
The Legacy of *Matsushita*: The Role of Economics in Antitrust Litigation

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I. INTRODUCTION

In *Matsushita*,¹ two U.S. electronics companies brought suit against, in effect, seven Japanese electronics manufacturers for collusively engaging in predatory pricing. The massive record compiled in the case apparently contained no direct evidence of the sort of conspiracy that could have led to damages to be owed to plaintiffs. While the record arguably did contain circumstantial evidence of such a conspiracy, the Court did not allow a jury to decide whether that evidence was sufficient. In granting appellants' motion for summary judgment, it ruled, "[I]f the factual context renders respondents' claims implausible—if the claim is one that simply makes no economic sense—respondents must come forward with more persuasive evidence to support their claim than would otherwise be necessary."² According to the Court, there were two aspects of the case that were particularly implausible. The period of predation supposedly began in 1953, more than twenty years before the case was filed. Even if the Japanese companies were eventually to drive U.S. firms from the market, the present value of the entire strategy must have been negative. Moreover, however implausible the predation strategy would have been for a single dominant firm, the allegation was that all the companies had colluded in the predatory scheme. This would have required the cartel to be stable for decades. The members would have had to agree on both the allocation of losses during the predation period and the allocation of gains in the post-predation period.

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1. *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 589 (1986).

2. *Id.* at 587 (emphasis added).

Matsushita occurred at a time of long-standing concerns that certain aspects of antitrust policy were fundamentally misguided and that economic analysis could be a powerful analytical tool for distinguishing between sound and counterproductive policies. Economics had been a part of antitrust litigation before the decision, but *Matsushita* was a key step in giving economics a greater role. That role is now widely accepted in the United States, in Europe, and arguably in much of the world.³ Yet, despite the apparent agreement on the broad principle that antitrust policy should be economically sound, there remains controversy over exactly what that principle implies either for policy or for the resolution of any particular case. One reading of *Matsushita* is that it requires an antitrust case to be supported by a formal economic model. In the years since *Matsushita*, the economic modeling used in antitrust cases has become increasingly sophisticated technically; and this increased use of formal economic tools is arguably part of the legacy of *Matsushita*. Yet, while *Matsushita* clearly lays out an increased role for economics, the use of a formal model as the centerpiece of a predation claim may not necessarily be the role implied by the decision.

The specific allegation in *Matsushita* was collusive predation. The legacy of the increased role the decision gives to economics extends far beyond that specific issue to virtually every area of antitrust law. The biggest impact, however, was on predatory pricing doctrine. This article describes the evolution of predatory pricing doctrine since *Matsushita* with a focus both on the role economics has played and on the role it should play in predatory pricing cases.

Part II of this article discusses the *Matsushita* decision itself. It argues that the decision can be read to create two possible roles for economics. One, henceforth the “microanalytic” role, would be to present each case in terms of a formal economic model. In contrast, a “decision theoretic” role would entail creating simple rules based on the recognition that economic analysis is inherently imprecise and that errors are inevitable. Part III explores the possible microanalytic role for economics in more detail. Drawing on game theory,⁴ it argues that the “no economic sense” screen in predation cases is inherently coarse. It can properly rule out allegations like those in *Matsushita*, but there are likely to be cases in which a wide range of behavior could make

3. See *infra* Part II (discussing *Matsushita*'s influence on the role of economics in antitrust litigation).

4. See *infra* Part III (describing game theory).

economic sense. Part IV then turns to *Brooke Group*,⁵ which seems to place extra emphasis on a microanalytic role for economics. Part IV argues, however, that the Court might have gone beyond what can be said as a matter of economics in dismissing the allegations on the grounds that recoupment was not plausible. Part V then turns to two recent cases involving the airline industry—the Department of Justice’s predatory pricing case against American Airlines,⁶ and Spirit Airlines’ predatory pricing case against Northwest.⁷ These cases illustrate how the courts’ ability to use economics appropriately in its decision theoretic role has been limited by academic neglect of the cost issues central to those cases.

