Economic Evidence on the Existence of Collusion: Reconciling Antitrust Law with Oligopoly Theory

Gregory J. Werden*

In a spate of recent cases with divergent outcomes, courts of appeals have evaluated attempts to establish collusion largely on the basis of economic evidence.[1] Substantial commentary, expressing sharply divergent views, also has appeared on the role of economic analysis in determining the existence of collusion, especially in light of the *Daubert* line of cases.[2] Although *Daubert* casts new light on the issues, they have been debated for more than a half century.[3]

---

* Senior Economic Counsel, Antitrust Division, U.S. Department of Justice. The views expressed herein are not purported to represent those of the U.S. Department of Justice.

[1] *E.g.*, Williamson Oil Co. v. Philip Morris USA, 346 F.3d 1287 (11th Cir. 2003) (summary judgment for defendants affirmed); *In re* High Fructose Corn Syrup Antitrust Litig., 295 F.3d 651 (7th Cir. 2002) (summary judgment for defendants reversed), *cert. denied* 123 S. Ct. 1251, *and cert. denied*, 123 S. Ct. 1253, *and cert. denied*, 123 S. Ct. 1254 (2003); Blomkest Fertilizer, Inc. v. Potash of Sask., 203 F.3d 1028 (8th Cir. 2000) (summary judgment for defendants affirmed by 6–5 en banc vote); *In re* Brand Name Prescription Drugs Antitrust Litig., 186 F.3d 781 (7th Cir. 1999) (judgment for defendants as a matter of law affirmed); *In re* Baby Food Antitrust Litig., 166 F.3d 112 (3d Cir. 1999) (summary judgment for defendants affirmed); City of Tuscaloosa v. Harcros Chems., Inc., 158 F.3d 548 (11th Cir. 1998) (summary judgment for defendants reversed).

[2] Roger D. Blair, *Lessons from* City of Tuscaloosa, ANTITRUST, Summer 1996, at 43; Roger D. Blair & Jill Boylston Herndon, *Ambiguous is Still Ambiguous*, ANTITRUST, Spring 2003, at 48 (Blair & Herndon III); Roger D. Blair & Jill Boylston Herndon, *Inferring Collusion from Economic Evidence*, ANTITRUST, Summer 2001, at 17 (Blair & Herndon II); Roger D. Blair & Jill Boylston Herndon, *The Implications of* Daubert *for Economic Evidence in Antitrust Cases*, 57 WASH. & LEE L. REV. 801 (2000) (Blair & Herndon I); Andrew I. Gavil, *Defining Reliable Forensic Economics in the Post-*Daubert / Kumho Tire *Era: Case Studies from Antitrust*, 57 WASH. & LEE L. REV. 831 (2000) (Gavil II); Andrew I. Gavil, *After* Daubert: *Discerning the Increasingly Fine Line between the Admissibility and Sufficiency of Expert Testimony in Antitrust Litigation*, 65 ANTITRUST L.J. 663 (1997) (Gavil I); Herbert Hovenkamp, *Economic Experts in Antitrust Cases*, *in* 3 MODERN SCIENTIFIC EVIDENCE ch. 23 (David L. Faigman et al. eds., 2d ed. 2002); Robert F. Lanzillotti, *Coming to Terms with* Daubert *in Sherman Act Complaints: A Suggested Economic Approach*, 77 NEB. L. REV. 83 (1998); Robert F. Lanzillotti & James T. McClave, *Comment: Meeting the "Ambiguity" Test under* Daubert, ANTITRUST, Spring 2003, at 44; Robert A. Milne & Jack E. Pace III, *Conspiratologists at the Gate: The Scope of Expert Testimony on the Subject of Conspiracy in a Sherman Act Case*, ANTITRUST, Spring 2003, at 36.

The *Daubert* line of cases consists principally of *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999); *General Electric Co. v. Joiner*, 522 U.S. 136 (1997); and *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993).

[3] Expert economic testimony on the existence of unlawful agreements has been employed even longer.

This article argues that the present state of law is unsatisfactory because neither the courts nor many testifying economists have explicitly grounded their analyses in modern oligopoly theory, which is the only rational basis for evaluating economic evidence on the existence of collusion. In this regard, *Daubert* has the potential to be an instrument of progress. To make the reliability determinations *Daubert* requires, judges will have to learn the basics of modern oligopoly theory. So educated, they will produce more refined and more consistent summary judgment rulings on the existence of collusive agreements in violation of section 1 of the Sherman Act. And the prospect of *Daubert* admissibility challenges will induce expert economists to base their testimony on rigorous analysis.

Section I of this article traces the development of oligopoly theory and indicates the current status of important models. Section II reviews the case law on the definition and proof of agreement under the Sherman Act. Section III reconciles the preceding sections by using modern oligopoly theory to shed some light on the problem of inferring an agreement. Section IV considers the admissibility of expert economic testimony on the existence of collusion. Section V concludes, explaining that differing views about, and especially ignorance of, modern oligopoly theory explain the divergence in court decisions.

I. A SHORT COURSE ON MODERN OLIGOPOLY THEORY[4]

For at least a quarter century, economists have analyzed oligopoly in terms of game theory.[5] Understanding the basics of oligopoly theory, therefore, requires

---

In *United States v. United States Steel Corp.*, 251 U.S. 417, 448–49 (1920), the Supreme Court declined to endorse the "philosophical deductions" of unlawful conduct from pricing patterns made by a "teacher of economics" who had been Deputy Commissioner of Corporations and an employee in the Bureau of Corporations, the predecessor to the Federal Trade Commission. In *Cement Manufacturers Protective Ass'n v. United States*, 268 U.S. 588, 605 (1925), the Court was more impressed by the "great volume of testimony . . . given by distinguished economists in support of the thesis that . . . uniformity in price will inevitably result from active, free and unrestrained competition."

[4] Edward Chamberlin has been credited with coining of the term "oligopoly," but he credited Sir Thomas More's *Utopia*, while noting that the term was virtually unknown until it appeared in EDWARD H. CHAMBERLIN, THE THEORY OF MONOPOLISTIC COMPETITION (1933). *See* Edward H. Chamberlin, *On the Origin of "Oligopoly,"* 67 ECON. J. 211 (1957). Sir Thomas More, however, wrote in Latin, and the earliest use of the word cited in the OXFORD ENGLISH DICTIONARY (2d ed. 1991) is an 1895 work about *Utopia*.

[5] *See, e.g.*, Franklin M. Fisher, *Games Economists Play: A Noncooperative View*, 20 RAND J. ECON. 113, 113

familiarity with some basic terms and concepts in game theory.[6]

A game is defined by *rules* specifying its *players* (e.g., the competing firms), what *actions* players may take or *moves* they may make (e.g., setting prices or setting quantities), the *information* players have about their environment (e.g., the demand curve for the product the firms sell) and about other players (e.g., their actions), the *payoffs* players get given the actions taken by all players (e.g., profits), and the *equilibrium concept* that indicates what actions are best given the payoffs and that determines the *outcome* of the game. Two classes of games relevant to oligopoly theory are *one-shot games,* which are played a single time, and *repeated games,* in which precisely the same *stage game* is repeated many, possibly infinitely many, times. With many possible permutations of the foregoing, there are many oligopoly models, and only the models with greatest relevance to the issues of this article are discussed below.

The key equilibrium concept in oligopoly theory is *Nash, non-cooperative equilibrium*, which in simple terms defines an equilibrium as a set of actions by players such that no player has an incentive to alter its action in light of the actions being taken by the other players. This concept was introduced by mathematician John F. Nash, Jr. in 1950, and it earned him a share of the 1994 Nobel Memorial Prize in Economics.[7] The focus on equilibrium is motivated by the notion that players somehow "evolve to an equilibrium position."[8]

(1989) ("oligopoly theory . . . is totally dominated by the game-theoretic approach").

[6] For basic introductions to game theory, defining the important terms and explaining key concepts, see DOUGLAS G. BAIRD ET AL., GAME THEORY AND THE LAW 6–11 (1994); ERIC RASMUSEN, GAMES AND INFORMATION ch. 1 (2d ed. 1994).

[7] Although he introduced his non-cooperative equilibrium a year earlier, Nash's main contribution on the subject is John Nash, *Non-Cooperative Games*, 54 ANNALS OF MATHEMATICS 286 (1951), *reprinted in* COURNOT OLIGOPOLY 82 (Andrew F. Daughety ed., 1988). Nash made one foray into oligopoly theory. J.P. Mayberry, J.F. Nash & M. Shubik, *A Comparison of Treatments of a Duopoly Situation*, 21 ECONOMETRICA 141 (1953). On Nash's work in game theory and its importance to economics, see Robert J. Leonard, *Reading Cournot, Reading Nash: The Creation and Stabilization of the Nash Equilibrium*, 104 ECON. J. 492 (1994); Roger B. Myerson, *Nash Equilibrium and the History of Economic Theory*, 37 J. ECON. LITERATURE 1067 (1999). For an elementary treatment of Nash, non-cooperative equilibrium, see BAIRD ET AL., *supra* note 6, at 19–23.

[8] R. DUNCAN LUCE & HOWARD RAFFIA, GAMES AND DECISIONS 105 (1957). How this evolution occurs is at the cutting edge of economic research. *See generally* DREW FUDENBERG & DAVID K. LEVINE, THE THEORY OF LEARNING IN GAMES (1998).

A. ONE-SHOT GAMES, INCLUDING THE CLASSIC COURNOT AND BERTRAND MODELS

In reviewing oligopoly theory, it is best to begin at the beginning—with the Cournot model introduced in 1838.[9] The usual version of the Cournot model, and the only one considered here, features a single, homogeneous product. Cournot competitors choose quantities, so the Cournot-Nash equilibrium is a set of quantities such that each competitor is happy with its quantity, given its rivals' quantities. Cournot-Nash equilibrium has appealing properties: As the number of competitors becomes arbitrarily large, price and quantity converge to those in a perfectly competitive industry. With a single competitor, price and quantity are those under monopoly. And as the number of competitors increases between these two extremes, price and quantity move toward competitive levels.

Today, the Cournot model is understood to be a straightforward application of the Nash, non-cooperative equilibrium concept to a one-shot game in which firms compete in quantities.[10] But before economists fully embraced game theory, the model was viewed quite differently, because it was understood to posit irrational behavior: As the model was presented verbally and mathematically, each competitor assumed that its rivals would not alter their quantities in response to its quantity changes. That assumption, however, was flatly inconsistent with the behavior of competitors in the model. Understood as premised on the assumption of irrational behavior, the model was consistently rejected.[11] But after Nash's work

---

[9] The model is named for Antoine Augustin Cournot, who presented it in his RESEARCHES INTO THE MATHEMATICAL PRINCIPLES OF THE THEORY OF WEALTH (Nathaniel T. Bacon trans., Augustus M. Kelley, 1971) (1838). For introductory presentations of the model, see DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 157–67 (3d ed. 2000); LYNNE PEPALL ET AL., INDUSTRIAL ORGANIZATION: CONTEMPORARY THEORY AND PRACTICE 236–51 (1999); DON E. WALDMAN & ELIZABETH J. JENSEN, INDUSTRIAL ORGANIZATION: THEORY AND PRACTICE 149–60 (1998). For more technical treatments, see Carl Shapiro, *Theories of Oligopoly Behavior*, *in* 1 HANDBOOK OF INDUSTRIAL ORGANIZATION 329, 333–39 (Richard Schmalensee & Robert D. Willig eds., 1989); XAVIER VIVES, OLIGOPOLY PRICING: OLD IDEAS AND NEW TOOLS ch. 4 (1999).

[10] *See, e.g.*, VIVES, *supra* note 9, at 1–2, 5–6.

[11] This critique appeared in the first analysis of Cournot's model written in English. Irving Fisher, *Cournot and Mathematical Economics*, 12 Q.J. ECON. 119, 126–27 (1898). It also appeared in two landmark works on oligopoly theory of the next half century. Edward H. Chamberlin, *Duopoly: Value Where Sellers Are Few*, 44 Q.J. ECON. 63, 83–84 (1929); WILLIAM FELLNER, COMPETITION AMONG THE FEW 65–66 (1949). Cournot's model also was dismissed by one of the first works on oligopoly theory to have acknowledged Nash, non-cooperative equilibrium. *See* Alexander Henderson, *The Theory of Duopoly*, 68 Q.J. ECON. 565,

on game theory entered the economic mainstream, "Cournot [was] reread and reinterpreted,"[12] and Cournot equilibrium is now viewed as the product of fully rational behavior.[13]

The second oldest oligopoly model is the Bertrand model introduced in an 1883 review of Cournot's book. Bertrand argued that it was more realistic for competitors to choose prices, rather than quantities.[14] Because Bertrand competitors choose prices, the Bertrand-Nash equilibrium is a set of prices such that each competitor is happy with its price, given its rivals' prices. The Bertrand model is applied principally to differentiated products industries.[15] With differentiated products, Bertrand-Nash equilibrium prices depend on the extent of product differentiation. The less differentiated products are, the lower are equilibrium prices, with

---

572 (1954) (All players "can do much better, and there is no reason to doubt that they will realize this. When people are asked to play games of this kind they soon realize there are better solutions.").

[12] Leonard, *supra* note 7, at 505. *See also* Myerson, *supra* note 7, at 1070–73 (tracing the insights that made sense out of Cournot equilibrium). Perhaps the first published reinterpretation of the Cournot model in terms of Nash equilibrium was MARTIN SHUBIK, STRATEGY AND MARKET STRUCTURE: COMPETITION, OLIGOPOLY, AND THE THEORY OF GAMES 63–64 (1959).

[13] The rationality of behavior in the Cournot model was questioned again in the early 1980s. *See, e.g.*, Timothy F. Bresnahan, *Duopoly Models with Consistent Conjectures*, 71 AM. ECON. REV. 934 (1981); John Laitner, *"Rational" Duopoly Equilibria*, 95 Q.J. ECON. 641 (1980); Martin K. Perry, *Oligopoly and Consistent Conjectural Variations*, 13 BELL J. ECON. 197 (1982). But it was then demonstrated that Cournot equilibrium exhibits rational expectations in the sense that competitors actually do what their rivals expect them to do. *See* Andrew F. Daughety, *Reconsidering Cournot: The Cournot Equilibrium is Consistent*, 16 RAND J. ECON. 368 (1985).

[14] The model is named for Joseph Louis François Bertrand, who posited it in *Review of "Théorie Mathématique de la Richesse Social," and "Recherches sur les Principles Mathématiques de la Théorie de Richesse*, 67 JOURNAL DES SAVANTS 499 (1883). A modern translation by James Friedman appears in COURNOT OLIGOPOLY 73 (Andrew F. Daughety ed., 1988). For introductory presentations of the model, see CARLTON & PERLOFF, *supra* note 9, at 166–72; PEPALL ET AL., *supra* note 9, at 254-67; WALDMAN & JENSEN, *supra* note 9, at 167–69. For more technical treatments, see Shapiro, *supra* note 9, at 343–48; VIVES, *supra* note 9, ch. 5.

[15] Bertrand considered homogeneous goods, and in that context, Edgeworth argued there was no equilibrium if competitors are capacity constrained. No price above marginal cost can be an equilibrium, because a competitor can increase its profits by slightly undercutting its rival's price and greatly expanding its output. Nor is pricing at marginal cost an equilibrium, because selling at a higher price to even a few customers the rival cannot supply is more profitable than selling any amount at marginal cost. *See* 1 F.Y. EDGEWORTH, PAPERS RELATING TO POLITICAL ECONOMY 116–21 (1925). For conditions under which an equilibrium does exist, see Huw David Dixon, *The Competitive Outcome as the Equilibrium in Edgeworthian Price-Quantity Model*, 102 ECON. J. 301 (1992); Eric Maskin, *The Existence of Equilibrium with Price-Setting Firms*, 76 AM. ECON. REV. (PAPERS & PROCEEDINGS) 382 (1986).

competitive prices as the limit as products become perfect substitutes. The more differentiated products are, the higher are equilibrium prices, with monopoly prices as the limit as products cease to be substitutes at all.

With homogeneous, or relatively undifferentiated products, the Bertrand-Nash equilibrium yields competitive or near-competitive prices even when there are only a few competitors, but the Cournot-Nash equilibrium does not. As a general matter, changing the rules of the game (e.g., from having players choose prices to having them choose quantities) can substantially affect the outcome. Some economists find this very discomforting,[16] and most agree with Bertrand that choosing prices is more realistic than choosing quantities. This has led to efforts to combine the best parts of the Cournot and Bertrand models, with competitors first making investment decisions that determine their capacities, then choosing prices in the light of their capacities. The equilibrium in such models depends on the "rationing rule" determining which consumers pay what price, when different firms charge different prices and the low-price firm cannot satisfy total market demand. With "efficient rationing," the available low-price units of output are used to satisfy the demand of consumers willing to pay the most, and the equilibrium is the same as in the Cournot model.[17]

Before leaving the subject of one-shot games, the huge literature on auctions[18] should be touched on briefly, especially because allegations of collusion commonly arise in auction settings. Auction models are much in the spirit of the Bertrand

---

[16] *See, e.g.*, Fisher, *supra* note 5.

[17] *See* David M. Kreps & José A. Scheinkman, *Quantity Precommitment and Bertrand Competition Yield Cournot Outcomes*, 14 BELL J. ECON. 326 (1983). A more general model is provided by Martin J. Osborne & Carolyn Pitchik, *Price Competition in a Capacity-Constrained Duopoly*, 38 J. ECON. THEORY 238 (1986). With rationing that is not efficient (e.g., if customers are served on a first-come-first-served basis), the equilibrium may be more competitive. *See* Carl Davidson & Raymond Deneckere, *Long-Run Competition in Capacity, Short-Run Competition in Price, and the Cournot Model*, 17 RAND J. ECON. 404 (1986). For an accessible review of this literature, see VIVES, *supra* note 9, at 132–35.

[18] An elementary survey of the literature is Paul Milgrom, *Auctions and Bidding: A Primer*, J. ECON. PERSP., Summer 1989, at 3. More comprehensive but more complicated surveys are Paul Klemperer, *Auction Theory: A Guide to the Literature*, 13 J. ECON. SURVEYS 227 (1999); R. Preston McAfee & John McMillan, *Auctions and Bidding*, 25 J. ECON. LITERATURE 699 (1987); Vernon L. Smith, *Auctions*, *in* 1 THE NEW PALGRAVE: A DICTIONARY OF ECONOMICS 138 (John Eatwell et al. eds., 1987).

model, because competitors choose prices, and the Nash, non-cooperative equilibrium concept is applied. There are "common value" auction models, in which the item sold is worth the same to all bidders, but during the auction, bidders have differing information about its worth. There are also "private value" auction models, in which bidders' personal preferences cause them to differ as to the value they place on the item being sold.[19] The impact of changing the number of bidders is comparable to that in the Cournot and Bertrand models. There is a positive probability that an additional bidder is willing to pay more than the others, so adding a bidder raises the expected sale price in the auction. This effect, however, may be slight, as in a Bertrand model with little product differentiation.

B. Models of Spontaneous and Enforced Coordination

As noted above, for more than half a century, the Cournot model was understood to be premised on an assumption of irrational behavior. Edward Chamberlin made the most influential early attempt to inject rationality.[20] He argued that the conventional assumption of profit maximization implies "a monopoly price for any fairly small number of sellers,"[21] because no competitor has any incentive to cut price below the monopoly level, realizing "his own move has a considerable effect upon his competitors, and that this makes it idle to suppose that they will accept without retaliation the losses he forces upon them" by cutting price.[22] Chamberlin indicated that this form of interdependent pricing should not be viewed as the product of an agreement: "[W]hen there are only two or a few sellers, their *fortunes* are not independent. . . . Each is forced by the situation itself to take into account the policy of his rival in determining his own, and this cannot be construed as a 'tacit agreement' between the two."[23] Although Chamberlin has rarely been cited in

---

[19] Auction models are used in both the context of competition to buy, as in art or timber auctions, and competition to sell, as in procurement auctions.

[20] Chamberlin, *supra* note 11. In 1933, a slightly revised version of the paper was published as chapter 3 of CHAMBERLIN, *supra* note 4. For more than three decades, that book was something of a best seller in economics. References below are to the final, eighth edition, published in 1962.

[21] Chamberlin, *supra* note 11 at 86; CHAMBERLIN, *supra* note 4, at 49.

[22] Chamberlin, *supra* note 11 at 85; CHAMBERLIN, *supra* note 4, at 48.

