induction which leads the incumbent firm to accommodate the entrant’s presence at each stage, and therefore in every local market. Under that paradigm, predation is indeed irrational. For Selten, however, this solution concept offers merely one approach to the problem; which he calls the “induction theory.”

What is often ignored is that Selten himself believed that the accommodative outcome frequently conflicts with observed behavior. In Selten’s own language “there is a disturbing disagreement between plausible game behavior and game theoretical reasoning” (p. 127). For this reason, he advocates using a “limited rationality approach” (p. 127) as an alternative, which he calls the “deterrence theory.”

Under Selten’s deterrence theory, the incumbent pursues an aggressive response to any entrant that appears at the first few decision points. Anticipating this reaction, possible entrants often do not appear. If, however, there are new entrants, the incumbent reacts aggressively and willingly bears the additional costs of doing so. While that conduct may be irrational for the case at hand, i.e. the local market, it may still lead to higher profits in the long run, and over all local markets, if potential entrants see the likely consequences of their entry and are thereby restrained from joining the market.
The purpose of contesting the entry of any particular firm is the message conveyed to all others about the costs of doing so.

At some point, towards the end of the game, Selten’s incumbent recognizes the greater power of the induction approach and switches to a more accommodative strategy. While this theory does not predict when the incumbent switches, Selten suggests “this does not impair the practical applicability of the theory” (Selten 1978, p. 132). He observes that this “not-strictly-rational theory” often leads to higher returns for the incumbent than does fully rational, subgame perfect behavior. Depending on the exact payouts and the length of the game, the gain from not-strictly-rational behavior can indeed be much larger than the profits earned through accommodation.

In Selten’s example, and often in the actual economy, the not-strictly-rational approach also leads to higher total payouts for all firms in the industry, including incumbents and entrants. This result occurs because the industry is less competitive without entry, and the producer surplus to be divided among sellers is larger as
increased monopoly returns are earned in the absence of effective entry.  

An alternative to Selten’s “deterrence theory” is that offered by Roy Radner. His approach is useful for explicitly describing the likely gains from conduct that is not strictly rational. This involves Radner’s concept of “epsilon equilibrium.” What is present there is a rigorous way of weakening the strict rationality requirement present in Cournot-Nash equilibria. Radnor’s epsilon equilibria rest on adopting a combination of strategies so that each player lies within epsilon (in terms of profit) of his best possible response in the action at hand. To be more explicit, in long finite games, the loss in playing in a predatory manner, as opposed to Nash best-response play, is small, relative to the gain from predation. Much like Selten’s deterrence theory, the predatory approach disappears towards the end of the game. However, even with a small error in calculation, a slight bias towards predation can lead to large gains. Thus, Selten and Radner both describe circumstances where predation is a likely outcome even in finite, full-information games.

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9 There is a literature on the evolutionary advantages of both a tendency to both dominant and cooperative behavior in both humans and other animals (Hirshleifer 1977; Sach, Mueller, Wilcox and Bull (2004); Van Doerbee, Hengeveld and Weissing (2003). This analysis makes the adherence to a the strong concept of rational in perfect equilibria less attractive and supports the view of Selten and Radner.
3.2.2 The Appearance of Multiple Equilibria

A common feature of modern game theory is the presence of multiple equilibria. Merely specifying the characteristics of each player, along with underlying market conditions, is often not sufficient to permit one to determine a game’s final outcome. A recent paper provides a formal connection between predatory pricing and the presence of multiple equilibria, where each equilibrium point rests fundamentally on different expectations.

In the authors’ model

multiple equilibria arise ... [when] there is more than one set of firms’ expectations regarding the value of continued play that is consistent with rational expectations about equilibrium behavior and industry dynamics. Which of these is realized depends on firms’ expectations. Loosely speaking, if firms anticipate that predatory pricing may work, they have an incentive to choose the extremely aggressive prices that, in turn, ensure that predatory pricing does work. (Besanko et al., 2014, p. 871)

What that study emphasizes is that rationality in the presence of multiple equilibria is an elusive concept. Identifying rationality with one particular equilibrium concept can be highly misleading particularly in the presence of alternative sets of expectations leading to widely different equilibrium points.