II. THE LEGACY OF *MATSUSHITA*

Matsushita contained two key phrases (or, more accurately, sets of phrases) with respect to the role of economics in antitrust cases. The first set, which was quoted in the introduction, linked the plausibility of a claim to whether it makes economic sense. The second set contains the assertions that “predatory pricing schemes are rarely tried, and even more rarely successful”⁸ and that “mistaken inferences in cases such as this one are especially costly, because they chill the very conduct the antitrust laws are designed to protect.”⁹

With these statements, the Court acknowledged that courts and juries would sometimes make mistakes in deciding whether predation had occurred and that the possibility of such mistakes affects legal standards. With a perfect test for predation, we would not need to worry whether predation was rare or about the cost of confusing competition with predation. When predation occurred, it would be punished. Absent such a test, however, the legal standard should rationally take account both of the relative frequency of anticompetitive price reductions (compared with those that are just good, clean competition) as well as the cost of falsely labeling a competitive price cut as predatory.¹⁰

5. *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209 (1993).

6. *United States v. AMR Corp.*, 335 F.3d 1109 (10th Cir. 2003). The district court decision is found at 140 F. Supp 2d. 1141 (D. Kan. 2001).

7. *Spirit Airlines, Inc. v. Northwest Airlines, Inc.*, 431 F.3d 917 (6th Cir. 2005).

8. *Matsushita*, 475 U.S. at 589.

9. *Id.* at 594.

10. Keith N. Hylton and Michael Salinger, *Tying Law and Policy: A Decision-Theoretic Approach*, 69 ANTITRUST L.J. 469 (2001) as well as James C. Cooper, Luke Froeb, Daniel P. O’Brien & Michael Vita, *Vertical Antitrust Policy as a Problem of Inference*, 23 INT’L J. INDUS. ORG. 639 (2005).

As important as *Matsushita* was, it left some important questions unanswered. It set out a two-pronged test for demonstrating predation. Plaintiffs must demonstrate pricing below the “appropriate measure of cost,”¹¹ and must demonstrate that the alleged predator had a reasonable prospect of recoupment.¹² The appropriate measure of cost remains a large, open question.¹³

The Court also gave little guidance as to the standards for demonstrating the plausibility of recoupment. The claims in *Matsushita* were so preposterous that there was no need to discuss details at that time. Any remotely plausible approach would give the answer that recoupment after a twenty-year predation period is implausible. From the decision itself, it is hard to know whether the “economic sense” screen was intended as a fine screen in which a professional economist would be needed to make the call, or whether it would be a kind of “sanity check” that would not require much in the way of formal economic tools. One might expect that as economic analysis becomes more sophisticated, the screen could become increasingly fine; and perhaps it will. The approach economists use to analyze market settings with a small number of firms—“game theory”—is, however, inherently imprecise and may only be capable of providing a coarse screen.

III. INHERENT LIMITS OF THE “NO ECONOMIC SENSE SCREEN”

For an economist, the requirement that a claim in a case make economic sense means that one can construct a formal economic model of the claim. The Court might not have explicitly intended the statement to refer to mathematical models, but the implication is unavoidable. To demonstrate that an antitrust claim makes economic sense, one must show that the defendant would have found the alleged anticompetitive behavior to be profitable. Such a conclusion could only rest on a computation of profits that would require estimates of costs, quantities sold, and prices received. In turn, costs, quantities sold, and prices are necessarily interrelated because of constraints imposed by market demand and competitive interaction. Any computation of the profitability of a particular action requires estimates of and/or assumptions about these interrelationships.

Determining these interrelationships is complicated by a variety of factors. One is that direct observation of demand and cost relationships is generally not possible. In any particular market, there is a price

11. *Matsushita*, 475 U.S. at 584 n.8.

12. *Id.* at 589.

13. *See infra* Part V (discussing the difficulty of ascertaining costs).

charged and quantity demanded. Even if these are observable, the counterfactual of what demand would have been under a different price is not. Similarly, even if the costs incurred by a firm to generate output are available, what costs would have been if the quantity sold were different is not. Yet, while direct observation of the counterfactuals is not possible, economists have techniques for estimating demand and cost functions. While such estimates must rest on assumptions—and different economists might make different judgments about which assumptions are most appropriate—demand and cost estimation are the very stuff that economics as a discipline is about.

A deeper problem with determining whether an allegation makes economic sense is that a firm gauges the profitability of an action by how it expects its rivals to respond. The economic approach to understanding expectations would be to assume that each firm expects other firms to behave in their own economic interest. But the behavior of other firms in turn depends on their own expectations. The problem is the province of game theory.¹⁴ Some economists would argue that the solution is to look for the suitable Nash equilibrium.¹⁵ Despite the extensive effort economists have devoted to this general problem—an effort that no doubt rivals the effort lawyers put into presenting the *Matsushita* case—they simply cannot narrow the possibilities very much.