[23] Chamberlin, *supra* note 11 at 65; CHAMBERLIN, *supra* note 4, at 31. Many years later, Chamberlin eliminated any doubt about whether he meant to use the term "agreement" in the same sense it is used

antitrust decisions, his influence has been profound.[24]

Two decades later, William Fellner provided a far more extensive treatment of oligopoly along much the same lines as Chamberlin.[25] Fellner agreed with Chamberlin that, in oligopoly, "there is a tendency toward the maximization of the joint profits,"[26] but Fellner argued that the ability of oligopolists to achieve that end would be limited by a variety of factors, such as differences in costs and product differentiation.[27] Fellner viewed the problem faced by oligopolists as one of bargaining with each other over prices and the division of profits, and he argued that there was "no fundamental difference between" instances of "explicit bargaining," producing a "'true' agreement," and those with only "implicit bargaining or quasi-bargaining," producing a "quasi-agreement":

> The difference between "true" agreement and quasi-agreement is that the former requires direct contact while the latter does not. This difference is not always insignificant. But from an economic point of view the difference between true agreement and quasi-agreement is one affecting fine points more than the fundamental characteristics of the problem. The distinction is analogous to that between "collusion" and what we will call *spontaneous co-ordination*.[28]

under the Sherman Act. *See* Chamberlin, *supra* note 4, at 216–17.

[24] Chamberlin's influence on Section 1 law is noted at many points in Sections II and III, and he also had a major influence on merger law, with its focus on coordinated effects. The Supreme Court justified its market-share-based presumption of illegality in merger cases as "fully consonant with economic theory." United States v. Philadelphia Nat'l Bank, 374 U.S. 321, 363 (1963). The Court did not cite any authority on economic theory, but Chamberlin's theory was generally accepted at the time, and the Court (*id.* at 363 n.38) cited authorities that appear to have been influenced by Chamberlin and later elaborations on his theory. *See* CARL KAYSEN & DONALD F. TURNER, ANTITRUST POLICY 105, 110 (1959); Derek C. Bok, *Section 7 of the Clayton Act and the Merging of Law and Economics*, 74 HARV. L. REV. 226, 239 (1960). The most recent court of appeals merger decision holds that "[m]erger law 'rests upon the theory that, where rivals are few, firms will be able to coordinate their behavior, either by overt collusion or implicit understanding, in order to restrict output and achieve profits above competitive levels.'" FTC v. H.J. Heinz Co., 246 F.3d 708, 715 (D.C. Cir. 2001) (quoting FTC v. PPG Indus., Inc., 798 F.2d 1500, 1503 (D.C. Cir. 1986) (Bork, J.)). *Heinz*, 246 F.3d at 724 n.23, is the only reported merger decision to cite Chamberlin's oligopoly theory by name. *See also* FTC v. Elders Grain, Inc., 868 F.2d 901, 905 (7th Cir. 1989) (Posner, J.) ("[I]f conditions are ripe, sellers may not have to communicate or otherwise collude overtly in order to coordinate their price and output decisions; at least they may not have to collude in a readily detectable manner.").

[25] FELLNER, *supra* note 11.

[26] *Id.* at 33.

[27] *See id.* at 130–34, chs. 5–6, 198–99.

[28] *Id.* at 15–16. *See also id.* at 229 ("so-called cartel agreements differ from the quasi-agreements here considered in that they involve explicit agreement"). Chamberlin protested that his oligopoly model did

Fellner believed that spontaneous coordination was not merely a possible outcome in oligopoly, but rather the almost inevitable outcome.[29] Hence, he argued: "To legislate against oligopoly and against quasi-agreements is less promising than some optimists may have believed. Not much is gained by trying to force a group of oligopolists to behave as if they were not aware of their individual influence on each other's policies."[30]

Naturally, the Chamberlin-Fellner view of oligopoly provided a defense against the inference of a collusive agreement based on evidence of non-competitive performance, and naturally economic experts were called to testify that observed pricing and other practices could be the product of independent decision making.[31] In the two decades following World War II, leading industrial organization economists published widely on antitrust policy issues and often commented on the implications of the prevailing view of oligopoly, that of Chamberlin and Fellner. Some economists disagreed with their view that spontaneous coordination did not produce an agreement under the antitrust laws, but maintained that it was pointless to apply Section 1 because spontaneous cooperation was the inevitable consequence of oligopoly.[32] Others made the more limited point that courts, especially in the

---

not involve an agreement in *some* sense—"not even 'tacit' agreement, quasi-agreement or 'spontaneous co-operation.'" Chamberlin, *supra* note 4, at 216.

[29] The leading industrial organization text of the 1960s, JOE S. BAIN, INDUSTRIAL ORGANIZATION (1st ed. 1959, 2d ed. 1968) (citations are to the second edition), articulated a similar view. Bain argued that oligopolists would recognize their interdependence (*id.* at 306–16) and that "an implicit bargaining process to fix a mutually acceptable level of selling price may automatically emerge among the rival sellers, possibly culminating in a tacit agreement on price," and causing a "blurring of the line between 'tacit collusion' and 'interdependent action without collusion'" (*id.* at 315).

[30] FELLNER, *supra* note 11, at 309–10.

[31] *See* GEORGE W. STOCKING & MYRON W. WATKINS, MONOPOLY AND FREE ENTERPRISE 89 (1951). Also naturally, disputes arose among economists about what inferences courts should draw and about how economists should conduct themselves in court. *See, e.g.*, J.M. Clark, *Imperfect Competition and Basing-Point Problems*, 33 AM. ECON. REV. 283 (1943) (adhering to the Chamberlin-Fellner view and commenting on a proposed code of ethics for testifying economists); Vernon A. Mund, *Monopolistic Competition Theory and Public Price Policy*, 32 AM. ECON. REV. 727 (1942) (arguing that cooperation is not apt to be spontaneous and criticizing witnesses supporting defense arguments).

[32] *See* Carl Kaysen, *Collusion under the Sherman Act*, 65 Q.J. ECON. 263, 269–70 (1951) ("[T]he exhibition of parallel courses of action by rival oligopolists can legitimately form the basis of an inference of collusion . . . , yet it may fail to be equally useful in providing remedies for the evils complained of."); Almarin Phillips, *Policy Implications of the Theory of Interfirm Organization*, 51 AM. ECON. REV. (PAPERS &

American Tobacco case,[33] had found Section 1 violations in situations in which they could not, and hence did not, impose a meaningful remedy.[34]

Industrial organization economists came to doubt the wisdom of the Chamberlin-Fellner view of oligopoly as they absorbed the teachings of game theory. Instrumental in this regard was the study of the Prisoner's Dilemma game:[35] Two suspects are separately interrogated, and each is offered an incentive to inform on the other. If just one prisoner takes the deal, all charges against him are dropped. If both take the deal, each gets a reduced sentence. If neither takes the deal, both are prosecuted for a lesser charge, carrying a short sentence. In this game, informing is a *dominant strategy* because it is preferable no matter what the other prisoner does: If Prisoner 2 does not inform on Prisoner 1, then informing on Prisoner 2 is preferred by Prisoner 1 because that causes all charges against him to be dropped. If Prisoner 2 does inform on Prisoner 1, then informing on Prisoner 2 it is still preferred by Prisoner 1 because that causes his sentence to be reduced. The prisoners would like to enter into a binding agreement that prevents them from informing, but that is both unrealistic and prohibited by the rules of the game.

The Prisoner's Dilemma can be translated directly into the problem faced by would-be cartel participants,[36] and the lesson from doing so is that cooperation cannot be expected to just happen. This lesson motivated George Stigler's model of

---

PROCEEDINGS) 245, 251 (1961) ("With but a few firms, rivalry may be inadequate for good market performance . . . . There can scarce be doubt that, in a behavioral sense, agreement exists among the few firms. . . . Each acts in contemplation—frequently justified—that the others will react in a particular way. . . . But, since agreements which affect prices are illegal, recognition of these tacit agreements by the courts would make simple oligopoly illegal per se.")

[33] Am. Tobacco Co. v. United States, 328 U.S. 781 (1946).

[34] *See* Edward S. Mason, *The Current Status of the Monopoly Problem in the United States*, 62 HARV. L. REV. 1265, 1277–80 (1949); William H. Nicholls, *The Tobacco Case of 1946*, 39 AM. ECON. REV. (PAPERS & PROCEEDINGS) 284 (1949) (arguing, at 288, that the "court in effect condemned the natural, normal, and intelligent consequences of an oligopolistic market structure" and, at 288–93, that little improvement in performance resulted from the case).

[35] *See, e.g.*, R.J. Aumann, *Game Theory*, *in* 2 THE NEW PALGRAVE: A DICTIONARY OF ECONOMICS 460, 468–69 (John Eatwell et al. eds., 1987); BAIRD ET AL., *supra* note 6, 33; ROBERT GIBBONS, GAME THEORY FOR APPLIED ECONOMISTS 2–5 (1992); LUCE & RAFFIA, supra note 8, at 94–97.

[36] For a direct translation, see KEITH N. HYLTON, ANTITRUST LAW: ECONOMIC THEORY AND COMMON LAW EVOLUTION 68–69 (2003).

oligopoly.[37] He reasoned that "oligopolists wish to collude to maximize joint profits" but "if any member of any agreement can secretly violate it, he will gain larger profits than by conforming to it," so a model of oligopoly should focus on the "problem of policing a collusive agreement."[38] Consequently, Stigler constructed a model in which participants in a collusive arrangement infer that a rival is engaged in secret price cutting if they lose unexpectedly many old customers or gain unexpectedly few new customers.[39] One implication of the model is that collusion is more likely to be sustainable the smaller the number of competitors. The reason is that the larger the share of the market a firm accounts for, the better is its ability to detect secret price cutting by observing its own sales. Stigler's model was, and remains, highly influential in focusing attention on the incentive to cheat on any collusive agreement and the need to detect and punish cheating.[40]

Game theorist Reinhard Selten contributed an insightful oligopoly model focused on the decision to participate in a cartel.[41] While its implications are broader, Selten's model is best understood as relating to legally enforceable cartels, in which the

---

[37] *See* George J. Stigler, *A Theory of Oligopoly*, 72 J. POL. ECON. 44 (1964), *reprinted in* GEORGE J. STIGLER, THE ORGANIZATION OF INDUSTRY 39 (1968). A slight refinement on the model was provided by Ronald I. McKinnon, *Stigler's Theory of Oligopoly: A Comment*, 74 J. POL. ECON. 281 (1966).

[38] Stigler, *supra* note 37, at 44, 46; STIGLER, *supra* note 37, at 39, 42.

[39] Stigler did not specify the nature of the "collusion," and the insights from his model are considered relevant to the analysis of any sort of coordinated pricing. Stigler, however, had previously remarked that "Tacit collusion based on 'oligopolistic rationality' is as inferior in efficiency and flexibility to overt collusion as mental telepathy is to a telephone. . . . It has not yet been shown that effective co-operation would be possible without leaving a dozen large evidences in the institutions and practices of the industry." *Report of the Attorney General's Committee on Antitrust Policy: Discussion*, 46 AM. ECON. REV. (PAPERS & PROCEEDINGS) 496, 506 (1956).

[40] For these points, the model has been cited by several courts. *E.g.*, Blomkest Fertilizer, Inc. v. Potash Corp. of Sask., 203 F.3d 1028, 1038 n.9 (8th Cir. 2000) (en banc); *In re* Brand Name Prescription Drugs Antitrust Litig., 123 F.3d 599, 606, 615 (7th Cir. 1997), *on remand*, 1999-1 Trade Cas. (CCH) ¶ 72,446 (N.D. Ill. 1999), *aff'd in part, vacated in part*, 186 F.3d 781 (7th Cir. 1999); Petruzzi's IGA Supermarkets, Inc. v. Darling-Del. Co., 998 F.2d 1224, 1233 (3d Cir. 1993); Consol. Metal Prods., Inc. v. Am. Petroleum Inst., 846 F.2d 284, 295 n.42 (5th Cir. 1988).

[41] *See* Reinhard Selten, *A Simple Model of Imperfect Competition, where 4 Are Few and 6 Are Many*, 2 INT'L J. GAME THEORY 141 (1973). For clearer and more complete presentation of the model, see LOUIS PHLIPS, COMPETITION POLICY: A GAME-THEORETIC PERSPECTIVE 23–38 (1995). Variations on this theme form the literature on "stable cartels." *See, e.g.*, Claude d'Aspremont et al., *On the Stability of Collusive Price Leadership*, 16 CANADIAN J. ECON. 17 (1983); M.-P. Donsimoni et al., *Stable Cartels*, 27 INT'L ECON. REV. 317 (1986).

decision to participate is binding. The best of all possible worlds for each competitor is for all of its rivals to participate in a cartel, while it does not, and free rides on the cartel. But if a competitor is large enough, it realizes that its non-participation in the cartel would make it unprofitable for its rivals to participate, thereby eliminating the opportunity to free ride. Consequently, only sufficiently large competitors elect to participate. Under somewhat restrictive assumptions, including that all competitors are identical, a cartel forms in this model with four or fewer competitors, but not with six or more.

C. NASH EQUILIBRIUM IN REPEATED GAMES AND THE FOLK THEOREM[42]

Within a decade of the introduction of Nash, non-cooperative equilibrium, game theory cognoscenti had conceived of the Folk Theorem[43] for infinitely repeated games.[44] It states that a non-cooperative equilibrium of an infinitely repeated game can achieve any average payoffs that are possible and that are greater than the payoffs in the non-cooperative equilibrium of the stage game. The idea is that players can be induced to act more in their collective interest, rather than their individual interests, through the use of *trigger strategies* that punish *defections*, i.e., actions contrary to the collective interest.[45] In 1971 James Friedman first published a proof of the Folk Theorem and first applied it to oligopoly theory.[46]

---

[42] To avoid any possible implications about whether there is an agreement, the words "collusion" and "cheating" are not used in this section, although both are very common in the literature discussed.

[43] It is called the "Folk Theorem" because the idea went unpublished for a considerable time and its origin remains uncertain. *See* Aumann, *supra* note 35, at 468 ("The authorship of the Folk Theorem, which surfaced in the late Fifties, is obscure."). Game theorist Martin Shubik perhaps alluded to the Folk Theorem when he wrote in a 1959 book on oligopoly theory that "almost any price is stable under a very plausible system of threats." SHUBIK, *supra* note 12, at 284.

[44] For a totally non-technical treatment of repeated games, see BAIRD ET AL., *supra* note 6, ch. 5. For an accessible, if somewhat technical treatment, see GIBBONS, *supra* note 35, 82–96.

[45] The idea of using punishment to support cooperation in the context of oligopoly also can be found in Robert L. Bishop, *Duopoly: Collusion or Warfare?*, 50 AM. ECON. REV. 933 (1960).

[46] James W. Friedman, *A Non-cooperative Equilibrium for Supergames*, 38 REV. ECON. STUD. 1 (1971). For more general analyses of the Folk Theorem, for example, requiring less knowledge on the part of the players, see Drew Fudenberg et al., *The Folk Theorem with Imperfect Public Information*, 62 ECONOMETRICA 997 (1994); Drew Fudenberg & Eric Maskin, *On the Dispensability of Public Randomization in Discounted Repeated Games*, 53 J. ECON. THEORY 428 (1991); Drew Fudenberg & Eric Maskin, *The Folk Theorem in Repeated Games with Discounting or with Incomplete Information*, 54 ECONOMETRICA 533 (1986).

The Folk Theorem is more concrete when phrased in terms of the Cournot, quantity-setting game.[47] Non-cooperative play of the Cournot stage game yields Cournot-Nash equilibrium quantities, which aggregate to more than the monopoly quantity, and thus yield less than the maximum possible aggregate payoff—that under monopoly. Recognizing this, a player may adopt the following strategy: choose some particular quantity less than its Cournot quantity, unless and until another player defects by failing to do likewise, then punish the defector by choosing the Cournot quantity forever after. Whether this is an equilibrium strategy depends on the responses of other players. If players do not discount future profits at a high rate, they prefer the discounted stream of profits from never defecting to the only alternative, which is defecting in the first stage of the game and then suffering punishment in all subsequent stages from the other players' choices of their Cournot quantities. The foregoing argument goes through for any set of quantities yielding more total profits to all players than the Cournot quantities, including of course, any set of quantities aggregating to the monopoly quantity. Moreover, punishment is not actually carried out in equilibrium, because no player ever defects.

The Folk Theorem does not state that a set of jointly profit-maximizing quantities is *the* equilibrium of the infinitely repeated game, but rather only that it is *an* equilibrium. The Folk Theorem teaches that the equilibrium of the stage game—in this case, the set of Cournot quantities—also is *an* equilibrium of the infinitely repeated game. Also equilibria of the infinitely repeated game are infinitely many sets of quantities between the Cournot and jointly profit-maximizing quantities. The Folk Theorem is sometimes very loosely paraphrased as "anything can happen."[48] Game theory says little about which of the infinitely many equilibria one should expect to observe, or about how the players might manage to achieve a relatively favorable equilibrium.[49] While Chamberlin and Fellner argued that there was a

[47] For useful presentations, see GIBBONS, *supra* note 35, at 96–98, 100–02; Shapiro, *supra* note 9, at 361–64; STEPHEN MARTIN, ADVANCED INDUSTRIAL ECONOMICS 297–301 (2d ed. 2002).

[48] F.M. SCHERER & DAVID ROSS, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 220 (3d ed. 1990); *see also* Fisher, *supra* note 5, at 116 ("Crudely put: anything that one might imagine as sensible can turn out to be the answer.").

[49] It has been argued that the adoption of a "social convention" can yield a unique equilibrium, rather than the usual multiplicity of equilibria with the Folk Theorem. *See* W. Bentley MacLeod, *A Theory of*

strong tendency toward monopoly pricing in oligopoly, models of repeated games make no such prediction.

The Folk Theorem also does not state that merely repeating a game affects its outcome. Consider a two-stage game with the same Cournot game at each stage. In the second stage, each player's best action is to choose its Cournot equilibrium quantity. The history of the first stage changes nothing.[50] All players realize this, so there is no possibility of using a threat in the first stage to deter defection in the second stage. Such threats are not credible, because it is known that they will not be carried out. The same argument applies with more than two stages if the number of stages is known by all players. No matter how many stages there are, in the last stage, each player chooses its Cournot-Nash equilibrium quantity.[51] Consequently, each also chooses its Cournot-Nash equilibrium quantity in the next-to-last stage,

---

Conscious Parallelism, 27 EUR. ECON. REV. 25 (1985). MacLeod assumes that price-setting firms selling differentiated products adopt a convention as to how to respond to price changes. Under certain assumptions, the only convention that makes sense is matching announced price changes. The equilibrium strategy is then to match announced price increases if that is more profitable than not to change price at all, but to revert to the non-cooperative equilibrium of the stage game whenever any player fails to match. The equilibrium strategy with price decreases is similar. A similar analysis is provided by Julio J. Rotemberg & Garth Saloner, *Collusive Price Leadership*, 39 J. INDUS. ECON. 93 (1990).

[50] For an accessible yet detailed demonstration of the foregoing, see Shapiro, *supra* note 9, at 357–60. Shapiro explains how the refinement of "subgame-perfect equilibrium" is required to make the Nash-Cournot quantities the only equilibrium. What this means is that equilibrium strategies must consist of actions that would form equilibria in each stage game or "subgame." *See also* GIBBONS, *supra* note 35, at 94–96. Subgame-perfect equilibrium, and further refinements on that concept, are used in repeated game oligopoly models.

[51] This argument no longer holds if there are multiple non-cooperative equilibria in stage game. *See generally* Jean-Pierre Benoit & Vijay Krishna, *Finitely Repeated Games*, 53 ECONOMETRICA 905 (1985); *see also* Joseph H. Harrington, *Collusion in Multiproduct Oligopoly Games under a Finite Horizon*, 28 INT'L ECON. REV. 1 (1987); James W. Friedman, *Cooperative Equilibria in Finite Horizon Noncooperative Supergames*, 35 J. ECON. THEORY 390 (1985).

In the standard Cournot model, however, and most other one-shot-game oligopoly models, there is a unique equilibrium. *See* Charles D. Kolstad & Lars Mathiesen, *Necessary and Sufficient Conditions for Uniqueness of a Cournot Equilibrium*, 54 REV. ECON. STUD. 681 (1987). With a unique equilibrium, the argument in the text still may break down under a certain circumstances. *See* Kaushik Basu, *Collusion in Finitely-Repeated Oligopolies*, 10 INT'L J. INDUS. ORG. 595 (1992) (punishment occurs before the crime); David M. Kreps et al., *Rational Cooperation in the Finitely Repeated Prisoners' Dilemma*, 27 J. ECON. THEORY 245 (1982) (players are uncertain about the strategies of other players); Roy Radner, *Collusive Behavior in Noncooperative Epsilon-Equilibria of Oligopolies with Long but Finite Lives*, 22 J. ECON. THEORY 136 (1980) (strategies need not be quite the best strategies).

and so on, back to the first stage.[52]

The Folk Theorem says nothing about how players come to know the rules of the game. All game theory models considered here assume the rules are common knowledge. Moreover, the equilibrium concepts address only whether all players would be happy with a given set of actions. They say nothing about how an equilibrium is achieved. The process of learning the rules and groping toward an equilibrium is suppressed.[53] And the Folk Theorem offers counter-intuitive predictions about the effect of the number of players on the ability to achieve the monopoly outcome. Under plausible assumptions, the theory has been shown to predict that the monopoly price is a possible outcome if there are fewer than four hundred competitors![54]

Beginning in the mid 1980s, a flood of repeated game oligopoly models appeared in the economic literature, exploring every variation the minds of economists could conjure. Several strains of this literature merit comment. One concerns the most efficacious punishment strategies. In quantity-setting games, it has been shown that the best strategy is to punish a defecting player as much as possible for one period

---

[52] The form of proof employed here is termed "backward induction," and it obviously does not apply to an infinitely repeated game, because there is no last stage of such a game. *See generally* BAIRD ET AL., *supra* note 6, at 159–165; GIBBONS, *supra* note 35, at 57–61. The backward induction argument also does not apply if a repeated game is terminated by a random process, because the last stage is not known in advance. A famous application of backward induction is Reinhard Selten, *The Chain Store Paradox*, 9 THEORY & DECISION 127 (1978), which applies to predatory conduct against multiple rivals.