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10 For a classic discussion of the question of multiple equilibria, although from different perspectives, see Franklin Fisher (1989) and Carl Shapiro (1989).
3.2.3 Imperfect information

Game theoretic arguments supporting the presence of predatory pricing are better known in an imperfect information setting. Consider a game (or an industry) where potential entrants can never observe an incumbent’s costs or technology. In that case, they never actually know if their rival’s actions are profitable or costly. In such circumstances, it may be fully rational for an incumbent to threaten and sometime carry out predatory pricing schemes. Some of the classics papers in this tradition are Krebs and Wilson (1982); Milgrom and Roberts (1982) and Fudenberg and Tirole (1986).

Consider the “signal-jamming” model of Drew Fudenberg and Jean Tirole (1986). In their model, a potential predator wants both to induce efficient entrants to exit as well as to deter future entry. It recognizes that these goals can be achieved only if it can mimic what a superior competitor with lower marginal costs would do in the same circumstances. The potential predator does this by setting below-cost prices. While that strategy would not work if all costs were transparent, it can be successful when actual or potential rivals are deceived.
Another approach would be signaling that its primary decision-maker is not strictly rational. As reflected in the models of both Selten and Radner, a predator’s deviation from strict rationality can be small and still gain its desired result. A critical feature in all these models is that relationships among rivals are inherently asymmetrical.

The potential predator’s signals must be understood by current and possible rivals so they must be observable (Comanor and Frech 1993). For this reason, an inquiry into a predator’s intent can be both easier and more productive than is widely believed. For a predator to succeed, it must communicate its commitment to its likely prey. For this reason, the situation again is inherently asymmetrical. We believe therefore that evidence of intent to communicate a predatory commitment should be given substantial weight. While hostile statements including bragging or misplaced analogies to war and sports may not be relevant, specific attempts to communicate commitments are.

3.2.4 The Role of Costs

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11 For an especially clear argument which is contrary to our view on the usefulness of intent, see Judge Easterbrook’s opinion in A.A. Poultry (1989).
A striking feature of the theoretical economics literature on predatory conduct is the minimal role played by costs, which however are pivotal in the Areeda-Turner approach. What is important are the expectations that firms have for each other; and depending on these expectations, they may or may not engage in predatory actions. That is the essential message which should be gleaned from our brief review of the economic literature.

While many factors can drive expectations, a critical one is a firm’s judgment of its rival’s costs. When a firm believes his rival’s costs are lower than his own, he likely believes that a rival’s price cuts can be maintained longer than his can; and he will respond accordingly. On the other hand, if he judges his rival’s costs as higher, then he recognizes his own advantage, and can employ predatory tactics when advisable. In this context, costs by themselves, are unimportant except through influencing firms’ expectations.

That conclusion applies to the question of whether a rival’s newly set prices are above or below marginal costs. What is relevant is the ability and willingness to earn lesser profits in the short run for longer run gains; and this calculus is present when all prices are set above
marginal costs just as they are when a new set of prices lies below marginal costs. On a theoretical basis, it is the willingness to sacrifice current profits for exclusionary purposes that marks the presence of predatory pricing, and not that the prices fall above or below some pre-specified measure of costs.

Einer Elhauge offers an interesting perspective on this issue, but one which suffers from a highly assumption-specific framework (2003). In the presence of substantial common fixed costs across different markets, and facing different classes of consumers with different price elasticities, sellers with market power may need to practice extensive price discrimination merely to cover their common costs. In that case, entrants who attract customers limited to particular market segments can represent business-threatening events if the incumbent cannot then cover its fixed common costs. In such circumstances, so Elhauge’s paper suggests, cutting prices in response to an entrant’s much lower prices in some market segment can be pro-competitive since it keeps the multi-product incumbent firm in business and thereby increases overall output.
Elhauge’s analysis has interesting paradoxical implications. The incumbent’s low prices are designed and have the effect of driving entrants from the market. However, under his assumed conditions, they are also welfare improving. For this reason, he would not label them as predatory. Alternatively, one could reasonably conclude that although predatory in both purpose and effect, the incumbent’s price cuts are also welfare-enhancing as needed to keep a multi-product monopolist in business. We do not question Elhauge’s conclusion that there can be conditions where predatory price cuts are efficiency-enhancing. His analysis is actually a particular version of the natural monopoly theory where any entry is inefficient and should be prevented.