To understand this point, some elaboration on the nature of game theory is necessary. The “prisoner’s dilemma” is a good place to start, as it is the game with which most people are familiar. Two people, A and B, are arrested, put into separate rooms, and given the choice of either confessing or not confessing. If neither confesses, they both go to jail for one year (on some minor charge). If both confess, they both go to jail for 10 years. If A confesses and B does not, A gets off entirely while B goes to jail for 15 years. The reverse happens if B confesses and A does not. The following “game matrix” represents the problem:

		Player B	
		<i>Confess</i>	<i>Don't Confess</i>
Player A	<i>Confess</i>	-10, -10	0, -15
	<i>Don't Confess</i>	-15, 0	-1, -1

14. See ROBERT G. GIBBONS, *GAME THEORY FOR APPLIED ECONOMISTS* (1992) (introducing game theory and its economic applications).

15. A Nash equilibrium is a set of actions in which the decision made by each party is optimal conditional on the actions of the others.

Like any game representation, the above matrix identifies the players (A and B), their possible strategies (Confess, Don't Confess), and the payoffs to each player for each possible combination of strategies. In the cells containing two numbers, the first is the payoff to player A while the second is the payoff to player B. These payoffs are represented as negative numbers to suggest that the payoffs in this case—years in jail—are bad, not good.

In this game, both players have an incentive to confess. Regardless of whether A confesses, B gets less jail time if he confesses; and the same is true for A. Since B has a clear incentive to confess, A can reasonably predict that B will confess and then make his choice based on that assumption. The same is true for B. Both players confessing is the unique Nash equilibrium in this model. A Nash equilibrium is one in which the action chosen by each player maximizes his own payoff given what the other player does. A's choice to confess is what is best for him, given that B confesses. True, both players would be better off if neither confessed, but that outcome would not be a Nash equilibrium. For example, if B chooses not to confess, A is still better off confessing (and getting off without any jail time) rather than not confessing (and spending one year in jail).

Despite its simplicity, the prisoner's dilemma provides great insight into a remarkably large number of situations. It applies to any situation in which two or more parties each can choose to behave cooperatively or selfishly. If the game is to be played only once, everyone's incentive is to be selfish. In such cases, the analysis of the game serves two proper roles for economic theory. First, it provides a basis for predicting that the outcome will be confession by both parties. Like any prediction, of course, there is no guarantee that it will turn out to be correct, but predicting that people will act in their own interest is likely to provide a more accurate forecast than predicting that they will act against their own interest. Second, it provides guidance to individuals as to what they should do if they find themselves in a setting that can be characterized as a single-play prisoner's dilemma. If the solution to all games was like the prisoner's dilemma, game theory would be a more powerful tool than it is.¹⁶

Many games are, however, different in an important way from the prisoner's dilemma. Consider the game traditionally referred to as

16. In both real and experimental settings with a prisoner's dilemma payoff structure, people cooperate even when they seem to have an incentive not to. Often, though, the cooperation arises when the game is repeated. *See* ROBERT AXELROD, *THE EVOLUTION OF COOPERATION* (1984).

“Battle of the Sexes.”¹⁷ As the story behind the game is typically told, a husband and wife wish to meet, but have not agreed on the location and have no means of communication. They both know that the alternatives are the baseball game and the opera. Whichever event they attend, they want to go together. That is, if the husband knew that the wife was going to the opera, he would go to the opera; if he knew she was going to the baseball game, he would go to the baseball game. Both spouses enjoy both events, but the husband likes the baseball game more while the wife prefers the opera. If we measure the payoffs as “utility”¹⁸ levels, the game matrix could be:

		Wife	
		<i>Baseball Game</i>	<i>Opera</i>
Husband	<i>Baseball Game</i>	2, 1	0, 0
	<i>Opera</i>	0, 0	1, 2

As with the prisoner’s dilemma, Battle of the Sexes is of interest not because of its literal application but because it has structure that corresponds to many real-world situations. The two parties have an incentive to coordinate, but they have different preferences about what they would coordinate on.