[53] Players should learn enough to reach a Nash equilibrium in infinitely repeated games, *see* Ehud Kalai & Ehud Lehrer, *Rational Learning Leads to Nash Equilibrium*, 61 ECONOMETRICA 1019 (1993), but not in finitely repeated games, *see* Alvaro Sandroni, *Does Rational Learning Lead to Nash Equilibrium in Finitely Repeated Games?*, 78 J. ECON. THEORY 195 (1998). To reach equilibrium, players may resort to "cheap talk" by making statements committing them to nothing, but affecting the beliefs of other players, and hence, their actions. *See* Joseph Farrell & Matthew Rabin, *Cheap Talk*, J. ECON. PERSP., Summer 1996, at 103.

[54] *See* Shapiro, *supra* note 9, at 365–66. For conditions under which the Folk Theorem holds with an arbitrarily large number of competitors, see Val Eugene Lambson, *Self-Enforcing Collusion in Large Dynamic Markets*, 34 J. ECON. THEORY 282 (1984). The foregoing relates to a quantity-setting game. In a price-setting game, Shapiro, *supra* note 9, at 370–71, shows that the monopoly price is a possible outcome if there are fewer than one hundred competitors. An alternative calculation by puts the critical number of competitors at just six, but it assumes a fifteen percent probability each month that the game ends. *See* VIVES, *supra* note 9, at 307. The leading paper in the relatively sparse literature on repeated price-setting games is William A. Brock & José A. Scheinkman, *Price Setting Supergames with Capacity Constraints*, 52 REV. ECON. STUD. 371 (1985).

of the game, and only for one period.[55]

Another significant strain addresses the implications of players' uncertainty about other players' actions, thus reflecting the real-world fact that firms often cannot observe their rivals' actions. What all players can observe is the market price, and if it declines, the reason may be a player's defection meriting punishment, but it also may be a decline in demand. The optimal strategy in such a situation is to infer that a player has defected if the market price falls sufficiently, and to undertake a period of punishment.[56] As in other infinitely repeated game models, the threat of punishment deters defection, but price wars nevertheless break out sometimes in this model because random fluctuations in demand create the possibility of erroneous inferences of defection.[57]

While repeated game oligopoly models say nothing about how players learn and how equilibrium is reached, there is significant literature, mostly outside economics, on these issues. In studies of the repeated Prisoner's Dilemma game, it was observed that strategies like the trigger strategies discussed above can be useful in the evolution of cooperation. A much touted strategy for evolving cooperation is Tit-for-Tat, which emerged victorious in several computer-run tournaments in which many different strategies were matched up against each other, playing the repeated

[55] *See* Dilip Abreu, *On the Theory of Infinitely Repeated Games with Discounting*, 56 ECONOMETRICA 383 (1988); Dilip Abreu, *Extremal Equilibria of Oligopolistic Supergames*, 39 J. ECON. THEORY 191 (1986). More accessible presentations of the analysis can be found in Shapiro, *supra* note 9, at 366–70; MARTIN, *supra* note 47, at 301–04. The length of "one period," however, is not specified.

[56] The seminal works on this topic are Edward J. Green & Robert H. Porter, *Noncooperative Collusion Under Imperfect Price Information*, 52 ECONOMETRICA 87 (1984); Robert H. Porter, *Optimal Cartel Trigger Price Strategies*, 29 J. ECON. THEORY 313 (1983). The theory was generalized by Dilip Abreu et al., *Toward a Theory of Discounted Repeated Games with Imperfect Monitoring*, 58 ECONOMETRICA 1041 (1990); Dilip Abreu et al., *Optimal Cartel Equilibria with Imperfect Monitoring*, 39 J. ECON. THEORY 251 (1986). More accessible presentations of the analysis can be found in Shapiro, *supra* note 9, at 373–79; MARTIN, *supra* note 47, at 314–24.

[57] In this model, price wars sometime break out when demand is unexpectedly low, because a decline in demand may be misperceived as defection. In a somewhat different model, price wars sometime break out when demand is unexpectedly high, because that is when defection pays the most. *See* Julio J. Rotemberg & Garth Saloner, *A Supergame-Theoretic Model of Price Wars during Booms*, 76 AM. ECON. REV. 390 (1986). For additional analyses on these issues, see Kyle Bagwell & Robert W. Staiger, *Collusion over the Business Cycle*, 28 RAND J. ECON. 82 (1997); Robert W. Staiger & Frank A. Wolak, *Collusive Pricing with Capacity Constraints in the Presence of Demand Uncertainty*, 23 RAND J. ECON. 203 (1992).

Prisoner's Dilemma game.[58] In that game, the Tit-for-Tat strategy is not to inform in the first stage of the game, and in every subsequent stage, to take whatever action the other prisoner took in the stage just prior.[59] If one prisoner consistently plays Tit-for-Tat, the other eventually learns that it is being played and responds by not informing, thus avoiding being informed upon.[60]

II. SECTION 1 LAW ON THE DEFINITION AND PROOF OF AGREEMENT

Section 1 of the Sherman Act "reaches unreasonable restraints of trade effected by a 'contract, combination . . . or conspiracy,'"[61] and all three of these "terms are understood to embrace a single concept"—that of "agreement."[62] Section 1 reaches every arrangement in which multiple parties have a "unity of purpose or a common design and understanding, or a meeting of minds"[63]—every "conscious commitment to a common scheme."[64] To prove a Section 1 violation, "some agreement must be shown under which the concerted action is taken. It is elementary, however, that conspiracies are seldom capable of proof by direct testimony, and may be inferred from the things actually done . . . ."[65] Moreover, "it is settled that '[n]o formal

---

[58] This strategy was popularized by ROBERT AXELROD, THE EVOLUTION OF COOPERATION (1984). Axelrod, a political scientist, organized the tournaments mentioned. For details, see *id.* ch. 2, App. A. Tit-for-Tat is by no means the only strategy for teaching cooperation, nor even the best, it is merely the best known. *See* 1 KEN BINMORE, GAME THEORY AND THE SOCIAL CONTRACT: PLAYING FAIR § 3.2.5, at 194–203 (1994); 2 KEN BINMORE, GAME THEORY AND THE SOCIAL CONTRACT: JUST PLAYING § 3.3.7, at 313–19 (1998). Moreover, strategies similar to, but different from, Tit-for-Tat have won more recent tournaments. *See* Robert Axelrod, *Evolving New Strategies: The Evolution of Strategies in the Iterated Prisoner's Dilemma, in* ROBERT AXELROD, THE COMPLEXITY OF COOPERATION 14 (1997).

[59] This is quite similar to the punishment strategy found to be optimal in the repeated game oligopoly models. *See supra* note 55 and accompanying text.

[60] It is also easily seen that Tit-for-Tat is an equilibrium to the repeated Prisoner's Dilemma game: If both suspects play that strategy, neither informs on the other, and both receive only a short prison sentence. Neither has the incentive to deviate from the Tit-for-Tat strategy, because that would cause the other to inform.

[61] Copperweld Corp. v. Independence Tube Corp., 467 U.S. 752, 768 (1984) (ellipsis in original) (quoting 15 U.S.C. § 1).

[62] 6 PHILLIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW ¶ 1400a, at 1 (2d ed. 2003); *see also id.* at ¶ 1403, at 16–17.

[63] *Copperweld*, 467 U.S. at 771 (quoting Am. Tobacco Co. v. United States, 328 U.S. 781, 810 (1946)).

[64] Monsanto Co. v. Spray-Rite Serv. Corp., 465 U.S. 752, 768 (1984).

[65] E. States Retail Lumber Dealers' Ass'n v. United States, 234 U.S. 600, 612 (1914).

agreement is necessary to constitute an unlawful conspiracy' and that 'business behavior is admissible circumstantial evidence from which the fact finder may infer agreement.'"[66]

This Section elaborates the foregoing by reviewing cases addressing the problem of inferring an agreement mainly in the context of parallel pricing or other parallel practices that may have resulted from agreement. Before proceeding to the case law, however, a digression on terminology is useful. Without prejudging the existence of an agreement, oligopoly pricing near monopoly levels is said to be "coordinated." In addition, two types of agreements are distinguished on the basis of the nature of the communication through which the agreements were reached.

A "spoken agreement" results from communications using anything akin to language, and the product of a spoken agreement is a "traditional conspiracy." As one court observed: "A knowing wink can mean more than words."[67] Because winks, nods, and the like communicate much as words do, and because the law does not require the exchange of explicit mutual assurances,[68] there are no legally important distinctions among essentially linguistic means of communication.

An "unspoken agreement" results from communications purely in the form of marketplace actions. It does not stretch the meaning of the term to say that communication occurs when rivals observe each others' marketplace actions, e.g., which customers each seller supplies and at what prices. This is the sort of communication that occurs in Cournot and Bertrand models, as each competitor observes the others' quantities or prices. Most interesting is the communication arising from repeated play, especially if strategies such a Tit-for-Tat are used. The long-running controversies over the Sherman Act's treatment of unspoken

[66] Norfolk Monument Co. v. Woodlawn Mem'l Gardens, Inc., 394 U.S. 700, 704 (1969) (per curiam) (quoting *Am. Tocacco*, 328 U.S. at 809, and Theatre Enters., Inc. v. Paramount Film Distrib. Corp., 346 U.S. 537, 540 (1954)). *See also* United States v. Falstaff Brewing Corp., 410 U.S. 526, 534 n.13 (1973) (noting that "circumstantial evidence is the lifeblood of antitrust law"); Petruzzi's IGA Supermarkets, Inc. v. Darling-Del. Co., 998 F.2d 1224, 1230 n.5 (3d Cir. 1993) ("Of course, contrary to popular thought a smoking gun might be mere circumstantial evidence unless the witness saw it fired.").

[67] Esco Corp. v. United States, 340 F.2d 1000, 1007 (9th Cir. 1965) (affirming criminal conviction for price fixing).

[68] *See* 6 AREEDA & HOVENKAMP, *supra* note 62, ¶ 1404, at 18–20; *Esco*, 340 F.2d at 1007–08.

agreements are taken up in Section III.

Case law and commentary contrast "tacit" agreements with those that are "express" or "explicit." It is doubtful, however, that the distinction between the contrasting terms has been consistent across cases, or that it was ever the same as that drawn here between "unspoken" and "spoken" agreements.[69] In the interest of clarity, the descriptors "tacit," "express," and "explicit" all are avoided. Moreover, the term "tacit collusion" commonly is used to refer to the absence of an agreement,[70] but it is counterintuitive that "tacit collusion" should mean something quite different from "tacit agreement," so neither term is used here.

A. Early Cases on Inferring Section 1 Agreements

Eastern States involved the inference of a concerted refusal to deal.[71] Defendant lumber retailers circulated "blacklists" containing names of lumber wholesalers selling directly to consumers. This "had and was intended to have the natural effect of causing such retailers to withhold their patronage from the concern listed."[72] The Supreme Court inferred an agreement among the retailers to boycott the blacklisted

---

[69] Cases indicating both "tacit" and "express" agreements violate Section 1 are: United States v. United States Gypsum Co., 438 U.S. 422, 457 (1978); Theatre Enterprises, Inc. v. Paramount Film Distributing Corp., 346 U.S. 537, 540 (1954); Alvord-Polk, Inc. v. F. Schumacher & Co., 37 F.3d 996, 1013 (3d Cir. 1994); *In re* Coordinated Pretrial Proceedings in Petroleum Products Antitrust Litigation, 906 F.2d 432, 446 (9th Cir. 1990). *See also* Apex Oil Co. v. DiMauro, 822 F.2d 246, 253 (2d Cir. 1987) ("tacit" and "explicit" agreement both violate Section 1). According to one observer, the case law uses these terms to "acknowledge differences in the types of evidence used to establish the fact of collective action." William E. Kovacic, *The Identification and Proof of Horizontal Agreements under the Antitrust Laws*, 38 ANTITRUST BULL. 5, 19 (1993).

[70] *See* Brooke Group Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209, 227 (1993) (equating "[t]acit collusion" with "oligopolistic price coordination or conscious parallelism" and asserting that it is "not in itself unlawful"); Jonathan B. Baker, *Two Sherman Act Section 1 Dilemmas: Parallel Pricing, the Oligopoly Problem, and Contemporary Economic Theory*, 38 ANTITRUST BULL. 143, 145 (1993) ("[M]erely . . . interacting while recognizing . . . interdependence [is] termed 'tacit collusion' . . . ."); Blair & Herndon I, *supra* note 2, at 817 (noting that "tacit collusion . . . is not illegal"); *id.* at 820 ("In a case of tacit collusion . . . there is no agreement by definition."); *Economists' Roundtable*, ANTITRUST, Spring 2003, at 8, 17 ("[O]rdinary oligopoly behavior . . . economists sometimes call tacit collusion . . . .") (remarks of Dennis W. Carleton). *But see* Kovacic, *supra* note 69, at 20 ("Most cases that speak of 'tacit' collusion refer to instances in which the plaintiff invokes 'indirect' or 'circumstantial' evidence to establish the fact of the agreement.").

[71] E. States Retail Lumber Dealers' Ass'n v. United States, 234 U.S. 600 (1914).

[72] *Id.* at 605, 608, 609.

wholesalers because the "record abound[ed] in instances where the offending dealer was thus reported, the hoped-for effect, unless he discontinued the offending practice, realized, and his trade directly and appreciably impaired."[73]

The Court's inference may have been reasonable, but its logic was incomplete. Individual retailers' actions in ceasing to do business with blacklisted wholesalers were not indicative of an agreement among the retailers if the latter could costlessly switch from blacklisted to non-blacklisted suppliers. In that event, they might reasonably have redirected their business to wholesalers not competing with them, even without an agreement with other retailers or the expectation that wholesalers would respond favorably. The Court's inference appears to presume some sort of switching cost, which is plausible but not obvious.[74]

American Column concerned an elaborate exchange among hardwood producers of information on production, prices, sales, and inventories, as well as market projections and advice on limiting production.[75] The Supreme Court found that the

> fundamental purpose of the "Plan" was to procure "harmonious" individual action among a large number of naturally competing dealers with respect to the volume of production and prices, without having any specific agreement with respect to them, and to rely for maintenance of concerted action . . . upon . . . the . . . potent and dependable restraints . . . of business honor and social penalties.[76]

Largely because "the united action of this large and influential membership of dealers contributed greatly to [an] extraordinary price increase," the Court found the agreement required for a violation of Section 1.[77]

The Court appears to have found that a significant price increase occurred

---

[73] *Id.* at 612.

[74] A recent treatise suggests that the critical insight is that the "members of the association would benefit from the program only if they responded to the lists uniformly." 2 JOSEPH P. BAUER & WILLIAM H. PAGE, *KINTNER*: FEDERAL ANTITRUST LAW § 11.5, at 60 (2002). But the Court did not make clear how uniform the retailers' responses were, and far-from-uniform responses might have reduced the blacklisted wholesalers' profits dramatically. Assuming, however, that the treatise has the facts right, its insight supplies only a motive to conspire, which is not a sufficient basis for inferring conspiracy. *See infra* notes 137–39 and accompanying text.

[75] Am. Column & Lumber Co. v. United States, 257 U.S. 377, 394–99, 402–09 (1921).

[76] *Id.* at 411.

[77] *Id.* at 409, 411–12.

without any satisfactory explanation on the basis of market forces. The inference of an agreement was fairly straightforward under the circumstances. It is significant that the Court did not consider the possibility that production was limited through a form of coordination that did not entail an agreement. A likely reason for this omission is that Chamberlin's oligopoly theory had not yet been published.

Although generally not significant in the present discussion, *International Harvester* is important for its oft-quoted[78] dictum that the mere "fact that competitors may see proper, in the exercise of their own judgment, to follow the prices of another" competitor does not establish a Section 1 violation.[79] This dictum also predated Chamberlin's oligopoly theory and is the most significant early statement by the Supreme Court that parallel pricing, without more, does not permit the inference of an agreement.[80]

Of perhaps greatest interest is *Interstate Circuit*, one of a host of cases involving the often contentious dealings of movie distributors and exhibitors.[81] Interstate was the only first-run exhibitor in much of Texas, and it sent a letter to eight distributors, listing all as addressees, asking them to include several specific provisions in their exhibitor contracts. One proposed provision set a minimum ticket price, which was above the level currently being charged in the subsequent-run exhibition of their movies. A second proposal barred the use of their movies in double features, as was common in subsequent-runs. Interstate then entered into separate contracts with each of the eight the distributors. In four Texas cities, the contracts adopted these two proposals but not a third, while in another part of Texas, none of the proposals were adopted.[82]

On these facts the district court found not only eight vertical agreements between

---

[78] *See, e.g.*, Rebel Oil Co. v. Atl. Richfield Co., 51 F.3d 1421, 1442–43 (9th Cir. 1995); *In re* Coordinated Pretrial Proceedings in Petroleum Prods. Antitrust Litig., 906 F.2d 432, 444 (9th Cir. 1990); Cont'l Cablevision of Ohio, Inc. v. Am. Elec. Power Co., 715 F.2d 1115, 1119 (6th Cir. 1983).

[79] United States v. Int'l Harvester Co., 274 U.S. 693, 708–09 (1927).

[80] *See* EDWARD P. HODGES, THE ANTITRUST ACT AND THE SUPREME COURT 45–47 (1941). To the same effect, but far less straightforward, is the Court's analysis in *United States v. United States Steel Corp.*, 251 U.S. 417, 448–49 (1920).

[81] Interstate Circuit, Inc. v. United States, 306 U.S. 208 (1939).

[82] *Id.* at 214–20.

Interstate and the distributors, but also a horizontal agreement among distributors. The Supreme Court affirmed, finding that there was no "persuasive explanation, other than agreed concert of action, of the singular unanimity of action on the part of the distributors by which the proposals were carried into effect" and that the distributors would not "have accepted and put into operation with substantial unanimity such far-reaching changes in their business methods without some understanding that all were to join."[83]

The prevailing view of the case appears to be that Interstate was using distributors to eliminate competition in exhibition and that Interstate was compensating them through the payment of higher film rentals. What is not so clear is the extent to which the collective and unilateral self interests of the distributors diverged, thus suggesting the need for an agreement among them. From the last quoted passage of the opinion, it seems clear that the Court believed that accepting Interstate's terms was profitable for each distributor only if the others accepted them as well.[84] The unstated rationale was that a distributor accepting Interstate's terms would have lost significant first-run revenue to non-accepting distributors' subsequent-run movies, as long as there were any non-accepting distributors.[85]

---

[83] *Id.* at 223.

[84] Thirty years later, the Court explained its prior reasoning:

> There was no direct evidence showing that the distributors agreed with one another to impose the identical restrictions, but it was shown that each distributor knew that all the other distributors had been approached with the same proposal and that the imposition of the restrictions would be feasible only if adhered to by all distributors. . . .
>
> . . . The reason that the absence of direct evidence of agreement in *Interstate Circuit* was not fatal is that the distributors all had the same motive to enter into a tacit agreement. Adherence to such an agreement would enable them to increase their royalties by forcing a rise in admission prices without the danger of competitors enlarging their share of the subsequent-run market by refusing to impose similar restrictions.

First Nat'l Bank of Ariz. v. Cities Serv. Co., 391 U.S. 253, 286–87 (1968). *See also* 6 AREEDA & HOVENKAMP, *supra* note 62, ¶ 1426a, at 188–89; James A. Rahl, *Conspiracy and the Anti-Trust Laws*, 44 ILL. L. REV. 743, 759 n.59 (1950). For an analysis of the case suggesting that the Court's belief was ill-founded, see David A. Butz & Andrew N. Kleit, *Are Vertical Restraints Pro- or Anticompetitive? Lessons from* Interstate Circuit, 44 J.L. & ECON. 131, 135–44 (2001).

[85] This is the argument made by the United States. *See* Brief for the United States at 45, Interstate Circuit, Inc. v. United States, 306 U.S. 208 (1939) (Nos. 38-269, 38-270). A variation on this rationale is premised on the proposition that substantial acceptance likely would have driven Interstate's exhibition rivals out of business. In that event, substantial acceptance of Interstate's terms would have eliminated any loss in revenue to subsequent-run exhibition.