Strikingly, Elhauge’s conclusions apply to price cuts both above and below marginal costs. For this reason, they have little bearing on the current debate over the Areeda-Turner rule.

3.3 Experimental Evidence

In an oft-cited early laboratory experiment involving a single market, Mark Issac and Vernon Smith attempted but failed to induce predatory pricing behavior (1985). They
interpreted that result as supporting Selten’s subgame
perfect game theoretic equilibrium (Issaac and Smith 1985, p. 342). As we noted above, however, that result was not what Selten actually expected.

Furthermore, subsequent experiments involving multiple markets have reported different results where predatory pricing actions are more commonly found (Gomez, Goerkee and Holt 2008). In related work, Jeroen Hinloopen, Wieland Mueller and Hans-Theo Normann show that bundling products across markets can function as a commitment device, leading to higher profits for a seller who has a monopoly in one market but is a duopolist in another (2011).

3.4 Empirical Evidence

Like their theoretical counterparts, empirical studies of the presence of predatory pricing are mixed. On the one hand, for example, is the study of Kenneth Elzinga and David Mills, covering the beer industry and an expost analysis of key antitrust cases. They conclude that the courts’ skepticism of predatory claims has been warranted. Similarly, a more recent survey by Joshua Wright and Judd Stone that concludes that “price predation … remains as elusive as ever in the wild” (2012, p. 882). In contrast is the review by Zerbe and Mumford (1996) which finds that
instances of predation are neither “rare or unsuccessful” (p. 957). In one example, they review the data and find “about 46% (of the cases) involved predation.” (p. 961). Of course, much depends on how predation is defined, and different authors use different constructs.

Take the issue of mergers and acquisitions, which is sometimes considered a reason why predatory pricing would be rare. The idea is that mergers eliminate rivals at lower cost as compared with predatory actions. Indeed, McGee’s original paper on the Standard Oil Trust (1958) is often cited for that conclusion. While McGee demonstrates that Standard Oil used mergers to gain its monopoly position, Zerbe and Mumford respond that Standard used actual and threatened predatory pricing to obtain favorable railroad rebates, which then allowed it pay less to acquire its rivals (p. 957).

That conclusion also applies to acquisitions made by the American Tobacco Trust in achieving its monopoly position. Using a data set comprised of all acquisitions made between 1891 and 1906, Burns (1980) reports that the “alleged predation reduced the acquisition costs of American Tobacco both by lowering the amounts paid for asserted victims and by creating a reputation for misconduct that lessened expenditures for competitors
acquired peacefully thereafter” (1986, p. 269). What Burns’ study suggests is that predatory actions and the acquisition of rivals are complementary rather than alternative strategies. From his study, he suggests that “below-cost pricing [may actually be] a systemic business practice.” (pp. 268-269).

3.5 Airline Predation

There are various reported instances of airline predation in which leading airlines have responded to the entry of smaller rivals by charging much lower prices in relevant city-pair markets, and then raising prices to pre-existing levels after the new entrants have left. Two instances include Northwest Airlines’ response to the entry of Sprint Airlines in the early 1990s and the campaign of American Airlines against low cost airlines on routes originating at its Dallas-Fort Worth hub. Both involve actions taken against smaller rivals which were designed allegedly to lead them to set higher prices of leave the market (Sagers, 2009, pp. 953-954).

In the case of Northwest/Sprint, two city-pair markets were at issue: Detroit-Philadelphia and Detroit-Boston. In 1995, prior to Sprint’s entry, Northwest’s shares were 69% and 90% respectively (Elzinga & Mills, 2014, pp. 320-321).
At that time, its average one-way fares were just over $200 and about $250 on the two routes. But once Sprint entered the market at the end of 1996, Northwest cut fares precipitously to under $100 in each case; and it increased the number of flights in both markets as well. Although its fares remained slightly lower than the new lower prices set by Northwest, Sprint’s load factors declined sharply, and it canceled all flights in both markets in September 1996, just nine months after it had entered. Immediately, Northwest raised prices to nearly its previous levels (pp. 313-316). Sprint brought suit, and the issue before the Court was whether Northwest’s actions represented predatory actions or were merely normal pricing practices under the competitive need to meet competition.