In contrast to the prisoner’s dilemma, there are two Nash equilibria in Battle of the Sexes.¹⁹ One is that both go to the opera. If the husband goes to the opera, the wife’s best option is to go to the opera. If the wife goes to the opera, the husband’s best option is to go to the opera. Thus, when both go to the opera, each is making the best choice (from a selfish standpoint) given the action of the other. Using the same logic, it is also a Nash equilibrium for both to go to the baseball game.²⁰

Even though two outcomes satisfy the definition of a Nash equilibrium, there is no particular reason to believe that either would

17. DREW FUDENBERG & JEAN TIROLE, GAME THEORY 18–20 (1991).

18. Utility is a measure of well-being in the sense that, given a choice generating different utilities, an individual chooses the one with the higher utility.

19. To be more precise, there are two Nash equilibria in “pure strategies.” If the players are allowed “mixed strategies,” which means that they can pick each strategy with any probability, there is a third equilibrium. Consideration of mixed strategies does not alter the points made here about the Battle of the Sexes game.

20. In the mixed strategy equilibrium, the husband goes to the ball game with probability $\frac{2}{3}$ and to the opera with probability $\frac{1}{3}$. The wife does the reverse. This outcome meets the mathematical definition of an equilibrium, but is unstable and therefore an even less credible basis for predicting what will happen than the pure strategy equilibria.

occur (absent explicit communication between the parties). Without knowing which of the two equilibria will prevail, neither party can know whether to go the baseball game or the opera. As a result, there does not seem to be any way to rule out the possibility that, say, the husband would go to the baseball game and the wife would go to the opera even though that outcome would not satisfy the definition of an equilibrium.

In the prisoner's dilemma, the Nash equilibrium is compelling because there is a single Nash equilibrium.²¹ In contrast, when there are multiple Nash equilibria (and no obvious way for the parties to focus on one as being most likely),²² the parties might have different expectations about which equilibrium will prevail, in which case the outcome might not be an equilibrium at all. Indeed, if a player recognizes that the multiplicity of equilibria makes it possible that the outcome will not be an equilibrium, he might make a choice that is not part of any Nash equilibrium.²³

In most market settings, the interaction between competitors is repeated over time. It is therefore natural to model market interaction as a repeated game. Even games that have a single Nash equilibrium when played just once can have multiple equilibria when they are repeated.²⁴ Multiple equilibria should be viewed as the norm for many types of market settings in which game theory might seem applicable; and, as a result, economic theory does not generate a clear prediction about what the outcome will be.

The fact that game theory does not provide precise predictions about market outcomes or what constitutes optimal behavior severely restricts the limitations imposed by the requirement that an allegation of predatory pricing must make economic sense. The requirement can properly be the basis for dismissing allegations as extreme as those in

21. Actually, the prisoner's dilemma has an additional unusual feature that makes the Nash equilibrium even more compelling. Each player has a single strategy that is best regardless of what the other player does. Such a strategy is known as a dominant strategy. In most games, players do not have a dominant strategy.

22. For example, suppose both husband and wife preferred the baseball game so that they both got a utility of 2 when both went to the game and they both got a utility of 1 if both went to the opera. With this change, there are still two Nash equilibria, but one might expect that both would go to the baseball game. In the language of game theory, the equilibrium in which both go to the baseball game "Pareto dominates" the one in which both go to the opera; and the exclusion of "dominated strategies" is referred to as a "refinement." As the original Battle of the Sexes game illustrates, however, this refinement does not always result in a unique equilibrium.

23. B. Douglas Bernheim, *Rationalizable Strategic Behavior*, 52 *ECONOMETRICA* 1007, 1010 (1984).

24. Ariel Rubinstein, *Equilibrium in Supergames with the Overtaking Criterion*, 21 *J. ECON. THEORY* 1 (1979).

Matsushita. But one should expect that there would be many cases where it would be much harder to dismiss a predation claim on the grounds that, as a matter of economics, the prospects for recoupment were implausible.