B. THE "CONCERT OF ACTION" BUBBLE

Supreme Court decisions beginning with *Interstate Circuit* and continuing through *American Tobacco*[86] were read by some at the time to have found Section 1 violations in the absence of an agreement. Contributing to this understanding was an alternative holding in *Interstate Circuit* that an

> agreement for the imposition of the restrictions upon subsequent-run exhibitors was not a prerequisite to an unlawful conspiracy. It was enough that, knowing that concerted action was contemplated and invited, the distributors gave their adherence to the scheme and participated in it. Each distributor was advised that the others were asked to participate; each knew that coöperation was essential to successful operation of the plan. They knew that the plan, if carried out, would result in a restraint of commerce, . . . and knowing it, all participated in the plan. The evidence is persuasive that each distributor early became aware that the others had joined. With that knowledge they renewed the arrangement and carried it into effect for the two successive years.
>
> . . . Acceptance by competitors, without previous agreement, of an invitation to participate in a plan, the necessary consequence of which, if carried out, is restraint of interstate commerce, is sufficient to establish an unlawful conspiracy under the Sherman Act.[87]

The first sentence of this passage might be read to assert the possibility of conspiracy without an agreement,[88] but the Court's point surely was that the requisite agreement among the distributors did not have to be a prior agreement among them as to how they would respond to Interstate.[89] The remainder of the passage then explained the inference of some other agreement, although it did so neither clearly nor convincingly.

Interstate Circuit's alternative theory of agreement among the distributors would be of little consequence but for the fact that it was adopted and applied in a series of

---

[86] Am. Tobacco Co. v. United States, 328 U.S. 781 (1946).

[87] *Interstate Circuit*, 306 U.S. at 226–27.

[88] Some relatively contemporary commentators argued that the Court did not dispense with the requirement of an agreement. *See* Rahl, *supra*, note 84, at 759; Note, *Conscious Parallelism—Fact or Fancy*, 3 STAN. L. REV. 679, 683–84 & n.29 (1951).

[89] The United States argued that the distributors necessarily entered into an agreement with each other when they entered into their separate agreements with Interstate. Thus, even with no *prior* agreement among the distributors about *whether to accept* Interstate's terms, an agreement among them to impose those terms was created by their acceptances. Brief of the United States, *supra* note 85, at 54–58.

decisions beginning with *Masonite*.[90] Masonite held several patents on a hardboard product that continues to bear its name, and it sued competing hardboard producers for patent infringement. After one appeals court sustained an infringement finding, Masonite began to enter into agreements with the competitors under which they acknowledged the validity of Masonite's patents and became its agents, selling masonite board at prices set by Masonite.[91] While unclear, the Supreme Court appears to have found that Masonite's agents participated in not just their own separate arrangements with Masonite, but also in some larger arrangement including all of the agents[92]:

> [I]n negotiating and entering into the first agreements, each appellee, other than Masonite, acted independently of the others, negotiated only with Masonite, desired the agreement regardless of the action that might be taken by any of the others, did not require as a condition of its acceptance that Masonite make such an agreement with any of the others, and had no discussions with any of the others. It is not clear at what precise point of time each appellee became aware of the fact that its contract was not an isolated transaction but part of a larger arrangement. But it is clear, that as the arrangement continued, each became familiar with its purpose and scope. Here as in *Interstate Circuit* . . . "It was enough that, knowing that concerted action was contemplated and invited, the distributors gave their adherence to the scheme and participated in it."[93]

The Court's holding appears to have been that simple knowledge of the existence of Masonite's dealings with others created an unlawful concert of action among all of those agents.[94]

The Court employed similar language in two cases decided six years later. In *Paramount Pictures*, the Court stated that "to find a conspiracy . . . [i]t is enough that a concert of action is contemplated and that the defendants conformed to the agreement."[95] In the *Cement Institute* case, the Court held: "It is enough to warrant

---

[90] United States v. Masonite Corp., 316 U.S. 265 (1942).

[91] *Id.* at 267–73.

[92] *But see* 6 AREEDA & HOVENKAMP, *supra* note 62, ¶ 1427d, at 203–04 (arguing it is wrong to read the Court this way because there was no motive to conspire).

[93] *Masonite*, 316 U.S. at 275 (quoting Interstate Circuit, Inc. v. United States, 306 U.S. 208, 226 (1939)).

[94] *See, e.g.*, Morris A. Adleman, *Effective Competition and the Antitrust Laws*, 61 HARV. L. REV. 1289, 1325 (1948) ("the 'conspiracy' consisted in non-simultaneous assent").

[95] United States v. Paramount Pictures, Inc., 334 U.S. 131, 142 (1948) (citing *Interstate Circuit*, 306 U.S.

a finding of a 'combination' with the meaning of the Sherman Act, if there is evidence that persons, with knowledge that concerted action was contemplated and invited, give adherence to and then participate in a scheme."[96]

American Tobacco upheld criminal convictions for conspiracy among the big three tobacco companies in the purchasing of tobacco and in the sale of cigarettes.[97] As to the latter, the Court found that the "record of price changes" in the cigarette industry of the 1930s was "circumstantial evidence of the existence of a conspiracy." On June 23, 1931, in the depth of the Depression, the big three all increased prices of their leading brands to the same level, and "[n]o economic justification for this raise was demonstrated."[98] Other parallel price changes followed over the next few years, and the Court evidently found this evidence sufficient to sustain the jury verdict of conspiracy. The Court held:

> No formal agreement is necessary to constitute an unlawful conspiracy. Often crimes are a matter of inference deduced from the acts of the person accused and done in pursuance of a criminal purpose. . . . The essential combination or conspiracy in violation of the Sherman Act may be found in a course of dealing or other circumstances as well as in an exchange of words. Where the circumstances are such as to warrant a jury in finding that the conspirators had a unity of purpose or a common design and

---

at 226–27; *Masonite*, 316 U.S. at 275). The Supreme Court affirmed several findings of antitrust violations, including a finding that motion picture distributors had conspired among themselves to impose minimum ticket prices on their exhibitors. In explanation, the Court indicated only that conspiracy could be "inferred from the pattern of price-fixing disclosed in the record." *Paramount Pictures*, 334 U.S. at 141–42. *See also* United States v. Bausch & Lomb Optical Co., 321 U.S. 707, 723 (1944) (whether defendant's resale price maintenance scheme "was achieved by agreement or by acquiescence of the wholesalers coupled with assistance in effectuating its purpose is immaterial").

[96] FTC v. Cement Inst., 333 U.S. 683, 716 n.17 (1948). The case was brought under section 5 of the FTC Act, and it challenged a multiple basing point pricing system that produced identical prices. Similar was the *Triangle Conduit* case. Triangle Conduit & Cable Co. v. FTC, 168 F.2d 175 (7th Cir. 1948), *aff'd per curiam by an equally divided court sub nom.* Clayton Mark & Co. v. FTC, 336 U.S. 956 (1949). A 1948 FTC press release also introduced the term "conscious parallelism." *See* Milton Handler, *Contract, Combination or Conspiracy*, 3 ABA ANTITRUST SECTION REPORT 38, 42 & n.10 (1953).

[97] Am. Tobacco Co. v. United States, 328 U.S. 781, 800–08 (1946). The conspiracy convictions under Section 1 were not before the Court, but the Section 2 convictions that were before the court had been predicated on a jury instruction requiring the existence of a conspiracy. *Id.* at 783–86.

[98] *Id.* at 804–05. Modern commentators have noted that a monopolist, and hence a cartel, would cut prices under such circumstances. *See* RICHARD A. POSNER, ANTITRUST LAW 90 (2d ed. 2001); HERBERT HOVENKAMP, FEDERAL ANTITRUST POLICY 173 (2d ed. 1999); Richard A. Posner, *Oligopoly and the Antitrust Laws: A Suggested Approach*, 21 STAN. L. REV. 1562, 1585–87 (1969).

> understanding, or a meeting of minds in an unlawful arrangement, the conclusion that a conspiracy is established is justified.[99]

It seems likely that the Court found it implausible that identical, simultaneous price changes could have occurred without an agreement, but some commentators of the period—adherents to Chamberlin's view of oligopoly—read the Court as having dispensed with the agreement requirement.[100]

Two lower court decisions of the period are worthy of note. In *Pevely Dairy*, the Eighth Circuit reversed a criminal conviction for price fixing based on circumstantial evidence. The court found that the price increases at issue were adequately explained by forces other than collusion, and it explicitly adopted Chamberlin's oligopoly theory.[101] In *Milgram* the Third Circuit affirmed the finding that motion picture distributors conspired to deny the plaintiff first-run films for its drive-in theater.[102] The majority opinion might be read to find ample evidence of

---

[99] *Am. Tobacco*, 328 U.S. at 809–10 (citing United States v. A. Schrader's Son, Inc., 252 U.S. 85 (1920)). *A. Schrader's Son*, 252 U.S. at 99, had indicated that an agreement may be "implied from a course of dealing."

[100] *See, e.g.*, Mason, *supra* note 34, at 1278–79 (the observed pattern of pricing was "quite compatible with independence of action on the part of the firms" so the decision "may have had the effect of enlarging the legal meaning of conspiracy"); Nicholls, *supra* note 34, at 288 ("the court in effect condemned the natural, normal, and intelligent consequences of an oligopolistic market structure"); Eugene V. Rostow, *The New Sherman Act: A Positive Instrument of Progress*, 14 U. CHI. L. REV. 567, 584 (1947) ("Parallel action based on acknowledged self-interest within a defined market structure is sufficient evidence of illegal action."). *But see* Adleman, *supra* note 94, at 1326–27 (the decision was novel only in its reliance on "economic data and statistics" and its significance "should not . . . be exaggerated"); Rahl, *supra* note 84, at 758 n.58 ("[T]he evidence . . . showed such startling deviations from the ordinary that actual agreement was an easy inference to draw.").

[101] Pevely Dairy Co. v. United States, 178 F.2d 363 (8th Cir. 1949). "The circumstantial evidence relied upon as sustaining the verdict consist[ed] of the uniformity of the prices charged by the appellants for Grade A regular fluid milk sold by them, and the proximity in time of" specified price changes. *Id.* at 367. But the court found that the price changes were "rationally explained and accounted for and shown to have resulted from economic conditions which increased the cost of processing and distributing." *Id.* at 368. And it cited the testimony of an expert economist opining that one should have "expect[ed] practically uniformity of price" because the product was homogeneous. *Id.* The court then referred to CHAMBERLIN, *supra* note 4, and quoted the passage regarding agreement that appears *supra* in text accompanying note 23. *Pevely Dairy*, 178 F.2d at 368. Finally, the court noted that "the price changes in question were not simultaneous." *Id.* at 369.

[102] Milgram v. Loew's, Inc., 192 F.2d 579 (3d Cir. 1951). A similar case in the same court was *William Goldman Theatres, Inc. v. Loew's, Inc.*, 150 F.2d 738 (3d Cir. 1945), in which the court reversed a district court decision finding no conspiracy. The court found that "there must have been some form of informal

agreement,[103] but a dissenting judge understood the majority

> to have reasoned that it is permissible to proceed to a legal conclusion of conspiracy in restraint of trade from an ultimate factual finding of "consciously parallel action" without any finding of a "meeting of the minds" of the alleged conspirators in the sense of agreement upon a common course of action reached by collaboration, however effected. This reasoning was decisive here because on the evidence the court was unable to conclude that there had been even the most informal collaboration among the defendant distributors. It skipped that step and moved from conscious parallelism as the ultimate fact to conspiracy as a legal conclusion believing that the Supreme Court and this court had sanctioned that course of reasoning.
>
> . . . I think, however, that only where conscious parallelism of action justifies and the trier of fact makes a finding of actual, if informal, agreement among the defendants can there be in law in this type of case a combination in violation of the antitrust laws.[104]

One commentator of the period concluded that the foregoing cases established the "legal doctrine of consciously parallelism of action" which "holds that like marketing policies of the firms in a few-firm market resulting in undue restraints of trade are illegal, even though the classical requisite of a conspiracy or agreement is not present."[105] Another remarked that "The phrase 'concert of action' has become something of a substitute for the agreement concept."[106]

---

understanding" behind the defendants' uniform policy of not providing first-run films to the plaintiff because such uniformity "could not possibly be sheer coincidence" and defendants offered no explanation for their refusal to license the plaintiff. *Id.* at 743. The court, however, summed up in very broad language: "Uniform participation by competitors in a particular system of doing business where each is aware of the other's activities, the effect of which is restraint of interstate commerce, is sufficient to establish an unlawful conspiracy . . . ." *Id.* at 745.

[103] *See Milgram*, 192 F.2d at 586 ("Our study of the evidence in this case has convinced us that the trial judge's finding of a conspiracy in violation of Section 1 of the Sherman Act is adequately supported by the record."). *But see id.* at 582 (reciting without questioning defendants' legitimate business reasons for declining to supply first-run films to plaintiff's drive-in).

[104] *Id.* at 590–91 (Hastie, J., dissenting) (footnote omitted). Judge Hastie's reading of the majority opinion was concurred in by Note, *supra* note 88, at 681.

[105] Michael Conant, *Consciously Parallel Action in Restraint of Trade*, 38 MINN. L. REV. 797, 797 (1954). Conant embraced the Chamberlin-Fellner view of oligopoly, *id.* at 799–800, and argued that oligopolistic interdependence provides the necessary meeting of the minds under Section 1, so monopoly outcomes in oligopoly necessarily violate Section 1, *id.* at 816.

[106] Edward H. Levi, *The Antitrust Laws and Monopoly*, 14 U. CHI. L. REV. 153, 177–78 (1947). Levi was no casual observer, having already served in the Antitrust Division. On the other hand, Milton Handler, perhaps the leading commentator of the period, strenuously objected to this view. *See* Handler, *supra* note 96, at 42–45.

A few commentators argued the courts had condemned conduct that the prevailing Chamberlinian oligopoly theory demonstrated was normal and not the product of an agreement.[107] Other commentators, especially economists, argued that it was pointless to condemn interdependent conduct that was not the product of an agreement, because no meaningful remedy was possible.[108]

The foregoing set the stage for *Theatre Enterprises*.[109] Respondent motion picture distributors all refused petitioner's requests to book their first-run movies in petitioner's suburban theater. After a jury finding that the distributors had not conspired was affirmed on appeal, petitioner sought from the Supreme Court a directed verdict against the distributors. Relying on recent Supreme Court decisions, petitioner argued:

> Each respondent followed the same exclusionary policy in the knowledge that every other respondent was likewise following such policy. Each respondent knew that the common policy of all of confining the licensing of first-run film to downtown areas could not be maintained in the absence of common action by all of them. Each respondent followed a course of conduct over a period of years with the deliberate purpose and intent of excluding petitioner and others similarly situated from a substantial part of the market. This Court has held repeatedly that such a factual setting is sufficient to constitute a conspiracy to violate the Sherman Act.[110]

Immediately following this passage in petitioner's brief, it cited five Supreme Court decisions.[111]

The assertion that the distributors would not all book exclusively in downtown theaters "in the absence of common action by all of them" was doubtful. The distributors had explained their refusal to book first-run movies in suburban theaters on the basis that downtown theaters provided more revenue and were in substantial

---

[107] Nicholls, *supra* note 34; Rahl, *supra* note 84, at 760–61; Note, *supra* note 88, at 683–84.

[108] *See, e.g.*, Mason, *supra* note 34, at 1277–80 ("If the behavior is really the result of agreement, enjoining the agreement may, by securing independence of action, change the market behavior. But if the action of firms is already independent, this remedy is useless."); *The Effectiveness of the Federal Antitrust Laws: A Symposium*, 39 AM. ECON. REV. 691, 693–94 (1949) (statement of Arthur R. Burns); Kaysen, *supra* note 32, at 299–70; Nicholls, *supra* note 34; Note, *supra* note 88, at 684.

[109] Theatre Enters., Inc. v. Paramount Film Distrib. Corp., 346 U.S. 537 (1954).

[110] Brief for the Petitioner at 36, Theatre Enters., Inc. v. Paramount Film Distrib. Corp., 346 U.S. 537 (1954) (No. 53-19).

[111] *Id.*

competition with the suburban theaters.[112] Apart from this doubtful assertion, petitioner's argument was not unreasonable given the current state of the law.

Despite the decisions relied on by petitioner, the Supreme Court famously held:

> To be sure, business behavior is admissible circumstantial evidence from which the fact finder may infer agreement. But this Court has never held that proof of parallel business behavior conclusively establishes agreement or, phrased differently, that such behavior itself constitutes a Sherman Act offense. Circumstantial evidence of consciously parallel behavior may have made heavy inroads into the traditional judicial attitude toward conspiracy; but "conscious parallelism" has not yet read conspiracy out of the Sherman Act entirely.[113]

The Court listed the same five decisions cited by petitioner for the limited point that "[c]ircumstantial evidence of consciously parallel behavior may have made heavy inroads into the traditional judicial attitude toward conspiracy."[114]

C. "PLUS FACTORS" AND "ACTION CONTRARY TO SELF-INTEREST"

Shortly before *Theatre Enterprises*, the case law began to use the term "plus factors" to articulate what more than mere parallel pricing or other parallel practices must be shown to support the inference of agreement. The term was introduced by the Ninth Circuit's 1952 decision in *C-O-Two*, which upheld a criminal conviction for price fixing.[115] The court relied on "'plus factors' which when standing alone and examined separately, could not be said to point directly to the conclusion that the charges of the indictment were true beyond a reasonable doubt, but which, when viewed as a whole, in their proper setting, spelled out that irresistible conclusion."[116] Among the factors cited by the court were meetings that afforded the opportunity to "discuss and agree upon prices," the use of a system of delivered pricing, "the submitting of identical bids to public agencies," and "raising of prices at a time when a surplus existed."[117] The plus factor formulation for what was required to support

[112] Theatre Enters., Inc. v. Paramount Film Distrib. Corp., 201 F.2d 306, 309, 313 (4th Cir. 1953).

[113] *Theatre Enters.*, 346 U.S. at 540–41 (citations and footnote omitted). Appended to the "heavy inroads" clause was a citation to Rahl, *supra* note 84.

[114] *Theater Enters.*, 346 U.S. at 541.

[115] C-O-Two Fire Equip. Co. v. United States, 197 F.2d 489 (9th Cir. 1952).

[116] *Id.* at 493.

[117] *Id.* at 493, 496–97.

an inference of agreement is now firmly established,[118] although it was rarely used for three decades after the *C-O-Two* decision.[119]

"The inelegant term 'plus factors' refers simply to the additional facts or factors required to be proved as a prerequisite to finding that parallel action amounts to a conspiracy."[120] As one court usefully explained: "consciously parallel business behavior is circumstantial evidence from which an agreement . . . can be inferred but . . . such evidence, without more, is insufficient unless circumstances under which it occurred make the inference of rational independent choice less attractive than that of concerted action."[121]

---

[118] Williamson Oil Co. v. Philip Morris USA, 346 F.3d 1287, 1301 (11th Cir. 2003) ("We have fashioned a test under which price fixing plaintiffs must demonstrate the existence of 'plus factors' that remove their evidence from the realm of equipose and render that evidence more probative of conspiracy than of conscious parallelism."); Todd v. Exxon Corp., 275 F.3d 191, 198 (2d Cir. 2001) ("[A] horizontal price-fixing agreement may be inferred on the basis of conscious parallelism, when such interdependent conduct is accompanied by circumstantial evidence and plus factors . . . ."); Blomkest Fertilizer, Inc. v. Potash Corp. of Sask., 203 F.3d 1028, 1033 (8th Cir. 2000) (en banc) ("An agreement is properly inferred from conscious parallelism only when certain 'plus factors' exist."); *In re* Citric Acid Litig., 191 F.3d 1090, 1102 (9th Cir. 1999) ("Parallel pricing is a relevant factor to be considered along with the evidence as a whole; if there are sufficient other 'plus' factors, an inference of conspiracy can be reasonable."); Mitchael v. Intracorp, Inc., 179 F.3d 847, 859 (10th Cir. 1999) ("[C]ourts require 'plus factors,' which are 'the additional facts or factors required to be proved as a prerequisite to finding that parallel action amounts to a conspiracy.'"); *In re* Baby Food Antitrust Litig., 166 F.3d 112, 122 (3d Cir. 1999) (courts "require that evidence of a defendant's parallel pricing be supplemented with 'plus factors'"); Wallace v. Bank of Bartlett, 55 F.3d 1166, 1168 (6th Cir. 1995) ("[P]arallel pricing, without more, does not itself establish a violation of the Sherman Act. Courts require additional evidence which they have described as 'plus factors' . . . .") (citation omitted); Reserve Supply Corp. v. Owens-Corning Fiberglas Corp., 971 F.2d 37, 51 (7th Cir. 1992) ("Parallel behavior without more (a 'plus factor') is not enough to establish a Sherman Act violation.") (quoting Quality Auto Body, Inc. v. Allstate Ins. Co., 660 F.2d 1195, 1201 (7th Cir. 1981)).