Sprint must have believed that Northwest’s implicit threat to keep prices at levels set during the first half of 1996 for the foreseeable future was credible. Otherwise, it would have remained in the market until Northwest raised its fares towards its earlier levels. Even at the new lower fares set by Northwest, Sprint apparently believed they could be maintained indefinitely, or at least long enough so that its own continued presence in these markets would be a losing proposition. While Northwest’s actions may not have been subgame optimal at
each decision point, they were likely profitable in the end.

Similar circumstances arose in American Airline’s (AA) response to the entry of various low-cost carriers into their Dallas-Fort Worth (DFW) hub in the mid-1990s. Prior to this entry, AA enjoyed relatively high margins at their DFW hub. While their flights to and from that hub represented only between 40 and 58 percent of AA’s domestic capacity, they accounted for between 60 and 86 percent of the airline’s domestic earnings (US v. AMR Corp., 2001, p. 1150). It thus faced a strong incentive to defend its most profitable territory, and it did just that when new rivals appeared. It cut prices and increased available flight capacities in order specifically “to get them out.” This is the same behavior that Selten calls “resistance to entry.”

American Airline officials acknowledged that this “strategy would be very expensive in terms of AA’s short-term profitability” (p. 1152). What occurred, as the judge in the lawsuit observed, was that the airline “weighed the cost of short-term profit loss against ‘benefits’ that include both the reduction of competition from current

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competitors and discouragement of future entrants” (p. 1155). In effect, the costs borne by AA in the form of lower profits represented an investment in future profitability. This behavior thus cannot be described as subgame perfect optimal conduct even though it may have led to greater AA profits in the long run.

A relevant finding from the lawsuit was that AA’s cost per available seat mile was 8.54 cents while a rival’s comparable cost was only 4.32 cents (p. 1151). This observation raises the relevant question of why the latter was unable to compete with the established incumbent and was forced to leave the market. One interpretation is that the incumbent had better access to financial resources (the long purse). In any case, larger established firms seem able to set predatory prices despite higher reported costs.

This issue is relevant because the Court ruled that AA did not price below “an appropriate measure of cost” nor did it price below its rivals’ fares (p. 1218,9). Despite that finding, AA’s lower fares along with its substantial capacity increase on the relevant routes were apparently sufficient to lead the new rivals to exit.

In both instances, the established airlines raised its fares to prior levels after the rival had left the market. The courts were asked to decide whether the lower interim
prices should be described as merely meeting competition or as exclusionary conduct. Under the first explanation, the presumption is that market conditions had changed so it was to be expected that the incumbent’s prices would change as well. On the other hand, the second explanation specifically presumes that the incumbent’s purpose is to discipline or exclude its rival in order to permit it to resume the profitable pricing practices that had existed prior to the rival’s entry. In this regard, the firm’s purpose and intent play important roles in helping the courts make this distinction.

4 Conclusions

There are both theoretical and empirical reasons for believing that predatory pricing is more common than acknowledged in recent court decisions. As Aaron Edlin concludes in his review of current economic studies of this question: if “business folk think so,” it is so. (Edlin, 2012, p. 147). A similar point is made in Besanko et al. (2014) where the authors argue that some of their multiple equilibria are “predation-like” and supported by differing expectations (2014, p. 871). We agree that analyzing predatory pricing is highly dependent on the perceptions and expectations of market participants. Our view thereby
contrasts with the sweeping generalizations of the conventional wisdom which appeared following Mcgee’s 1958 paper and which underlie the Areeda-Turner rule. The proposition that predatory pricing rarely occurs is not supported either by economic theory or empirical evidence.

As to the specific issue of the usefulness of price-cost tests, we observe that whether prices are above or below marginal costs plays little role in any of the theoretical or empirical discussions of predatory pricing reviewed above. We therefore believe that using the Areeda-Turner cost test as a filter or hurdle for litigation, and granting safe harbor status to all price cuts above marginal cost, represents misplaced concreteness. To be sure, analyzing available cost and price data, particularly during alleged predatory episodes, may provide useful information; but it is merely one source of information among others. It is time to demote the Areeda-Turner analysis from the status of a rule to that of a potentially useful form of inquiry in predatory pricing litigation, but one which is neither necessary nor dispositive.
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