IV. BROOKE GROUP

In *Brooke Group*, the Supreme Court extended the economic sense screen of *Matsushita* beyond the realm of cases involving no direct evidence of the alleged behavior. In contrast to *Matsushita*, there was evidence in *Brooke Group* that Brown & Williamson (B&W) attempted predatory pricing. If the Supreme Court was correct when it said in *Matsushita* “that predatory pricing schemes are rarely tried, and even more rarely successful,”²⁵ then *Brooke Group* involves a rare case in which a company attempted such a scheme. B&W lowered prices on its generic cigarettes below average variable cost for a period of between 12 and 18 months, and its intent in doing so was to persuade Liggett either to stop selling generic cigarettes or at least to get it to charge higher prices for them. As the trial court ruled, the documents written by top B&W executives “indicating B & W’s anticompetitive intent . . . are more voluminous and detailed than any other reported case. This evidence not only indicates B & W wanted to injure Liggett, it also details an extensive plan to slow the growth of the generic cigarette segment.”²⁶

In *Brooke Group*, the appellate court had ruled that a successful predatory pricing claim could not rest on the need for oligopolistic coordination on prices in the recoupment period. It went so far as to say such a theory defies “economic logic.”²⁷ The Supreme Court correctly disagreed with that assertion, instead ruling that such theories are logical but unlikely. It ruled, however, that “when the realities of the market and the record facts indicate that it has occurred and was likely to have succeeded, theory will not stand in the way of liability.”²⁸

The question raised by *Brooke Group* is, if evidence of actual expectations of recoupment are not sufficient to demonstrate recoupment, then what in addition to company documents would be necessary? There would seem to be only a few possibilities. One

25. *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 589 (1986).

26. *Liggett Group, Inc. v. Brown & Williamson Tobacco Corp.*, 748 F. Supp. 344, 354 (M.D.N.C. 1990).

27. *Liggett Group, Inc. v. Brown & Williamson Tobacco Corp.*, 964 F.2d 335, 341 (4th Cir. 1992).

28. *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 229 (1993).

would be that plaintiff must demonstrate actual recoupment. Indeed, that would seem to be a plausible interpretation of the phrase, “the realities of the market and the record facts indicate it has occurred” Such a standard could conceivably be justified on decision-theoretic grounds. Requiring actual recoupment would necessarily create some risk of false negatives, as it is certainly possible for a company to have a reasonable expectation that predation would be profitable only to have unexpected events make the company ultimately regret its attempt. Still, if the costs of false positives are sufficiently great relative to the cost of false negatives, then that risk might be worth taking.

Whether or not the Court intended the standard to require a demonstration of actual recoupment, there remains the requirement of demonstrating that recoupment was likely to succeed.²⁹ Because B&W attempted predatory pricing, it must have expected to succeed. So the Court decided that the judgment of the company did not settle the issue. Instead, it substituted its own judgment. Presumably, it intended courts to rely at least in part on expert economic testimony to reach such judgments. Yet it might be relatively rare for expectations of recoupment to be so implausible that they can be dismissed as making no economic sense.³⁰

To the extent that the Court focused on the need for price coordination among tobacco companies in *Brooke Group*, it is not clear why it would have found such coordination so implausible *ex ante*. The industry had a long history of price coordination.³¹ In merger analysis, evidence of past coordination is arguably the factor deemed most important for predicting whether future coordination is likely.³² The Court was arguably on firmer ground when it observed that the success of B&W’s predation required that it be able to raise the price of generic cigarettes above competitive levels. The successful coordination in the past had rested on the presence of entry barriers,³³ but those barriers

29. Either the phrase “the realities of the market and the record facts indicate it has occurred” required a demonstration of actual recoupment, or it did not. If it did, one must still contend with the phrase “and was likely to have succeeded.” Alternatively, if “it” in the above phrase merely referred to the attempt at predation, then there remains the requirement of a showing that the attempt was likely to succeed.

30. *See supra* Part III (discussing the limitations of game theory in making precise predictions about market outcomes).

31. *Brooke Group*, 509 U.S. at 213; FED. TRADE COMM’N, 105TH CONG., REPORT ON COMPETITION AND THE FINANCIAL IMPACT OF THE PROPOSED TOBACCO INDUSTRY SETTLEMENT 1–13 (1997), available at <http://www.ftc.gov/reports/tobacco/ndoc95.pdf>.

32. FEDERAL TRADE COMM’N, COMMENTARY ON THE HORIZONTAL MERGER GUIDELINES 22–24 (2006), available at <http://www.usdoj.gov/atr/public/guidelines/215247.pdf>.