[119] In the three decades following *C-O-Two,* only a few decisions used the "plus factors" formulation: Del. Valley Marine Supply Co. v. Am. Tobacco Co., 297 F.2d 199, 205–06 n.19 (3rd Cir. 1961); FTC v. Lukens Steel Co., 454 F. Supp. 1182, 1190–91 (D.D.C. 1978); Harlem River Consumers Coop., Inc. v. Associated Grocers of Harlem, Inc., 408 F. Supp. 1251, 1278 (S.D.N.Y. 1976). A likely contributor to the later popularity of the "plus factor" formulation was its use by LAWRENCE A. SULLIVAN, HANDBOOK OF THE LAW OF ANTITRUST 317–19 (1977).

[120] 6 AREEDA & HOVENKAMP, *supra* note 62, ¶ 1433e, at 240; *accord Williamson Oil Co.*, 346 F.3d at 1301 (anything "that 'tend[s] to exclude the possibility of independent action' can qualify as a 'plus factor'") (alteration in original) (quoting City of Tuscaloosa v. Harcros Chems., Inc., 158 F.3d 548, 571 n.35 (11th Cir. 1998)); *see also* Jonathan B. Baker, *Identifying Horizontal Price Fixing in the Electronic Marketplace*, 65 ANTITRUST L.J. 41, 48 (1996) ("Plus factors are evidence that the parties have gone through a process of negotiation and exchange of assurances . . . .").

[121] Bogosian v. Gulf Oil Corp., 561 F.2d 434, 446 (3d Cir. 1977).

Some plus factors, particularly those relating to communications among the alleged conspirators, may support the inference of an agreement, although not on the basis of any economic analysis.[122] "Antitrust law also sometimes permits judges or juries to premise antitrust liability upon little more than uniform behavior among competitors, preceded by conversations implying that later uniformity might prove desirable, or accompanied by other conduct that in context suggests that each competitor failed to make an independent decision."[123] An illustrative example discussed above is *American Column*.[124] There are also two well-known cases in which the inference of agreement was sufficiently compelling to satisfy the criminal standard of proof beyond a reasonable doubt.

Foley involved the fixing of real estate commissions. At a dinner party attended by leading realtors, Mr. Foley announced that his firm was raising its commission rate from six to seven percent. A discussion about the rate change ensued, and there was conflicting testimony about whether others indicated an intention to follow. There were many subsequent bilateral discussions about matters such as whether particular firms were complying with their "agreement," and the seven percent commission rate was substantially adopted over the ensuing months.[125]

Champion International involved bid rigging in Forest Service timber auctions. The defendants met and discussed which tracts they most wanted, but there was no evidence that, in so many words, they allocated the tracts. The courts, however, inferred an agreement from the evidence of the meetings and the pattern of bidding that followed, which was consistent with a market allocation.[126]

---

[122] There may be a limited role for economic expert testimony even in such cases. *See* Hays Gorey, Jr. & Henry A. Einhorn, *The Use and Misuse of Economic Evidence in Horizontal Price-Fixing Cases*, 12 J. CONTEMP. L. 1 (1986).

[123] Brown v. Pro Football, Inc., 518 U.S. 231, 241 (1996) (citations omitted); *see* Taxi Weekly, Inc. v. Metro. Taxicab Bd. of Trade, Inc., 539 F.2d 907, 911–12 (2d Cir. 1976) (nearly simultaneous actions immediately following a meeting supported the jury finding of group boycott).

[124] *See supra* notes 75–77 and accompanying text.

[125] United States v. Foley, 598 F.2d 1323, 1327, 1332 (4th Cir. 1979).

[126] United States v. Champion Int'l Corp., 1975-2 Trade Cas. (CCH) ¶ 60,453 (D. Or. 1975), *aff'd*, 557 F.2d 1270 (9th Cir. 1977).

The inference of an agreement may be particularly compelling when competitors simultaneously take identical actions not explainable as normal responses to market forces. Possible examples are the cigarette price increases in *American Tobacco*,[127] and the identical responses to the exhibitor's proposal in *Interstate Circuit*.[128] Few cases, however, have found parallelism so extraordinary that agreement could be inferred without more.[129] The Ninth Circuit made a not-so-compelling inference in the *Petroleum Products Antitrust Litigation*. Although patterns of price movements were found to be consistent with mere interdependent conduct, an agreement was inferred because the defendants announced price changes in the press or posted their prices where all could read them.[130]

A second type of plus factor is "action contrary to self-interest."[131] This plus

---

[127] *See supra* notes 97–99 and accompanying text.

[128] *See supra* notes 81–83 and accompanying text.

[129] One of the few such cases may be *Ball v. Paramount Pictures, Inc.*, 169 F.2d 317, 321 (3d Cir. 1948) (uniform refusal to accept plaintiff's proposed terms that would have benefitted defendants, permitted the inference of agreement because the "record fail[ed] to reveal a convincing basis for accepting the actions of appellees as merely an amazing coincidence"). Rejecting such an inference (although finding an agreement) is *Coleman v. Cannon Oil Co.*, 849 F. Supp. 1458, 1466–67 (M.D. Ala. 1993) ("interdependent conscious parallelism" could explain parallelism in pricing that plaintiffs argued "was so aberrant that it could not have been inadvertent but rather could only have resulted from a conscious agreement").

[130] *In re* Coordinated Pretrial Proceedings in Petroleum Prods. Antitrust Litig., 906 F.2d 432, 441–50 (9th Cir. 1990). The court inferred an agreement to exchange price information on the basis of its conclusion that disseminating prices did not otherwise make business sense. That conclusion and the court's inference of agreement both are dubious.

[131] *See, e.g.*, Williamson Oil Co. v. Philip Morris USA, 346 F.3d 1287, 1310 (11th Cir. 2003) ("It is firmly established that actions that are contrary to an actor's economic interest constitute a plus factor that is sufficient to satisfy a price fixing plaintiff's burden in opposing a summary judgment motion."); Re / Max Int'l, Inc. v. Realty One, Inc., 173 F.3d 995, 1009 (6th Cir. 1999) (that "the defendants' actions, if taken independently, would be contrary to their economic self-interest . . . will consistently tend to exclude the likelihood of independent conduct"); Merck-Medco Managed Care, LLC v. Rite Aid Corp., 1999-2 Trade Cas. (CCH) ¶ 72,640, at 85,750 (4th Cir. 1999) (unpublished per curiam) ("Evidence of acts contrary to an alleged conspirator's economic interest is perhaps the strongest plus factor indicative of a conspiracy."); Petruzzi's IGA Supermarkets, Inc. v. Darling-Del. Co., 998 F.2d 1224, 1242 (3d Cir. 1993) ("[A] plaintiff also must show . . . actions contrary to the defendants' economic interests . . . ."); Bolt v. Halifax Hosp. Med. Ctr., 891 F.2d 810, 826 (11th Cir. 1990) ("[E]vidence of conscious parallelism does not permit an inference of conspiracy unless the plaintiff establishes that each defendant engaging in the parallel action acted contrary to its economic self-interest."); Apex Oil Co. v. DiMauro, 822 F.2d 246, 254 (2d Cir. 1987) (conduct "'against the apparent individual economic self-interest of the alleged conspirators' . . . might tend to exclude the possibility of independent parallel behavior") (quoting Modern Home Inst., Inc. v. Hartford Accident & Indem. Co., 513 F.2d 102, 111 (2d Cir. 1975)); Wilcox v. First Interstate Bank of Or.,

factor is certainly a misnomer, because no rational economic actor does anything contrary to self-interest and obviously "a price-fixing conspiracy, if successfully implemented, is in the collective self-interest of the conspirators."[132] What courts mean by the phrase is that a "defendant acted in a way that, but for a hypothesis of joint action, would not be in its own interest."[133] As Judge Posner explained, an agreement may be demonstrated through

> circumstantial evidence, economic in character, that [the defendants'] behavior could better be explained on the hypothesis of collusion than on the hypothesis that each was embarked on an individual rather than a concerted course of action—that each, in other words, was merely exploiting the market power it had, rather than seeking to create or amplify such power through an agreement with competitors not to compete.[134]

One variation on this theme is to infer an agreement among competitors engaged in parallel conduct when that conduct would be contrary to the unilateral interest of each unless all undertook it. The Supreme Court apparently understood such to have been the case in *Interstate Circuit*.[135] The recent Seventh Circuit decision in *Toys*

N.A., 815 F.2d 522, 527 (9th Cir. 1987) ("[C]onscious parallel conduct may allow for an inference of agreement if it is also shown that each conspirator acted against its own self-interest by engaging in the parallel behavior."); Royal Drug Co. v. Group Life & Health Ins. Co., 737 F.2d 1433, 1437 (5th Cir. 1984) (a plaintiff relying on "the theory of 'conscious parallelism'" must show defendants' conduct "'was contrary to their economic self-interest so as not to amount to a good faith business judgment'") (last phrase quoting Pan-Islamic Trade Corp. v. Exxon Corp., 632 F.2d 539, 559 (5th Cir. 1980)); Kreuzer v. Am. Acad. of Periodontology, 735 F.2d 1479, 1488 (D.C. Cir. 1984) (inference of agreement "may only be drawn . . . when an alleged conspirator has acted contrary to his own independent interest"); Admiral Theatre Corp. v. Douglas Theatre Co., 585 F.2d 877, 884 (8th Cir. 1978) ("Only where the pattern of action undertaken is inconsistent with the self-interest of the individual actors, were they acting alone, may an agreement be inferred solely from such parallel action."); Venzie Corp. v. U.S. Mineral Prods. Co., 521 F.2d 1309, 1314 (3d Cir. 1975) ("The absence of action contrary to one's economic interests renders consciously parallel business behavior 'meaningless' . . . .").

[132] City of Tuscaloosa v. Harcros Chems., Inc., 158 F.3d 548, 570 n.33 (11th Cir. 1998).

[133] Ill. Corp. Travel, Inc. v. Am. Airlines, Inc., 806 F.2d 722, 726 (7th Cir. 1986) (Easterbrook, J.); *see also City of Tuscaloosa*, 158 F.3d at 570 n.33 (self-interest in this context is "a reference to what that defendant's legitimate economic self-interest would be under the assumption that it acted alone").

[134] *In re* Brand Name Prescription Drugs Antitrust Litig., 186 F.3d 781, 785 (7th Cir. 1999).

[135] *See supra* notes 83–85 and accompanying text; *see also Bolt*, 891 F.2d at 826–27 (11th Cir. 1990) ("[T]he plaintiff must establish that each defendant would have acted unreasonably in a business sense if it had engaged in the challenged conduct unless that defendant had received assurances from the other defendants that they would taken the same action."); City of Long Beach v. Standard Oil Co. of Cal., 872 F.2d 1401, 1407 (9th Cir. 1989) (reversing summary judgment for defendants in part because each defendant "knew that the participation of all the companies was necessary to make the plan work"); Barry v. Blue Cross of Cal., 805 F.2d 866, 869–70 (9th Cir. 1986) (affirming summary judgment for defendants

"R" Us also relies on such an inference.[136]

"Motive to conspire," i.e., that the defendants stood to gain from the alleged agreement, is sometimes listed as a plus factor.[137] It would be more accurate, however, to refer to the absence of a motive to conspire as a "minus factor," because that is strong evidence against the conspiracy hypothesis.[138] Moreover, a motive to conspire is subsumed in the existence of action contrary to self-interest. The latter requires a divergence between collective and unilateral self-interest, which implies a motive to conspire. On the other hand, the existence of a motive to conspire in no way suggests action contrary to self-interest. There typically is a motive to conspire if the defendants are competitors and the alleged conspiracy is directed at eliminating some significant dimension or degree of that competition.[139] Although economists may offer admissible evidence on motive to conspire,[140] that possibility is not discussed below.

Rarely, the use of "facilitating practices" also has been listed as a plus factor.[141]

---

in part because it had not been shown "that cooperation was essential to successful operation of the plan").

[136] Toys "R" Us, Inc. v. FTC, 221 F.3d 928, 935–36 (7th Cir. 2000) (citing "testimony . . . to the effect that the only condition on which each toy manufacturer would agree to TRU's demands was if it could be sure its competitors were doing the same thing" and inferring agreement because no participant would have gone along unless "it could be sure that its competitors were doing the same thing").

[137] *See, e.g.*, Blomkest Fertilizer, Inc. v. Potash Corp. of Sask., 203 F.3d 1028, 1043 (8th Cir. 2000) (en banc) ("'motive to conspire' and 'high level of interfirm communications,' are often cited as 'plus factors' because they make conspiracy possible"); *In re* Baby Food Antitrust Litig., 166 F.3d 112, 132 (3d Cir. 1999) (one plus factors is whether defendants "had an economic motive to conspire in order to increase their profits"); Wallace v. Bank of Bartlett, 55 F.3d 1166, 1168 (6th Cir. 1995) ("'plus factors' include . . . a common motive to conspire").

[138] *See* Matsushita Elec. Indus. Co. v. Zenith Radio Corp., 475 U.S. 574, 596–97 (1986) ("Lack of motive bears on the range of permissible conclusions that might be drawn from ambiguous evidence: if petitioners had no rational economic motive to conspire, and if their conduct is consistent with other, equally plausible explanations, the conduct does not give rise to an inference of conspiracy."); First Nat'l Bank of Ariz. v. Cities Serv. Co., 391 U.S. 253, 287 (1968) (rejecting the inference of agreement based on the absence of a motive to conspire). Lack of motive to conspire is does not establish the absence of an agreement, because the law entertains the notion of agreements that make no economic sense.

[139] *Cf.* Minn. Ass'n of Nurse Anesthetists v. Unity Hosp., 208 F.3d 655, 660 (8th Cir. 2000) ("Non-competing hospitals have no logical motive to 'conspire' with each other . . . .").

[140] *See, e.g., Baby Food Antitrust Litig.*, 166 F.3d at 134 (expert economist testified primarily that there was a motive to conspire).

[141] *See* Todd v. Exxon Corp., 275 F.3d 191, 198 (2d Cir. 2001).

Many facilitating practices involve the dissemination of information. As such, they are a type of communication included in the first plus factor.[142] Other facilitating practices include pricing commitments, such as best-price policies, and the adoption of industry-wide pricing systems, such as basing point pricing.[143] Antitrust commentary on such practices[144] has focused on the legality of the practices themselves in an effort "to avoid the issue of whether an agreement can be found" and to identify conduct that can be enjoined.[145]

D. SUMMARY JUDGMENT STANDARDS AND THEIR APPLICATION IN RECENT CASES

In recent years, summary judgment has been a major hurdle for plaintiffs in cases involving the inference of an agreement. This pattern began with *Monsanto*, which involved a motion for directed verdict on the existence of a vertical agreement. The Supreme Court held:

> There must be evidence that tends to exclude the possibility that the manufacturer and

---

[142] The Supreme Court has held that information exchange itself can violate Section 1. *See* United States v. U.S. Gypsum Co., 438 U.S. 422, 457–59 (1978); United States v. Container Corp. of Am., 393 U.S. 333, 334–35 (1969). Professor Posner, however, argued that information exchange itself ought not to be considered unlawful but rather that it should be treated as circumstantial evidence of the existence of a price-fixing agreement. *See* Richard A. Posner, *Information and Antitrust: Reflections on the* Gypsum *and* Engineers *Decisions*, 67 GEO. L.J. 1187 (1979).

[143] On the competitive effects of such practices, see Thomas E. Cooper, *Most-Favored-Customer Pricing and Tacit Collusion*, 17 RAND J. ECON. 377 (1986); George A. Hay, *Facilitating Practices: The Ethyl Case*, *in* THE ANTITRUST REVOLUTION 182 (John E. Kwoka, Jr. & Lawrence J. White eds., 3d ed. 1998); Charles A. Holt & David T. Scheffman, *Facilitating Practices: The Effects of Advance Notice and Best-Price Policies*, 18 RAND J. ECON. 203 (1987); William S. Neilson & Harold Winter, *Bilateral Most-Favored-Customer Pricing and Collusion*, 24 RAND J. ECON. 147 (1993); Steven C. Salop, *Practices that (Credibly) Facilitate Oligopoly Co-Ordination*, *in* NEW DEVELOPMENTS IN THE ANALYSIS OF MARKET STRUCTURE 265 (Joseph E. Stiglitz & G. Frank Mathewson eds., 1986); Michael G. Vita, *Fifteen Years After* Ethyl: *The Past and Future of Facilitating Practices*, 68 ANTITRUST L.J. 991 (2000).

[144] *See, e.g.*, Michael D. Bleckman, *Conscious Parallelism, Signalling and Facilitating Devices: The Problem of Tacit Collusion under the Antitrust Laws*, 24 N.Y.L. SCH. L. REV. 881 (1979); Donald S. Clark, *Price-Fixing without Collusion: An Antitrust Analysis of Facilitating Practices after* Ethyl Corp., 1983 WISC. L. REV. 887; George A. Hay, *The Meaning of "Agreement" under the Sherman Act: Thoughts from the "Facilitating Practices" Experience*, 16 REV. IND. ORG. 113 (2000); George A. Hay, *Oligopoly, Shared Monopoly, and Antitrust Law*, 67 CORNELL L.REV. 439 (1982).

[145] Dennis A. Yao & Susan S. DeSanti, *Game Theory and the Legal Analysis of Tacit Collusion*, 38 ANTITRUST BULL. 113, 121 (1993); *see also* Peter C. Carstensen, *Commentary: Reflections on Hay, Clark, and the Relationship of Economic Analysis and Policy to Rules of Antitrust Law*, 1983 WISC. L. REV. 953 (criticizing facilitating practices commentary for failing to focus on the agreement requirement).

> nonterminated distributors were acting independently. . . . [T]he antitrust plaintiff should present direct or circumstantial evidence that tends to prove that the manufacturer and others "had a conscious commitment to a common scheme designed to achieve an unlawful objective."[146]

Although the Court addressed a vertical agreement, courts of appeals commonly apply the *Monsanto* test in cases involving alleged horizontal agreements.[147]

The Court's analysis two years later in *Matsushita* is more significant for several reasons.[148] The case involved an alleged horizontal agreement, and the Court stressed that, as a general matter, "antitrust law limits the range of permissible inferences from ambiguous evidence in a § 1 case."[149] The Court read *Monsanto* to have held that "conduct as consistent with permissible competition as with illegal conspiracy does not, standing alone, support an inference of antitrust conspiracy,"[150] and it held: "To survive a motion for summary judgment or for a directed verdict, a plaintiff seeking damages for a violation of § 1 must present evidence 'that tends to exclude the possibility' that the alleged conspirators acted independently."[151] In remanding the case, the Court further instructed the court of appeals to "consider whether there is . . . evidence that is sufficiently unambiguous to permit a trier of fact to find that petitioners conspired."[152]

There is obvious difficulty in framing the plaintiffs' burden as proffering

---

[146] Monsanto Co. v. Spray-Rite Serv. Corp., 465 U.S. 752, 764 (1984) (quoting Edward J. Sweeney & Sons, Inc. v. Texaco, Inc., 637 F.2d 105, 111 (3d Cir. 1980)); *see also Monsanto*, 465 U.S. at 768 (almost identical statement).

[147] *See, e.g.*, Blomkest Fertilizer, Inc. v. Potash Corp. of Sask., 203 F.3d 1028, 1032 (8th Cir. 2000) (en banc); *In re* Citric Acid Litig., 191 F.3d 1090, 1094 (9th Cir. 1999); *In re* Baby Food Antitrust Litig., 166 F.3d 112, 124 (3d Cir. 1999); City of Tuscaloosa v. Harcros Chems., Inc., 158 F.3d 548, 570 (11th Cir. 1998).

[148] Matsushita Elect. Indus. Co. v. Zenith Radio Corp., 475 U.S. 574 (1986).

[149] *Id.* at 588. *Matsushita* involved allegations of group predation, and the Court explained that mistaken inferences of predation "chill the very conduct the antitrust laws were designed to protect." *Id.* at 594. As a consequence, the Ninth Circuit initially limited the application of *Matsushita*'s summary judgment standard to situations in which "inference of a conspiracy would pose a significant deterrent to beneficial procompetitive behavior." *In re* Coordinated Pretrial Proceedings in Petroleum Prods. Antitrust Litig., 906 F.2d 432, 440 (9th Cir. 1990). The Ninth Circuit, however, has more recently treated its prior statements as dicta. *See Citric Acid Litig.*, 191 F.3d at 1096.

[150] *Matsushita*, 475 U.S. at 588; *see also id.* at 597 n.21 (almost identical language).

[151] *Id.* at 588 (quoting *Monsanto*, 465 U.S. at 764).