33. JOSEPH S. BAIN, BARRIERS TO NEW COMPETITION: THEIR CHARACTER AND CONSEQUENCES IN MANUFACTURING INDUSTRIES 144–66 (1956).

may have restricted entry into the branded segment.³⁴ Whether there were any barriers to generic entry is less clear. Still, the implication that economic expert testimony should be used to second-guess the clear expectations of the company might be placing far too much faith in the precision with which economic analysis can pinpoint what makes economic sense when allegations of predation are at issue.

V. RECENT AIRLINES CASES

The argument is not to suggest that the *Matsushita* Court's faith in economics was inherently misplaced. While the wide range of possible outcomes in game-theoretic situations limits (but does not eliminate altogether) the importance of the microanalytic role for economics, economics still has an important role in formulating and implementing standards based on decision theory.

Recall that decision theory starts from the proposition that judicial mistakes are inevitable. This basic insight is fundamental to understanding standards for establishing a predatory pricing claim. If there were no judicial uncertainty, the standards for predation would be much different from those the Court laid down in *Matsushita* and *Brooke Group*. In a world of certainty, predation might well be defined as charging any price below the one that maximizes short run profits if the intent of doing so is to exclude or limit the rate of entry.³⁵ It would be possible in such a world to bring a predation case even if the company was charging a price above any measure of its own costs.

The requirement that plaintiff demonstrate pricing below the "relevant measure of cost" can only be justified on the basis of decision theory. The decision not to adopt what is known more generally as the "profit sacrifice"³⁶ standard for predatory pricing is presumably in part due to the difficulty of administering such a standard. It would require ascertaining exactly what the short-run, profit-maximizing price is, something that courts would have extreme difficulty doing even with the aid of expert economists. Moreover, the standard is motivated in

34. BAIN, *supra* note 33. Bain identified three classes of entry barriers: scale economies, absolute cost advantages, and product differentiation. Of these, product differentiation is likely the most important in cigarettes.

35. See Janusz A. Ordover & Robert D. Willig, *An Economic Definition of Predation: Pricing and Product Innovation*, 91 YALE L.J. 8 (1981). The authors argue that this should be the appropriate conceptual standard for defining predation in general. It is not, however, the standard used for predatory pricing.

36. A. Douglas Melamed, *Exclusive Dealing Agreements and Other Exclusionary Conduct—Are There Unifying Principles?* 73 ANTITRUST L.J. 375, 389–403 (2006) (describing the sacrifice test and discussing its merits and drawbacks).

part by a recognition that false positives in predatory pricing cases have high costs because they can chill the competitive conduct that the antitrust laws are intended to promote. The “below the relevant notion of cost” standard is an example of what is known more generally as a “no economic sense test.”³⁷ The idea is to have a class of behavior that qualitatively would make no economic sense unless it had the effect of excluding competitors. Properly applied, such a standard creates a low risk of false positives, but it does not rule out the possibility altogether of a successful predatory pricing case.

Applying the test, however, requires determining the proper notion of costs. The Court did not resolve the relevant notion of cost in *Matsushita* nor has it done so since. In this regard, developments in the economics profession in the twenty years since *Matsushita* (as well as the ten years prior to the decision) have not been as helpful as they might have been. Much attention over this time period has been devoted to game theoretic analysis of markets. Little has been paid to more basic cost analysis.³⁸ At one time, much of industrial economics started from the premise that competition drives prices down to marginal cost and then proceeded to measure deviations from competition with price-cost margins.³⁹ That approach fell out of favor in large part because of the difficulty of measuring the relevant notion of cost. Those difficulties are real. Yet, the reaction among industrial economists has been to neglect the measurement of cost altogether. That reaction is most unfortunate, as courts hearing antitrust cases are in need of proper cost analysis. Two relatively recent cases, both involving the airline industry, illustrate this point.

A. American Airlines

The American Airlines case concerned the response of American Airlines to entry by low-cost carriers on routes to and from its Dallas–Fort Worth hub between 1995 and 1997. The typical pattern was that American cut and expanded the availability of its discounted fairs and

37. See Gregory J. Werden, *Identifying Exclusionary Conduct Under Section 2: The “No Economic Sense” Test*, 73 ANTITRUST L.J. 413, 413–33 (2006).