[152] *Id.* at 597.

evidence that "tends to exclude the possibility" of independent action.[153] Plaintiffs need not exclude the *possibility* of independent action under the civil preponderance of the evidence standard. Consistent with the civil standard of proof and the procedural setting in which the evidence is reviewed, plaintiffs' burden is better stated as producing evidence not merely consistent with the existence of an agreement, but that "would allow a reasonable finder of fact to conclude . . . that the alleged conspiracy is more probable than not."[154]

Judge Posner recently held that, with "neither an a priori reason nor direct evidence to suppose" that parallel conduct resulted from agreement, on a motion for summary judgment, "the plaintiffs have the burden of rebutting, by the normal civil standard of a preponderance of the evidence, the hypothesis of individual maximizing behavior."[155] Evidence of action contrary to self-interest provides precisely what is required to carry this burden: "[A]cts that would be contrary to the actor's self-interest in the absence of a conspiracy, but which make economic sense as part of a conspiracy, provide the crucial type of 'plus factor' evidence necessary to exclude the possibility of independent action."[156]

Since 1998 the courts of appeals have reviewed grants of summary judgment in a series of cases in which plaintiffs tried to establish the existence of an agreement

---

[153] Judge Posner has argued that the "development of the law in this area has been handicapped by" this language, because it is taken "to require a plaintiff as part of his burden of proof to prove a sweeping negative." POSNER, *supra* note 98 at 99–100. Professor Hovenkamp has made the slightly different argument that many courts have misunderstood *Matsushita*. Herbert Hovenkamp, *The Rationalization of Antitrust*, 116 HARV. L. REV. 917, 925–26 (2003) (book review).

[154] 2 PHILLIP E. AREEDA, HERBERT HOVENKAMP & ROGER D. BLAIR, ANTITRUST LAW ¶ 308c, at 87 (2d ed. 2000); *accord* Williamson Oil Co. v. Philip Morris USA, 346 F.3d 1287, 1300 (11th Cir. 2003) ("Evidence that does not support the existence of a price fixing conspiracy any more strongly than it supports conscious parallelism is insufficient to survive a defendant's summary judgment motion.").

[155] *In re* Brand Name Prescription Drugs Antitrust Litig., 186 F.3d 781, 787–88 (7th Cir. 1999); *see also* Super Sulky, Inc. v. U.S. Trotting Assoc., 174 F.3d 733, 739 (6th Cir. 1999) (plaintiff's evidence "may be *consistent* with conspiratorial conduct but . . . proving that conduct is consistent with a conspiracy is not sufficient to allow an inference of conspiracy absent some evidence which tends to exclude the possibility that conduct is independent") (quoting Riverview Invs., Inc. v. Ottawa Cmty. Improvement Corp., 899 F.2d 474, 485 (6th Cir. 1990)).

[156] Blomkest Fertilizer, Inc. v. Potash Corp. of Sask., 203 F.3d 1028, 1046 (8th Cir. 2000) (Gibson, J. dissenting); *see also id.* at 1044 (very similar statement).

among competitors largely through economic evidence. Chronologically first was *City of Tuscaloosa*.[157] Five chemical companies were alleged to have fixed prices in the sale of chlorine to thirty-nine Alabama municipalities. After excluding much of plaintiff's evidence, the district court granted summary judgment for defendants.[158] The Eleventh Circuit reversed some of the evidentiary rulings as well as the grant of summary judgment, the latter on the strength of the evidence of "high and rising incumbency rates," i.e., high rates at which the plaintiff municipalities retained their incumbent chlorine supplier when they entered into new contracts.[159] The court held that such "high incumbency would not be likely to occur" absent collusion.[160] The court's reasoning was unclear and incomplete. The district court indicated that the high incumbency rates resulted from the municipalities' having often retained their incumbent suppliers in the event of tie bids.[161] The issue, therefore, was whether the high incidence of tie bids provided a basis for inferring an agreement, and there is no apparent basis for distinguishing tie bids from mere parallel pricing.

In the *Baby Food Antitrust Litigation*, the Third Circuit affirmed summary judgment for defendants on claims that the three major baby food producers conspired to fix prices.[162] Plaintiffs relied heavily on evidence of an exchange of price information, but the courts found only evidence of "mere 'chit-chat' at chance meetings or trade shows among persons with no pricing authority."[163] Plaintiffs also relied on a statistical analysis of pricing data purporting to demonstrate pronounced

---

[157] City of Tuscaloosa v. Harcros Chems., Inc., 158 F.3d 548 (11th Cir. 1998).

[158] City of Tuscaloosa v. Harcros Chems., Inc., 877 F. Supp. 1504 (N.D. Ala. 1995), *aff'd in part, vacated in part, rev'd in part*, 158 F.3d 548 (11th Cir. 1998).

[159] Plaintiffs' expert statistician found that the incumbency rate was about fifty percent before the alleged conspiracy and rose substantially during it, to as high as ninety percent. *Id.* at 1516–17. The district court noted that five non-defendant chemical companies had been awarded contracts as a result of being tied for low bidder, and the court concluded that "the evidence of tie bids in this case should be viewed as a strong indication of the absence of a conspiracy." *Id.* at 1529.

Incumbency rates were not the only evidence on which plaintiffs relied. For a discussions of the other evidence, see *id.* at 1514–16, 1526–27; Blair, *supra* note 2, at 43; Blair & Herndon II, *supra* note 2, at 19; Blair & Herndon I, *supra* note 2, at 823–27.

[160] *See City of Tuscaloosa*, 158 F.3d at 572–73.

[161] *See City of Tuscaloosa*, 877 F. Supp. at 1517, 1529.

[162] *In re* Baby Food Antitrust Litig., 166 F.3d 112 (3d Cir. 1999).

[163] *Id.* at 124–26, 133, 137.

pricing parallelism over a four-year period, but the courts found that parallelism was shown only for list prices, while actual transaction prices did not move in a parallel fashion.[164] Finally, the plaintiffs relied on an expert economist who "knew nothing about the baby food industry" but was prepared to conclude that there was a rational motive to conspire. On this evidence, the court of appeals commented that "something more is required before a court can conclude that competitors conspired to fix prices."[165] On the court of appeals' view of the case, there was not even parallel pricing, much less plus factors.

In *Re/Max*, the Sixth Circuit reinstated a claim by real estate brokerage firm Re / Max that the two dominant incumbents had conspired to fix the terms of commission splits between buyers' and sellers' agents when Re / Max was on either side of the transaction.[166] To attract agents away from other brokers, Re / Max allowed its agents to retain all or nearly all of their commissions, while the dominant incumbents required their agents to pay half of their commissions back to their employers. Re / Max alleged that the dominant incumbents agreed to adopt this "adverse splits" policy to disadvantage Re / Max in competing for agents.[167] Plaintiff's expert economist argued that unilateral adoption of the policy by either dominant incumbent would have led Re / Max to direct its buyers to homes listed by the dominant incumbent not adopting the policy. In reversing summary judgment for defendants, the Sixth Circuit credited this analysis, finding "evidence that the adverse-splits policy would not have been in either defendant's *independent* economic interest."[168] Although it is impossible to evaluate the expert's analysis with only the information provided by the court, Re / Max's duty to act in the interest of its clients may have prohibited it from steering clients in a manner that benefitted itself while injuring the clients.

In *Brand Name Prescription Drugs*, retail pharmacies alleged that drug

---

[164] *Id.* at 128–30.

[165] *Id.* at 134–35.

[166] Re / Max Int'l, Inc. v. Realty One, Inc., 173 F.3d 995 (6th Cir. 1999), *rev'g in part* 924 F. Supp. 1474 (N.D. Ohio 1996).

[167] *Re/Max*, 173 F.3d at 1000–03.

[168] *Id.* at 1009–11.

manufacturers conspired to adopt an elaborate scheme of price discrimination disfavoring the pharmacies. After a jury trial, the district court granted defendants judgment as a matter of law, and Judge Posner for the Seventh Circuit (mostly) affirmed.[169] "The plaintiffs' principal economic evidence was that brand name prescription drugs [were] indeed priced discriminatorily,"[170] but Judge Posner held that the fact of price discrimination was "not in issue." He explained that each of the manufacturers "had some market power," so the price discrimination schemes were "consistent with unilateral profit-maximizing behavior," and that the plaintiffs "failed to come up with any evidence" indicating that the actual schemes were the product of an agreement.[171] This case is significant because non-competitive performance was an undisputed fact, and the holding of the Seventh Circuit was that plaintiffs had proffered no evidence indicating that unilateral exercises of market power did not fully explain the observed conduct.

Citric Acid presented the unusual issue of whether a particular competitor had participated in an admitted price fixing scheme, and the Ninth Circuit affirmed summary judgment in favor of the defendant.[172] In doing so, the court reviewed many separate arguments for inferring participation, most relating to evidence of communications, but of greatest interest here were arguments relating to the defendant's pricing and capacity decisions. Plaintiffs argued that indicative of participation in a collusive arrangement was the fact that the defendant expanded capacity only fifty percent after originally announcing a hundred-percent expansion. The Ninth Circuit credited the defendant's asserted business reasons for expanding

---

[169] *In re* Brand Name Prescription Drugs Antitrust Litig., 186 F.3d 781 (7th Cir. 1999) (Posner, C.J.), *aff'g in part, rev'g in part, and remanding* 1999-1 Trade Cas. (CCH) ¶ 72,446 (N.D. Ill. 1999). The court of appeals left standing one collusion theory supported by documentary evidence. *See* 186 F.3d at 788–89.

[170] *Brand Name Prescription Drugs,* 186 F.3d at 786. The district court excluded most of this testimony under *Daubert* or at least found it to have been based on inadequate knowledge of the industry. *See In re* Brand Name Prescription Drugs Antitrust Litig., 1999-1 Trade Cas. (CCH) ¶ 72,446, at 84,126–28 (N.D. Ill. 1999), *aff'd in part, vacated in part,* 186 F.3d 781 (7th Cir. 1999); *In re* Brand Name Prescription Drugs Antitrust Litig., No. 94 C 897, 1996 WL 167350, at *22–*23 (N.D. Ill. Apr. 4, 1996), *modified*, Nos. 94 C 897, MDL 997, 1996 WL 351178 (N.D. Ill. June 24, 1996), *and rev'd*, 123 F.3d 599 (7th Cir. 1997). The court of appeals found that the district court was wrong to exclude the testimony for the reason given. *See Brand Name Prescription Drugs,* 186 F.3d at 786, 788.

[171] *Id.* at 786–88.

[172] *In re* Citric Acid Litig., 191 F.3d 1090 (9th Cir. 1999), *aff'g* 996 F. Supp. 951 (N.D. Cal. 1998).

only fifty percent and cautioned against "second-guessing" "strategic business decisions."[173] Critically, plaintiffs did not appear to be able to explain why the hundred-percent capacity increase would have been in the defendant's unilateral self-interest. Plaintiffs also contended that the defendant had stopped growing its market share and began mirroring the prices of others. The court of appeals found neither contention supported by the facts.[174]

Perhaps the most remarkable recent case is *Blomkest Fertilizer,* in which the Eighth Circuit affirmed summary judgment for Canadian potash producers accused of price fixing.[175] The en banc court split six to five on whether plaintiff had produced sufficient evidence of an agreement. The major point of disagreement was the evaluation of evidence of "price verification." The defendants occasionally telephoned each other to verify whether a particular price was really being charged to a particular customer. The majority found these communications "facially innocent," while the dissenters viewed them as a device to prevent secret price cutting and therefore precisely the sort of evidence tending to exclude the possibility of independent action.[176] The dissenters made an interesting point, but there are major gaps in the logic. In the first place, there may not have been any secret price cutting to prevent, because there was no cartel, and with no collusive agreement to cheat on, there would have been no reason for secrecy. Second, if price verification was being used to detect secret price cutting, how did the secrets get out? Customers getting secret discounts would know better than to tell anyone. And if the callers had only vague suspicions of secret price cutting, why would secret price cutters confess? Thus, the price verification most likely served some purpose other than preventing secret price cutting.[177]

---

[173] *Citric Acid Litig.*, 191 F.3d at 1100–01.

[174] *Id.* at 1101–03.

[175] Blomkest Fertilizer, Inc. v. Potash Corp. of Sask., 203 F.3d 1028 (8th Cir. 2000) (en banc), *aff'g In re* Potash Antitrust Litig., 954 F. Supp. 1334 (D. Minn. 1997). The vacated panel opinion is reported at 176 F.3d 1055 (8th Cir. 1999).

[176] *Blomkest Fertilizer,* 203 F.3d at 1033–35 (en banc majority); *id.* at 1041, 1045–50 (Gibson, J. dissenting).

[177] Price verification is used to prevent fraud when matching of competitors' prices can be expected or is contractually required. On the use of most-favored-nation contracts in the natural gas industry, which spawned a great deal of price verification, see Keith J. Crocker & Thomas P. Lyon, *What Do "Facilitating Practices" Facilitate? An Empirical Investigation of Most-Favored-Nation Clauses in Natural Gas*

The majority and dissenting judges also evaluated differently the significance of dumping proceedings and the "Suspension Agreement" that followed, which they agreed caused a substantial increase in prices. The dissenters found probative plaintiffs' expert economist's econometric analysis purporting to show that prices rose more than the Suspension Agreement required, while the majority found the econometrics without value because it did not account for the dumping proceedings or the major reorientation in the business plan of the largest defendant.[178]

Also of particular interest is Judge Posner's decision in *High Fructose Corn Syrup*, which reversed summary judgment for defendants.[179] He explained that "the existence of an agreement can be inferred" on the basis of "economic evidence suggesting that the defendants were not in fact competing," i.e., "evidence that the structure of market was such to make secret price fixing feasible . . . and evidence that the market behaved in a noncompetitive manner."[180] The latter evidence is of primary interest here. Judge Posner found it telling that the industry had moved to a 9:10 ratio for the prices of the main two high fructose corn syrup (HFCS) products. He found that there was no convincing explanation for the price change and that the price ratio was inconsistent with the dictates of perfect competition.[181] It is notable that Judge Posner used the model of perfect competition as his only benchmark, neglecting to address whether the same would be true in non-cooperative oligopoly and evidently treating as irrelevant whether the observed pricing was more consistent with monopoly than with competition.[182] Judge Posner also found significance in the fact that market shares were stable despite industry growth.[183]

Contracts, 37 J.L. & ECON. 297 (1994); R. Glenn Hubbard & Robert J. Weiner, *Efficient Contracting and Market Power: Evidence from the U.S. Natural Gas Industry*, 34 J.L. & ECON. 25 (1991).

[178] *See Blomkest Fertilizer*, 203 F.3d at 1037–38; *id.* at 1051–52 (Gibson, J. dissenting).

[179] *In re* High Fructose Corn Syrup Antitrust Litig., 295 F.3d 651 (7th Cir. 2002), *cert. denied*, 123 S. Ct. 1251, *and cert. denied*, 123 S. Ct. 1253, *and cert. denied*, 123 S. Ct. 1254 (2003), *rev'g* 156 F. Supp. 2d 1017 (C.D. Ill. 2001).

[180] *High Fructose Corn Syrup*, 295 F.3d at 654–55. Judge Posner also found other evidence was "highly suggestive of the existence of an explicit though of course covert agreement to fix prices." *Id.* at 663.

[181] *See id.* at 658–59.

[182] It is especially notable because Judge Posner had criticized the Supreme Court for inferring agreement from conduct that was inconsistent with monopoly. *See* POSNER, *supra* note 98, at 90.

[183] *See High Fructose Corn Syrup*, 295 F.3d at 659–60.

And despite conflicting testimony, he also gave some weight to a regression analysis performed by plaintiff's expert economist purporting to show that the HFCS prices were higher during the period of the alleged conspiracy than could be explained by market forces.[184] Judge Posner's approach to summary judgment seems far more consistent with that of the dissenters in *Blomkest Fertilizer*, than with the majority, and suggests that the bar is significantly lower in the Seventh Circuit than in its sister circuits.[185]

The most recent case of interest is *Williamson Oil*, in which the Eleventh Circuit affirmed summary judgment for defendant cigarette manufacturers in a class action brought by cigarette wholesalers.[186] Price fixing allegedly began with a significant price *decrease* by the industry leader, Philip Morris, narrowing the price gap between premium and discount brands and simplifying the industry's pricing structure. Rivals followed these pricing moves, as well as subsequent price increases, although for a considerable time prices remained below prior levels.[187] The Eleventh Circuit was right to affirm in the light of the plaintiffs' evidence, but some of the reasoning is troubling. The court appears to have held that evidence of pricing coordination facilitated by communications is insufficient to withstand summary judgment because oligopolists coordinate prices even without agreement. The court found public statements on pricing policies were no more indicative of agreement than of "rational, lawful, parallel pricing behavior that is typical of an oligopoly."[188] The court also found no indication of agreement in the failure of major sellers of discount brands to attempt to re-widen the price gap, because Philip Morris had sent an "unambiguous message . . . that it would act aggressively to attempt to maintain its

---

[184] *See id.* at 660–61.

[185] *See* Hovenkamp, *supra* note 153, at 926; David L. Meyer, *The Seventh Circuit's* High Fructose Corn Syrup *Decision—Sweet for Plaintiffs, Sticky for Defendants*, ANTITRUST, Fall 2002, at 67. *But see* Kenneth Glazer, *Easy Facts Make Good Law: A Response to David Meyer's Article on the* High Fructose Corn Syrup *Decision*, ANTITRUST, Summer 2003, at 90.

[186] Williamson Oil Co. v. Philip Morris USA, 346 F.3d 1287 (11th Cir. 2003), *aff'g* Holiday Wholesale Grocery Co. v. Philip Morris, Inc., 231 F. Supp. 2d 1253 (N.D. Ga. 2002).

[187] *Williamson Oil*, 346 F.3d at 1292–95.

[188] *Id.* at 1307.

desired price differential."[189] In other ways, the court also appears to have required more of plaintiffs than Judge Posner would. For example, the court found it "plausible" that a particular information exchange was "a means of facilitating the monitoring of the conspiracy," but nevertheless found the exchange not to be a plus factor because there was also a "plausible" innocent explanation.[190]

III. RECONCILING THE SECTION 1 CONCEPT OF AGREEMENT WITH MODERN OLIGOPOLY THEORY

A. PERSPECTIVES ON MODERN OLIGOPOLY THEORY

The concept of Nash, non-cooperative equilibrium is simple and totally intuitive.[191] Competitors observe their rivals' actions, and they find themselves in equilibrium if all are happy with their own actions in light of those of their rivals. Industrial organization economists employ this equilibrium concept to the almost total exclusion of any alternative.

One-shot game oligopoly models are a mainstay of modern economic thinking about competition, even though they are criticized for abstracting from the real-word fact that competitors interact again and again.[192] Economists nevertheless believe one-shot game oligopoly models provide useful, if imperfect, predictions of the behavior of real-world oligopolies, and indeed, these models have been found to explain reasonably well the levels of prices and profits typically observed in real-world industries.[193] One-shot game oligopoly models are taught in industrial

---

[189] *Id.* at 1311.

[190] *Id.* at 1313.

[191] Unlike much in economics, Nash equilibrium is certainly comprehensible to lawyers and judges.

[192] *See, e.g.*, Fisher, *supra* note 5, at 115.

[193] The relationship between concentration and profits or prices is roughly as predicted by the Cournot model. *See* Micha Gisser & Raymond D. Sauer, *The Aggregate Relation between Profits and Concentration Is Consistent with Cournot Behavior*, 16 REV. INDUS. ORG. 229 (2000); Luke M. Froeb & Gregory J. Werden, *Endogeneity in the Concentration-Price Relationship: Causes and Consequences* 12–13 (U.S. Department of Justice, Antitrust Division, Economic Analysis Group Discussion Paper 91-7, July 1, 1991). And the predictions of auction models comport well with bidding in real-world auctions. *See* Patrick Bajari & Lixin Ye, *Deciding Between Competition and Collusion*, 85 REV. ECON. & STAT. 971 (2003); Patrick Bajari & Ali Hortacsu, *Are Structural Estimates of Auction Models Reasonable? Evidence from Experimental Data* (Feb. 24, 2003), *available at* http://www.stanford.edu/~bajari/behavioral.pdf.

organization courses, and they are widely used by professional economists outside the courtroom. The Cournot and Bertrand models have been used extensively in the analysis of mergers.[194] Auction models are beginning to be used in both the analysis of mergers and the evaluation of actual bids for evidence of collusion.[195]

Nash, non-cooperative equilibrium in one-shot game oligopoly models is viewed by economists as depicting a best-case scenario (from society's perspective), in the sense that economists do not expect competition to be more intense than this over the long term. More intense competition may occur for limited periods of time, as with aggressive pricing for a new product, or with an episode of predatory conduct. The absence of a collusive agreement certainly does not imply competitive performance in an oligopoly. Prices are not expected to equal the short-run marginal cost of production, as in the textbook model of perfect competition. Nor is this viewed with alarm. Prices well in excess of short-run marginal cost often may be

---

[194] For theoretical analyses of mergers in homogeneous good industries using the Cournot model, see Joseph Farrell & Carl Shapiro, *Horizontal Mergers: An Equilibrium Analysis*, 80 AM. ECON. REV. 107 (1990); Luke M. Froeb & Gregory J. Werden, *A Robust Test for Consumer Welfare Enhancing Mergers Among Sellers of a Homogeneous Product*, 58 ECON. LETTERS 367 (1998); Stephen W. Salant et al., *Losses from Horizontal Merger: The Effects of an Exogenous Change in Industry Structure on Cournot-Nash Equilibrium*, 98 Q.J. ECON. 185 (1983); Gregory J. Werden, *Horizontal Mergers: Comment*, 81 AM. ECON. REV. 1002 (1991). For theoretical analyses of mergers in differentiated consumer products industries using the Betrand model, see Raymond Deneckere & Carl Davidson, *Incentives to Form Coalitions with Bertrand Competition*, 16 RAND J. ECON. 473 (1985); Gregory J. Werden, *A Robust Test for Consumer Welfare Enhancing Mergers Among Sellers of Differentiated Products*, 44 J. INDUS. ECON. 409 (1996). For predictive analyses of actual differentiated products mergers using the Bertrand model, see Jerry A. Hausman & Gregory K. Leonard, *Economic Analysis of Differentiated Products Mergers Using Real World Data*, 5 GEO. MASON L. REV. 321 (1997); Aviv Nevo, *Mergers with Differentiated Products: The Case of the Ready-to-Eat Cereal Industry*, 31 RAND J. ECON. 395 (2000); Gregory J. Werden, *Expert Report in* United States v. Interstate Bakeries Corp. and Continental Baking Co., 7 INT'L J. ECON. BUS. 139 (2000).