38. “Firms’ price-cost margins are not taken to be observables; economic marginal cost (MC) cannot be directly or straightforwardly observed. The analyst infers MC from firm behavior, uses differences between closely related markets to trace the effects of changes in MC, or comes to a quantification of market power without measuring cost at all.” Timothy F. Bresnahan, *Empirical Studies of Industries With Market Power*, in HANDBOOK OF INDUSTRIAL ORGANIZATION 1011, 1012–13 (Richard Schmalensee & Robert Willig eds., 1992).

39. Richard Schmalensee, *Inter-Industry Studies of Structure and Performance*, in HANDBOOK OF INDUSTRIAL ORGANIZATION, 951, 951–1001 (Richard Schmalensee & Robert Willig eds., 1992).

expanded its capacity by adding flights and increasing the size of the planes it used. When the entrants subsequently exited, American raised its fares back to previous levels and removed the added capacity from the routes.

The district court ruled for American Airlines on the grounds that plaintiffs had not demonstrated pricing below the relevant measure of cost, finding that none of the cost measures put forward was the right one.⁴⁰ The Court of Appeals for the Tenth Circuit upheld that decision.⁴¹ The decisions of both courts reflect fundamental confusion about the nature of costs.

Conceptually, one wants to ascertain whether a company charged prices below the incremental costs per unit of providing the output sold at those prices. Doing so is rarely simple, and it is probably particularly complicated in the airline industry. Areeda and Turner's classic 1975 article on the subject argued for using average variable cost as a proxy for short-run marginal cost.⁴² From the start, the article was controversial, eliciting criticism from, among others, F.M. Scherer, and alternative recommendations from Oliver Williamson and William Baumol.⁴³ These criticisms notwithstanding, the Areeda-Turner standard has been highly influential. Notably, the Supreme Court has failed to endorse it, and, as the American Airlines case illustrates, with good reason.

One problem is that, as the Areeda-Turner rule is implemented, average variable cost means average variable *accounting* costs, which is different from average variable economic costs. To take a specific example, the government proposed various cost measures that included airplane expense. The district court in the case ruled, "Aircraft ownership costs are properly considered fixed costs in the industry, and are not an avoidable cost of changing capacity in a route."⁴⁴ This statement is simply wrong as a matter of economics. If American increased the number of available seat miles as part of its response, then the airplanes were an input that varied with the level of output. Exactly

40. United States v. AMR Corp., 140 F. Supp. 2d 1141, 1199 (D. Kan. 2001) [hereinafter *American Airlines I*].

41. United States v. AMR Corp., 335 F.3d 1109, 1120–21 (10th Cir. 2003) [hereinafter *American Airlines II*].

42. Philip Areeda & Donald F. Turner, *Predatory Pricing and Related Practices Under Section 2 of the Sherman Act*, 88 HARV. L. REV. 697 (1975).

43. F. M. Scherer, *Predatory Pricing and the Sherman Act: A Comment*, 89 HARV. L. REV. 869 (1976); Oliver E. Williamson, *Predatory Pricing: A Strategic and Welfare Analysis*, 87 YALE L.J. 284 (1977); William J. Baumol, *Quasi-Permanence of Price Reductions: A Policy for Prevention of Predatory Pricing*, 89 YALE L.J. 1 (1979).

44. *American Airlines I*, 140 F. Supp. 2d at 1175.

how those costs should be measured may not be a simple matter. The answer would be different in a period like the late 1980s, when airlines had invested in far too much capacity and were retiring aircraft, than it was in the late 1990s.⁴⁵

Another general problem is that a company uses many inputs for multiple “products.” If the activity driving the cost is hard to identify, it might be labeled as “joint” (and, therefore, “fixed”) for accounting purposes. In an economic sense, though, a cost is joint between two activities only if the firm must incur the entire cost if it engages in just one of the activities, and the marginal cost associated with the second activity is zero. For example, the price of a football ticket would be a joint cost if one were to think of viewing the first half of the game and the second half as joint activities. Many costs that have traditionally been treated as “joint” for accounting purposes are not joint in the economic sense. The field of “activity-based costing,”⁴⁶ which has been a major body of literature in accounting for many years, starts from the premise that many costs traditionally treated as fixed for accounting purposes are in fact marginal. The district court ruled that American’s cost allocation scheme allocated these types of costs “arbitrarily” across routes. It likely erred in making that judgment. The choice of an allocation basis would almost certainly have been driven by results about how different activities drive the level of expenditure on different cost components.

Of course, none of these allocation schemes is perfect. Therefore, reliance on them poses a risk of overestimating marginal cost. However, if courts impose a very strict standard for justifying how accounting fixed costs are allocated, the result will be a systematic underestimation of incremental cost.

B. Spirit

The predatory pricing case by Spirit Airlines against Northwest raised many of the same issues as the American Airlines case.⁴⁷ Northwest’s cost accounting system seems to have been more

45. Adam Bryant, *U.S. Airlines Finally Reach Cruising Speed*, N.Y. TIMES, Oct. 20, 1996, § 3, at 1; Agis Salpukas, *A Struggle to Survive in the Air*, N.Y. TIMES, Oct. 2, 1983, § 3 at 1.

46. See David S. Evans and Michael Salinger, *Why Do Firms Bundle and Tie? Evidence From Competitive Markets and Implications for Tying Law*, 22 YALE J. REG. 37 (2005) (discussing the costs and efficiencies of “tying”—selling a particular good only together with another item).

47. *Spirit Airlines, Inc. v. Northwest Airlines, Inc.*, 431 F.3d 917 (6th Cir. 2005).

transparent. The Court of Appeals for the Sixth Circuit did rule that a reasonable jury could accept the cost estimates by Spirit's experts.⁴⁸

Indeed, there were some key points of agreement that were absent in the American Airlines case. Both experts included airplane expense as part of variable cost. Both agreed that the right cost concept was average variable cost.⁴⁹

The agreement on this last point is particularly interesting. On one level, the point should not be controversial, but there are two important qualifications. First, all the economic variable costs, not just the ones treated as variable, must be included. Second, the average must be computed over the correct range. When firms increase output as part of a predatory pricing scheme, the relevant range is the output increase. The variable costs incurred to increase output should be averaged over the amount of the increase.

The district court decision did mention a cost measure generated by Northwest that included "long-term fixed costs that Northwest expects to incur as it grows over time."⁵⁰ This wording is inherently imprecise. The fact that the costs would grow over time with the level of output means that the costs are not fixed according to the proper economic use of that term.⁵¹ They might be sunk costs,⁵² and, if so, they should not enter an average variable cost calculation directly. However, the presence of sunk, nonfixed costs has implications for the average variable cost.

There is a general principle in economics called the "envelope theorem."⁵³ While it is (on one level) an abstract mathematical principle, it is important enough to be illustrated in every introductory microeconomics textbook.⁵⁴ The envelope theorem says that when the level of output is equal to the level that was planned for (in making capacity decisions), short-run marginal cost equals long-run marginal cost. When output exceeds the level that was planned for, short-run marginal cost (and, therefore, variable cost averaged over the output increase) is greater than long-run marginal cost. Yet, average variable

48. *Id.* at 944.

49. *Id.* at 939–940.

50. *Spirit Airlines, Inc. v. Northwest Airlines, Inc.*, No. 00-71535, 2003 WL 24197742, at *5 (E.D. Mich. March 31, 2003).

51. WILLIAM J. BAUMOL, JOHN C. PANZAR, & ROBERT D. WILLIG, *CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE* 280 (1982).

52. *Id.*

53. HAL VARIAN, *MICROECONOMIC ANALYSIS* 70–71 (3d ed. 1992).

54. WALTER NICHOLSON, *MICROECONOMIC THEORY* 39–43 (7th ed. 1998) (illustrating the envelope theorem).

cost as it is computed for antitrust cases is below what one would estimate as long-run marginal cost. While some might argue that this is appropriate because it reduces the likelihood of false positives, false negatives have a cost as well. If they did not, then section 2 of the Sherman Act should be interpreted as not applying to pricing at all.

VI. CONCLUSION

Matsushita used economics as a tool for reining in antitrust doctrine that was too quick to label as anticompetitive the very conduct that the antitrust laws are supposed to encourage. The case, however, left many questions unanswered about exactly how economics should be used. In the twenty years since *Matsushita*, economists have devoted a great deal of effort to modeling the market settings under which predation might occur. Properly understood, these models do not lead to the precise predictions that courts might want in distinguishing between claims that do and do not make economic sense. At the same time, economists have neglected the question of how to measure costs in a way that would allow an economist to conclude that a firm's pricing behavior has a qualitative feature that could only be justified as an effort to exclude competitors. Solving that problem is not easy, but progress on it is possible, and better antitrust enforcement will be the result.