[195] For theoretical analyses of mergers in auction markets, see Serdar Dalkir et al., *Mergers in Symmetric and Asymmetric Noncooperative Auction Markets: The Effects on Prices and Efficiency*, 18 INT'L J. INDUS. ORG. 383 (2000); Luke Froeb & Steven Tschantz, *Mergers Among Bidders with Correlated Values*, *in* MEASURING MARKET POWER 31 (Daniel J. Slottje ed., 2002); Steven Tschantz et al., *Mergers in Sealed versus Oral Auctions*, 7 INT'L J. ECON. BUS. 201 (2000); Keith Waehrer & Martin K. Perry, *The Effects of Mergers in Open Auction Markets*, 34 RAND J. ECON. 287 (2003). For an application to Forest Service timber auctions, see Lance Brannman & Luke M. Froeb, *Mergers, Cartels, Set-Asides, and Bidding Preferences in Asymmetric Oral Auctions*, 82 REV. ECON. STAT. 283 (2000). For an accessible treatment of the use of acution models to detect collusion, see Patrick Bajari & Garrett Summers, *Detecting Collusion in Procurement Auctions*, 70 ANTITRUST L.J. 143 (2002). For the theoretical underpinnings and specific applications, see Bajari & Ye, *supra* note 193; Martin Pesendorfer, *A Study of Collusion in First Price Auctions*, 67 REV. ECON. STUD. 381 (2000).

required for the complete recovery of fixed costs and achievement of a competitive rate of return on investment.[196]

The vast majority of economists also believe that real-world competitors sometimes are able do better than in Nash, non-cooperative equilibrium in one-shot games. The strongest evidence of this is the large number of successful criminal collusion cases brought by the Department of Justice[197] combined with the empirical evidence that many prosecuted cartels were successful.[198] Many studies of bid rigging in government procurement have found that collusion substantially affected prices paid.[199] A few studies have found substantial success from buyer conspiracies

---

[196] *See, e.g.*, William J. Baumol & Daniel G. Swanson, *The New Economy and Ubiquitous* Competitive *Price Discrimination: Identifying Defensible Criteria of Market Power*, 70 ANTITRUST L.J. 661, 666–68 (2003).

[197] The Department of Justice reports having won 443 criminal Section 1 cases (involving fewer separate cartels) over the past decade, resulting in the imposition of sentences on 336 individuals and 316 corporations. Antitrust Workload Statistics FY 1993–2002, *available at* http: // www.usdoj.gov / atr / public / 12848.htm.

[198] Doubters remain. *See* Michael F. Sproul, *Antitrust and Prices*, 101 J. POL. ECON. 741 (1993) (arguing that price increases following indictments demonstrate that cartels had not increased prices). *But see* Gregory J. Werden, *The Effect of Antitrust Policy on Consumer Welfare: What Crandall and Winston Overlook* (U.S. Dep't of Justice, Antitrust Division, Economic Analysis Group Discussion Paper 03-02, Jan. 2003) (arguing that price increases following indictments are not indicative of price effects of conspiracies and that Sproul's data were totally unsuitable to the task). *See also* Howard P. Marvel et al., *Price Fixing and Civil Damages: An Economic Analysis*, 40 STAN. L. REV. 561 (1988) (arguing that a low incidence of follow-on damage suits demonstrates that criminally prosecuted cartels were unsuccessful). *But see* Gregory J. Werden, *Price-Fixing and Civil Damages: Setting the Record Straight*, 34 ANTITRUST BULL. 307 (1989) (challenging both the empirical observations of Marvel et al. and the implications drawn).

[199] Bid rigging on school milk has been much studied. *See* Robert H. Porter & J. Douglas Zona, *Ohio School Milk Markets: An Analysis of Bidding*, 30 RAND J. ECON. 263 (1999) (Ohio conspiracy increased prices up to 11.3% in a given year and an average of 6.5% over its life span); Pesendorfer, *supra* note 195 (Florida and Texas conspiracies produced winning bids statistically significantly higher than non-collusive bids); *see also* Robert F. Lanzillotti, *The Great School Milk Conspiracies of the 1980s*, 11 REV. INDUS. ORG. 413 (1996) (price decreases in Florida when the state began an investigation suggest the cartel increased prices 14–21%); In K. Lee, *Non-Cooperative Tacit Collusion, Complementary Bidding and Incumbency Premium*, 15 REV. INDUS. ORG. 115 (1999) (rigged bids in Dallas–Fort Worth were 18% higher than non-rigged bids in San Antonio, while costs in Dallas–Fort Worth were only about 2% higher). Studies of the effects of bid rigging in construction compared winning bids to pre-sale engineering estimates across auctions with and without rigged bids. *See, e.g.*, Lance E. Brannman & J. Douglass Klein, *The Effectiveness and Stability of Highway Bid-Rigging*, *in* EMPIRICAL STUDIES IN INDUSTRIAL ORGANIZATION: ESSAYS IN HONOR OF LEONARD W. WEISS 61 (David B. Audretsch & John J. Siegfried eds., 1992) (bid rigging on highway contracts in North Carolina raised prices 18% and bid rigging in South Dakota raised prices 6.5%); Jeffrey H. Howard & David Kaserman, *Proof of Damages in Construction Industry Bid-Rigging Cases*, 34 ANTITRUST BULL. 359 (1989) (average price increases from bid rigging on several sewer construction projects were at least 36%). And

to lower purchase prices,[200] and several have found that recent international cartels substantially increased prices.[201]

Criminal collusion cases involve spoken agreements, and it is far less clear that unspoken agreements are a significant phenomenon.[202] Many believed them to be major problem in the 1960s, when a Presidential task force chaired by University of Chicago law school dean Phil C. Neal recommended legislation "dealing with entrenched oligopolies [which] would rectify the most important deficiency in the present antitrust laws."[203] But for a considerable time now, a widely held view,

---

there is one interesting study of Defense Department procurement. *See* Luke M. Froeb et al., *What is the Effect of Bid-Rigging on Prices?*, 42 ECON. LETTERS 419 (1993) (prices were increased 23–30% by bid rigging in Defense Department auctions procuring frozen fish).

[200] *See* John E. Kwoka, Jr., *The Price Effects of Bidding Conspiracies: Evidence from Real Estate Auction "Knockouts,"* 42 ANTITRUST BULL. 503 (1997) (a 32% price decrease resulted from bid rigging in real estate auctions); Jon P. Nelson, *Comparative Antitrust Damages in Bid-Rigging Cases: Some Findings from a Used Vehicle Auction*, 38 ANTITRUST BULL. 369 (1993) (a 17–28% price decrease resulted from bid rigging in auctions for used police cars).

[201] There have been several studies on the price effects of the lysine cartel. *See* JOHN M. CONNOR, GLOBAL PRICE FIXING: OUR CUSTOMERS ARE THE ENEMY 264 (2001) (the best estimate is that the lysine cartel increased prices 17%); B. Adair Morse & Jeffrey Hyde, *Estimation of Cartel Overcharges: The Case of Archer Daniels Midland and the Market for Lysine* (Purdue University, Department of Agricultural Economics, Staff Paper 08-00, Oct. 2000) (the lysine conspiracy increased prices 34%); *see also* John M. Connor, *"Our Customers Are Our Enemies": The Lysine Cartel of 1992–1995*, 18 REV. INDUS. ORG. 5 (2001); John M. Connor, *The Global Lysine Price-Fixing Conspiracy of 1992–1995*, 19 REV. AGRIC. ECON. 412 (1997); Lawrence J. White, *Lysine and Price Fixing: How Long? How Severe?*, 18 REV. INDUS. ORG. 23 (2001). There is some evidence on several other cartels. *See* CONNOR, *supra*, at 158 (the citric acid cartel increased prices 10–25%), 336 (the vitamins cartel increased prices of particular vitamins an average of 25–28%).

[202] Some academic literature purports to demonstrate the existence of "tacit collusion," but there is no basis for determining whether undetected spoken agreements were responsible for the observed performance. Notable contributions applying repeated game models to actual industry pricing behavior over time are Jonathan B. Baker, *Identifying Cartel Policing under Uncertainty: The U.S. Steel Industry 1933–1939*, 32 J.L. & ECON. S47 (1989); Severin Borenstein & Andrea Shepard, *Dynamic Pricing in Retail Gasoline Markets*, 27 RAND J. ECON. 429 (1996); Glenn Ellison, *Theories of Cartel Stability and the Joint Executive Committee*, 25 RAND J. ECON. 37 (1994); Robert H. Porter, *A Study of Cartel Stability: The Joint Executive Committee, 1880–1886*, 14 BELL J. ECON. 301 (1983); Ray Rees, *Collusive Equilibrium in the Great Salt Duopoly*, 103 ECON. J. 833 (1993); Margaret E. Slade, *Interfirm Rivalry in a Repeated Game: An Empirical Test of Tacit Collusion*, 35 J. INDUS. ECON. 499 (1987).

[203] Report of the White House Task Force on Antitrust Policy 1 (July 5, 1968), *reprinted in* 1 J. REPRINTS ANTITRUST L. & ECON. 633 (1969). The Task Force's legislative proposal was titled The Concentrated Industries Act, and its text is found at HARVEY J. GOLDSCHMID ET AL., INDUSTRIAL CONCENTRATION: THE NEW LEARNING App. C (1974). It was introduced in Congress as S. 2614, 92d Cong. (1971). Senator Phillip Hart proposed his own Industrial Reorganization Act, S. 3882, 92d Cong. (1972), *see* 118 CONG. REC. 24,925

heavily influenced by the most basic insights of game theory and Stigler's model, is that "coordination cannot be simply spontaneous" and "it follows that the needed efforts at concurrence, coordination, and compliance should yield sufficient smoking-gun-type evidence for conviction."[204]

Repeated game oligopoly models are not understood to make contrary predictions. These models show that pricing coordination is possible under certain circumstances, but very few economists take the models so literally that they believe coordinated pricing occurs without communication of any form. A widely held view is that repeated game models correctly identify what outcomes are possible in oligopoly, but which outcomes actually are achieved is determined by forces outside the models, including agreements among competitors.[205] A complementary view is that the predictions of repeated game oligopoly models usefully identify factors that facilitate pricing coordination, such as the ability rapidly to change prices in response to other firms actions.[206]

Another view is that repeated game oligopoly models should not be taken

---

(1972); S. 1167, 93d Cong. (1973); S. 1959, 94th Cong. (1975), *see* 121 CONG. REC. 19,219 (1975). Salient provisions are discussed by PHILLIP E. AREEDA, ANTITRUST ANALYSIS 285–89 (3d ed. 1981).

Within a year, a rival task force, chaired by George Stigler, made a contrary recommendation. Report of the Task Force on Productivity and Competition (Feb. 18, 1969), *reprinted in* 1 J. REPRINTS ANTITRUST L. & ECON. 827 (1969). Stigler, of course, had previously doubted the significance of unspoken agreements. *See supra* note 39. Other notable antitrust scholars sided with Stigler. *See* ROBERT H. BORK, THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF 175 (1978) (doubting that "tacit collusion is an important phenomenon, or even that it is a real phenomenon"); *Antitrust in Transition: Crossing the Threshold of Change: Panel Discussion*, 54 ANTITRUST L.J. 31, 33 (1985) (remarks of William F. Baxter) (the concern that animated the 1982 Merger Guidelines was "not Chamberlinian oligopoly theory").

[204] Kenneth G. Elzinga, *New Developments on the Cartel Front*, 29 ANTITRUST BULL. 3, 25 (1984).

[205] See Dennis W. Carlton et al., *Communication among Competitors: Game Theory and Antitrust*, 5 GEO. MASON. L. REV. 423, 430–31 (1997); Robert H. Gertner & Andrew M. Rosenfeld, *Agreement under the Sherman Act*, *in* 1 THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE LAW 25, 38 (Peter Newman ed., 1998). These authors argue that only Nash, non-cooperative equilibria can be sustained without legally enforceable cartel contracts. And since cartel contracts were unenforceable even before the Sherman Act, they reason that everything the Sherman Act was intended to prohibit must be a Nash equilibrium. Finally, they conclude that competitor communications and other such conduct help determine which Nash equilibrium prevails.

[206] *See* Shapiro, *supra* note 9, at 364, 409.

seriously by antitrust law.[207] Repeated game models are in many ways even more abstract and artificial than one-shot game models. Infinite repetition of precisely the same stage game is hardly realistic, and the equilibrium concept in repeated games is far less intuitive than in one-shot games. It is one thing to observe rivals' current prices or quantities as in a one-shot game, and quite another to "observe" rivals' complex, time-varying price or output strategies. Moreover, models of repeated games do not capture important dynamic aspects of competition; in the vast majority of the models, there is neither communication nor learning.

If unspoken agreements both exist and have a significant impact, they probably do so only when a very simple form of cooperation emerges from repeated interaction using strategies such as Tit-for-Tat. This might happen, for example, if each customer is uniquely best served by one particular supplier. Realizing this, a supplier may elect not to compete aggressively, if at all, for the business of customers it is not best positioned to serve. Quickly, all may get the message, with the result being a customer allocation resulting from an unspoken agreement.[208]

Because the lower courts pay far more attention to what the Supreme Court says about economic theory than about what economists say, it is important to reflect on the Court's remark that

> Tacit collusion, sometimes called oligopolistic price coordination or conscious parallelism, describes the process, not in itself unlawful, by which firms in a concentrated market might in effect share monopoly power, setting their prices at a profit-maximizing, supracompetitive level by recognizing their shared economic interests and their interdependence with respect to price and output decisions.[209]

---

[207] *See* Joseph Kattan & William R. Vigdor, *Application of Game Theory to Antitrust: Game Theory and the Analysis of Collusion in Conspiracy and Merger Cases,* 5 GEO. MASON. L. REV. 441, 451–56 (1997); Bruce H. Kobayashi, *Game Theory and Antitrust: A Post-Mortem,* 5 GEO. MASON. L. REV. 411, 411–14 (1997).

[208] A possible example comes from the events prior to those supporting the convictions in *United States v. Champion International Corp.*, 557 F.2d 1270 (9th Cir. 1977), about which *see supra* text accompanying note 126. One of the defendants was surprised to find no one bidding against him on a particular tract, and decided not to bid on another tract auctioned the same day. For the next several years, there was little bidding competition, as the defendants bid only on their most preferred tracts. The courts found that this "bidding pattern . . . developed by 'normal economic forces,' presumably in a noncollusive evolution." *Id.* at 1273.

[209] Brooke Group Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209, 227 (1993).

This oft-quoted[210] dictum might be understood to endorse the Chamberlin-Fellner view of oligopoly,[211] but all it actually says is that oligopolists recognize their interdependence and achieve supracompetitive prices without resorting to agreement.[212] This is true in essentially all oligopoly models, including one-shot game models such as Cournot and Bertrand.

B. TWO CASES OF REAL-WORLD PRICING COORDINATION

Two Justice Department civil cases, settled by consent decree in the 1990s, provide case studies of real-world pricing coordination. In both of these cases, competitors communicated using something akin to language, but they never directly addressed each other, nor did they use words as such. But the communication did not consist of taking, or publicizing, marketplace actions such as the building of capacity, the production of output, or the charging of particular prices.

By far the best known of these cases is *Airline Tariff Publishing Co.*[213] ATP was a joint venture owned by the major airlines. It served as the central repository for their fare information, distributing it to the member airlines, as well as to computerized reservation systems. With fares updated once a day, the airlines were able to use ATP to monitor rivals' pricing closely, facilitating rapid responses to their price changes. And the airlines did not use ATP just to post fares actually available to

---

[210] *See, e.g.*, Williamson Oil Co. v. Philip Morris USA, 346 F.3d 1287, 1299 (11th Cir. 2003); Blomkest Fertilizer, Inc. v. Potash Corp. of Sask., 203 F.3d 1028, 1032 (8th Cir. 2000); *In re* Baby Food Antitrust Litig., 166 F.3d 112, 121 (3d Cir. 1999); City of Tuscaloosa v. Harcros Chems., Inc., 158 F.3d 548, 570 (11th Cir. 1998); *In re* Disposable Contact Lens Antitrust Litig., 2001-1 Trade Cas. (CCH) ¶ 73,198, at 89,834 (M.D. Fla. 2001).

[211] The Court cited 2 PHILLIP E. AREEDA & DONALD F. TURNER, ANTITRUST LAW ¶ 404 (1978), discussing pricing coordination under oligopoly in a manner heavily influenced by Chamberlin and Fellner, and SCHERER & ROSS, *supra* note 48, at 199–208, outlining basic oligopoly theories, including those of Cournot, Bertrand, and Chamberlin.

[212] The Eleventh Circuit appears to have read more into this dictum. The court first suggested that "firms realize that attempts to cut prices usually reduce revenue without increasing any firm's market share." *City of Tuscaloosa*, 158 F.3d at 570. Most recently, the court indicated that oligopolists have a "rational recognition that the market structure in which they operate will most easily yield profits by means other than price competition." *Williamson Oil*, 346 F.3d at 1299.

[213] United States v. Airline Tariff Publishing Co., No. 92 2854 (D.D.C. filed Dec. 21, 1992).

travelers, but also to post proposed changes in fares and responses to such proposals.

The airlines were permitted to attach footnotes to their ATP fare postings, indicating notably a "first-ticket date," i.e., a date on which a fare would become available for sale, and a "last-ticket date," i.e., a date on which a fare would no longer be available for sale. By using first and last ticket dates, the defendant airlines were able to communicate proposed fare changes to rivals, without actually changing any fares available to travelers. Using a future first-ticket date, one carrier could propose a fare increase for a particular route, and using the same first-ticket date, a rival on that route could match or propose an alternative increase. If a consensus was not quickly reached, the first-ticket date could be "rolled forward" to prevent a proposed fare from actually being used. Using a last-ticket date, the airlines could negotiate the termination of an existing discount on a particular route.

Footnotes also were used to indicate a linkage of fares on multiple routes. In that way, one carrier could threaten to cut its fare on a particular route in retaliation for another's fare cut on a different route. A carrier also could offer to raise its fare on a particular route as an inducement to a rival for going along with a fare increase on some linked route. The Department of Justice alleged that negotiations using all of these tactics had occurred, resulting in price-fixing violating Section 1.[214]

The second case involved a Federal Communication Commission auction for licenses to broadband radio spectrum used to provide PCS service.[215] The FCC organized an extremely complex auction in which licenses in each of 493 geographic areas were simultaneously auctioned. The geographic areas were called "Basic

---

[214] *See* Proposed Final Judgment and Competitive Impact Statement, 58 Fed. Reg. 3,971 (Jan. 12, 1993); United States' Response to Public Comments, April 8, 1993; Proposed Final Judgment and Competitive Impact Statement, 59 Fed. Reg. 15,225 (Mar. 31, 1994); Severin Borenstein, *Rapid Price Communication and Coordination: The Airline Tariff Publishing Case*, *in* THE ANTITRUST REVOLUTION 233 (John E. Kwoka, Jr. & Lawrence J. White eds., 4d ed. 2004). For an argument that the conduct should not have been condemned as per se illegal price fixing, see Carlton et al., *supra* note 205, at 436–39.

[215] Three separate cases were brought relating to three separate agreements for particular licenses. United States v. Omnipoint Corp., No. 1:98CV02750 (D.D.C. Nov. 10, 1998); United States v. Mercury PCS II, L.L.C., No. 1:98CV02751 (D.D.C. Nov. 10, 1998); United States v. 21st Century Bidding Corp., No. 1:98CV02752 (D.D.C. Nov. 10, 1998).

Trading Areas" or BTAs, and each was assigned a three-digit code. Omitting many details, the auction was conducted in rounds, in each of which bidders could not only place bids, but also could withdraw any bids that were currently highest for a particular license. Bids tended to be in the hundreds of thousands of dollars, and generally were made in integer multiples of one thousand dollars. The auction continued until a round passed with no new high bids, which ultimately required 276 rounds of bidding.

Typical of the unlawful agreements alleged by the Department of Justice is the following: In order to induce a rival bidder to drop out in BTA 444, one defendant first submitted, then withdrew, new high bids in two other BTAs in which the rival had been the high bidder. Those new high bids were not in integer thousands of dollars, but rather ended in the digits 444. The bids ending in 444 were designed to signal a quid pro quo, and the signal was understood. The rival ceased bidding in BTA 444, and the first bidder submitted bids less than those of the rival in the two other BTAs.[216]

In both cases, the defendants communicated and reached an agreement on price. The communication was clearer in *ATP* than in the PCS auction, but even in the former case, the bargain was struck without an explicit offer or acceptance. None was required. In the PCS auction, the communication was exceptionally minimal but nevertheless effective. The inference of an agreement was not difficult in either case and required no economic insights. In the terminology adopted above, both cases involved traditional conspiracies organized with spoken agreements.

C. Applying the Concept of Action Contrary to Self-Interest

Professor Posner has suggested that the concept of action contrary to self-interest "invites the defendants to argue that they were not competing because it was not in their self-interest to compete—which hardly ought to be extenuating."[217] That concept of self-interest obviously fails to distinguish the self-interest of the

---

[216] *See* Proposed Final Judgments and Competitive Impact Statements, 63 Fed. Reg. 65,228 (Nov. 25, 1998).

[217] Posner, *supra* note 98, at 100.

individual competitor from the collective interest of all competitors, and thus, misses the point of the exercise. Chamberlin's view of oligopoly essentially holds that there is no difference between the interest of the individual competitor and the collective interests of all competitors, but the Prisoner's Dilemma game and Stigler's model have taught the error of such thinking. Models of repeated games have in no way undermined that lesson. Pursuit of the collective interest in such models requires threats of punishment precisely because competitors' pursuit of their unilateral self-interests does not further the collective interest. The case law, however, often has failed to appreciate this, because the courts have ignored or misunderstood modern oligopoly theory.[218]

In the *Petroleum Products Antitrust Litigation* the Ninth Circuit reversed summary judgment for defendants, but the court nevertheless accepted the defendants' argument that "interdependence" alone could explain their pricing, plainly adopting the Chamberlin-Fellner view of oligopoly when it held that "interdependent pricing may often produce economic consequences that are comparable to those of classic cartels."[219] The court reasoned:

> In determining whether to follow a unilateral price increase by a competitor, a firm in a relatively concentrated market will recognize that, because its pricing and output decisions have an effect on market conditions and will generally be watched by its competitors, there is less likelihood that any shading would go undetected or would be ignored. The firm thus knows that if it fails to follow the price lead, the leading firm will quickly reduce its prices back to their earlier level. On the other hand, the firm may recognize that the higher price is one that would produce higher profits. It may therefore decide to follow the price increase, knowing that the other firms will likely see things the same way and that, at any rate, any subsequent downward movement in prices would likely be detected before there was any substantial loss of market share.[220]

While the pricing evidence in the case may not have been particularly suggestive of an agreement, the court's reasoning was faulty. As in the Prisoners' Dilemma game, a competitor's pursuit of its unilateral self-interest often means not going along with

[218] *See id.* ("Most courts mistakenly regard tacitly collusive behavior as independent and therefore infer from the dictum in *Monsanto* that the plaintiff must negate the possibility that supracompetitive pricing was achieved without explicit agreement.").

[219] *In re* Coordinated Pretrial Proceedings in Petroleum Prods. Antitrust Litig., 906 F.2d 432, 444 (9th Cir. 1990).

[220] *Id.* at 443 (citation omitted).

a price increase, even through that runs contrary to the collective interest.

In *Reserve Supply* the Seventh Circuit affirmed summary judgment for defendant insulation producers against claims of price fixing.[221] Among the facts cited by plaintiffs in support of the inference of an agreement was a series of parallel price increases during a period of weak demand. According to the court, the defendants contended that it would have been "irrational to attempt to increase sales by maintaining lower prices, because lower prices would be met by their competitors, leaving no increase in market share and reduced profit levels."[222] Citing the fact that demand was inelastic, the court reasoned that the only customers that could be attracted by a defendant maintaining lower prices "were those that were currently being served by their competitors."[223] Thus, the court concluded that failing to maintain lower prices "does not suggest that [the defendants] 'acted in a way that, but for a hypothesis of joint action, would not have been in [their] own interest.'"[224] Again, the reasoning is faulty, because it ignored the fact that prices are competed down from monopoly levels when competitors pursue their unilateral self-interests.

In *Petruzzi's IGA* the Third Circuit reversed summary judgment in favor of defendants on bid rigging charges.[225] The court followed the same approach as the Ninth and Seventh Circuits had, opining that "courts do not consider a failure to cut prices or an initiation of a price rise as an action against self-interest because it also reflects the interdependence of the industry."[226] But, the court reasoned, the plaintiff had not alleged price fixing, but instead an agreement not to bid on each others' existing accounts, and found that such conduct "was against the defendants' self-

---

[221] Reserve Supply Corp. v. Owens-Corning Fiberglas Corp., 971 F.2d 37 (7th Cir. 1992).

[222] *Id.* at 52.

[223] *Id.*

[224] *Id.* at 53 (second alternation in original) (quoting Ill. Corporate Travel, Inc. v. Am. Airlines, Inc., 806 F.2d 722, 726 (7th Cir. 1986)).

[225] Petruzzi's IGA Supermarkets, Inc. v. Darling-Del. Co., 998 F.2d 1224 (3d Cir. 1993).

[226] *Id.* at 1244. The Third Circuit has more recently endorsed this dictum. *See In re* Baby Food Antitrust Litig., 166 F.3d 112, 122, 135 (3d Cir. 1999) ("[R]efusing to raise or lower prices unless rivals do the same could be against a firm's self-interest" but it would constitute mere interdependence. To satisfy the requirements of a conspiracy, the action that is against self-interest must "go beyond mere interdependence.") (quoting Coleman v. Cannon Oil Co., 849 F. Supp. 1458, 1467 (M.D. Ala. 1993)).

interest" because "there is no reason that bidding on each other's accounts should trigger a price war anymore than bidding on new accounts should trigger one."[227] There is, however, no rational definition of self-interest under which both this holding and the contrasting dictum on pricing can be right. If it is in competitors' self-interests not to compete on price, it is also in their self-interests not to take away each others customers. In fact, neither is in their self-interest properly understood.

Petroleum Products and *Reserve Supply*, as well as several other cases, rely on Judge Breyer's analysis in *Clamp-All*.[228] In that case, the defendants were alleged to have predated against the plaintiff and to have fixed prices. The evidence for the latter claim was that the defendants had published identical list prices for various products. Judge Breyer quite reasonably affirmed the district court's grant of summary judgment, explaining:

> Courts have noted that the Sherman Act prohibits *agreements*, and they have almost uniformly held, at least in the pricing area, that . . . individual pricing decisions (even when each firm rests its own decision upon its belief that competitors will do the same) do *not* constitute an unlawful agreement under section 1 of the Sherman Act. That is not because such pricing is desirable (it is not), but because it is close to impossible to devise a judicially enforceable remedy for "interdependent" pricing. How does one order a firm to set its prices *without regard* to the likely reactions of its competitors?[229]

Although some courts appear to read a Chamberlinian view into Judge Breyer's analysis, he actually indicated only that merely interdependent oligopoly conduct does not violate Section 1 even if it produces supracompetitive pricing. To reach this conclusion does not require the adoption of any particular oligopoly model, and it is by no means clear from this passage whether Judge Breyer subscribed to the Chamberlin-Fellner view of oligopoly or to any other particular model.

Analysis of one-shot games provides the clear definition of self-interest necessary to allow evidence of action against self-interest to play a useful role in inferring the

---

[227] *Petruzzi's IGA*, 998 F.2d at 1245.

[228] Clamp-All Corp. v. Cast Iron Soil Pipe Inst., 851 F.2d 478 (1st Cir. 1988). Among the decisions relying on *Clamp-All* are: *In re* High Fructose Corn Syrup Antitrust Litigation, 295 F.3d 651, 654 (7th Cir. 2002); *cert. denied*, 123 S. Ct. 1251, *and cert. denied*, 123 S. Ct. 1253, *and cert. denied* 123 S. Ct. 1254 (2003); *Baby Food*, 166 F.3d at 128; *Reserve Supply*, 971 F.2d at 50; *Petroleum Products*, 906 F.2d at 444.

[229] *Clamp-All*, 851 F.2d at 484 (citations omitted) (emphasis in original).

existence of an agreement. If there is a unique Nash, non-cooperative equilibrium to a particular game, as there is in conventional one-shot game oligopoly models, it follows that there is a unique action each player will take if does not coordinate its actions with its rivals. These equilibrium actions are consistent with self-interest, and any other actions are not.

There are, however, significant limits to the insights from the analysis of one-shot games, particularly because equilibrium actions depend on the rules of the game. Oligopoly theory cannot always provide sufficiently robust predictions of the precise actions real-world competitors would take in pursuit of their unilateral self-interests. But some things are quite clear, and principal among them is that going along with price increases is not necessarily consistent with self-interest. In one-shot game models, monopoly pricing is not an equilibrium unless there is a monopoly.[230] Game theory teaches that pursuit of self-interest may mean cutting price, even if others match price cuts immediately and with certainty. This is a critical insight of the Prisoners' Dilemma game as well as the models of Cournot, Bertrand, and Stigler.[231]

Judge Posner took the proper approach in *Name Brand Prescription Drugs*. He explained that the defendants all had significant unilateral market power by virtue of patent protection for their particular drugs. Acting purely in their unilateral self-interests, each would exploit its market power by charging prices well above short-run marginal cost, as predicted by the Bertrand model. As was critical in the case, each defendant's unilateral self-interest dictated marking up price over cost by differing amounts to different classes of customers, depending on their willingness to pay. That the defendants practiced price discrimination, thus, was not evidence of an agreement among them. It did not tend, even in the slightest, to exclude the possibility that "each was embarked on an individual rather than a concerted course

---

[230] If available capacity is insufficient to produce more than the monopoly quantity, the number of competitors does not matter. That possibility, however, is ignored.

[231] Although oligopoly theory may offer a solid theoretical basis for distinguishing self-interested action from action pursuant to an agreement, reliable empirical implementation may present more of a problem. Distinguishing Cournot or Bertrand prices from monopoly prices may require more precise estimation of demand and cost than is possible in some cases. *See* PHLIPS, *supra* note 41, ch. 8; Louis Phlips, *On the Detection of Collusion and Predation*, 40 EUR. ECON. REV. 495 (1996), *reprinted in* APPLIED INDUSTRIAL ECONOMICS 269 (Louis Phlips ed., 1998).

of action—that each, in other words, was merely exploiting the market power it had, rather than seeking to create or amplify such power through an agreement with competitors not to compete."[232]

Although the Cournot and Bertrand models are useful in defining a competitor's unilateral self-interest in a case of alleged price fixing, a somewhat different situation may be presented by a case of alleged concerted refusal to deal, such as *Interstate Circuit* or *Toys "R" Us*. A conventional way to understand the facts of these cases is that the refusal to deal was in the self-interest of each defendant if, and only if, all went along.[233] Assuming that to have been the case, it follows that there were two Nash, non-cooperative equilibria—one in which all defendants refused to deal, and one in which no defendant refused to deal.[234] If any defendant observed that not all of its rivals were refusing to deal, its best action would be not to refuse to deal. But if any defendant observed that all its rivals were refusing to deal, its best course of action would be to refuse to deal as well. Communication through the named defendants was the mechanism through which rivals observed each others' actions, and if that is all there was to the communications, the fact that all refused to deal did not support the inference of agreement.[235] Game theory, therefore, casts substantial doubt on the usual rationale for the inferences in both cases, although finding an agreement may have been amply justified by other evidence.

---

[232] *In re* Brand Name Prescription Drugs Antitrust Litig., 186 F.3d 781, 785 (7th Cir. 1999). There is debate about whether it is proper to characterize the foregoing as an exercise of market power. *See* Benjamin Klein & John Shepard Wiley, Jr., *Competitive Price Discrimination as an Antitrust Justification for Intellectual Property Refusals to Deal*, 70 ANTITRUST L.J. 599, 624–33 (2003); Jonathan B. Baker, *Competitive Price Discrimination: The Exercise of Market Power without Anticompetitive Effects (Comment on Klein and Wiley)*, 70 ANTITRUST L.J. 643, 645, 649 & n.19 (2003); Benjamin Klein & John Shepard Wiley, Jr., *Market Power in Economics and in Antitrust: Reply to Baker*, 70 ANTITRUST L.J. 655, 657–58 (2003). This debate has generated heat but not light. For this author's views on the meaning of "market power" and "monopoly power" in economics and law, see Gregory J. Werden, *Demand Elasticities in Antitrust Analysis*, 66 ANTITRUST L.J. 363, 367–80 (1998).

[233] *See supra* notes 135–36 and accompanying text.

[234] This observation is also made by Butz & Kleit, *supra* note 84, at 142–44.

[235] Areeda & Hovenkamp agree that self-interest must be understood to depend on the behavior of rivals. They infer agreement merely from parallel action in circumstances such as these only when "the challenged act or inaction is perilous to the actor in the absence of parallel action." 6 AREEDA & HOVENKAMP, *supra* note 62, ¶ 1415c, at 96. However, there may be peril in breaking from the herd, which ever way it goes, and that likely was true in the *Interstate Circuit* and *Toys "R" Us* cases.

D. REVISITING THE ANALYSES OF TURNER AND POSNER

Donald Turner provided one of the first and best known scholarly reconciliations of Section 1 law with oligopoly theory.[236] He held a Ph.D. in economics from Harvard, where Chamberlin taught, and must have been well versed in Chamberlin's theory of oligopoly,[237] which he recounted near the outset of his article.[238] But Professor Turner viewed Chamberlin's analysis as a mere theoretical construct. He observed that "no element that could properly be called 'agreement' is present" in the "hypothetical case [with] no counterpart in reality" of two or three symmetric sellers of a homogeneous product operating under static demand conditions arriving at "the 'best' price for each seller."[239] Turner's view of oligopoly was much closer to that of Fellner, who argued that there was a tendency to the monopoly outcome, but a lot of problems stood in the way.[240] Turner argued that, with the real-world complications not present in his hypothetical case, for "a pattern of noncompetitive pricing to emerge . . . requires something which we could, not unreasonably, call a 'meeting of minds.'"[241]

Professor Turner saw no difficulty in recognizing under Section 1 what is referred to here as an unspoken agreement. He argued that "purely as a problem in linguistic definition, there is no reason to exclude oligopolistic behavior from the scope of the term agreement simply because the circumstances make it possible to communicate without speech," but he also opined that "there is fair ground for argument that oligopoly price behavior can be described as individual behavior."[242]

---

[236] Donald F. Turner, *The Definition of Agreement under the Sherman Act: Conscious Parallelism and Refusals to Deal*, 75 HARV. L. REV. 655 (1962).

[237] *See supra* notes 20–24 and accompanying text.

[238] Turner, *supra* note 236, at 661 ("[E]conomic theory has suggested that . . . noncompetitive behavior might well arise in an 'oligopoly' situation . . . without overt communication or agreement, but solely through the rational calculation by each seller of what the consequences of his price decision would be, taking into account the probable or virtually certain reactions of his competitors.").

[239] *Id.* at 663–64.

[240] *See supra* notes 25–30 and accompanying text.

[241] Turner, *supra* note 236, at 664. Turner quoted at length the analysis of Carl Kaysen, *supra* note 32, at 268–69, arguing that real-world oligopoly interaction entails some form of meeting of minds. Turner, *supra* note 236 at 664–65.

[242] Turner, *supra* note 236, at 665–66.

Ultimately, Professor Turner concluded that the most sensible approach was to declare that an unspoken agreement was not "an unlawful agreement."[243] Three observations pointed him toward this resolution: First, he viewed Chamberlin-Fellner oligopoly "behavior in essence [to be] identical to that of sellers in a competitive industry."[244] Second, he understood the implication of finding an agreement with ordinary oligopoly behavior to be to declare oligopoly pricing itself to be unlawful, which made no sense in the light of the fact that monopoly pricing was not unlawful under the Sherman Act.[245] Finally, he found meaningful injunctive relief was impossible because the objectionable conduct was merely the rational accounting for probable reactions of competitors.[246] Turner went on to discuss what might today be considered facilitating practices. He advocated finding an agreement in violation of Section 1 when, even if without any communication, competitors adopt certain anticompetitive pricing schemes, because there is no remedial problem in enjoining such schemes.[247]

Were Professor Turner alive today, he likely would continue to argue that unspoken agreements should not be deemed unlawful under Section 1, even though his original rationale for that conclusion has been substantially undercut by developments in oligopoly theory. Oligopoly behavior in one-shot game models is

---

[243] *Id.* at 671–72; *see also id.* at 683 ("Once one goes beyond the boundaries of explicit, verbally communicated assent to a common course of action—a step long since taken and from which it would not seem reasonable to retreat—it is extraordinarily difficult if not impossible to define clearly a plausible limit [to the concept of agreement] short of interdependence"); *id.* 705 ("Interdependence of decisions should be enough to establish horizontal agreement among competitors.").

[244] *Id.* at 666.

[245] *Id.* at 667–68; *see, e.g.*, Verizon Communications, Inc. v. Law Offices of Curtis V. Trinko, 124 S. Ct. 872, 879 (2004) ("The mere possession of monopoly power and the concomitant charging of monopoly prices, is not only not unlawful; it is an important element of the free-enterprise system."); Blue Cross & Blue Shield of Wis. United v. Marshfield Clinic, 65 F.3d 1406, 1413 (7th Cir. 1995) (Posner, C.J.) (a lawful monopolist may "charge any price that it wants, for the antitrust laws are not a price-control statute or a public-utility or common-carrier rate-regulation statute") (citations omitted); Kartell v. Blue Shield of Mass., Inc., 749 F.2d 922, 927 (1st Cir. 1984) (Breyer, J.) ("[E]ven a monopolist is free to exploit whatever market power it may possess when that exploitation takes the form of charging uncompetitive prices.").

[246] Turner, *supra* note 236, at 669–70. While Turner is often cited for his observations on the problem of relief, much the same observations previously had been made by economists. *See supra* notes 30, 32, 34 & 108 and accompanying text.

[247] Turner, *supra* note 236, at 673–77, 681.

much like that of sellers in a competitive industry, but the same cannot be said of coordinated pricing achieved through the use of a punishment mechanism. Consequently, condemning unspoken agreements does not mean condemning all oligopoly pricing and does not create an inconsistency with the Sherman Act's treatment of monopoly pricing. Moreover, as Professor Posner has written: "Remedy is a problem . . . , but not, as Turner thought, because it would require telling oligopolists to behave irrationally."[248] The remedy problem presented by unspoken agreements does make it unattractive to condemn them under Section 1, but more than mere rational accounting for competitors' reactions is required to produce an unspoken agreement. Finally, Professor Turner likely would not today perceive the serious "oligopoly problem" that motivated his analysis in the first place.[249]

Richard Posner has written often on the reconciliation of Section 1 with oligopoly theory, both from his position in the academy (in which he is referred to here as Professor Posner) and from his position on the bench (in which he is referred to here as Judge Posner). Professor Posner has agreed with Professor Turner's conclusion that oligopoly gives rise to unspoken agreements that could be challenged under Section 1, but disagreed with Turner's conclusion that unspoken agreements should not be challenged under Section 1.

Professor Posner has consistently argued that oligopoly can give rise to legally cognizable, but unspoken, agreements. In his most recent analysis, just a few years ago, he explained: "If seller *A* restricts his output in the expectation that *B* will do likewise, and *B* restricts his output in a like expectation, there is a literal meeting of the minds—a mutual understanding—even if there is no overt communication."[250] He argued that, in this situation, "one seller communicates his 'offer' by restricting output, and the offer is 'accepted' by the actions of his rivals in restricting their

---

[248] POSNER, *supra* note 98, at 98.

[249] That he perceived such a problem forty years ago is clear from KAYSEN & TURNER, *supra* note 24, at 110–11.

[250] POSNER, *supra* note 98, at 94.

outputs as well."[251]

Professor Posner's rationale for his disagreement with Turner was expressed most clearly in Posner's original analysis of the subject more than three decades ago.[252] When Professor Turner wrote his article, the Chamberlin-Fellner view of oligopoly dominated economic thought on the subject, but by the time Professor Posner wrote his, Stigler's model had appeared. Consequently, Posner argued that the oligopoly theory on which Turner relied "was unsatisfactory in important respects" and that oligopolists, in fact, would have incentives to cut price below the monopoly level.[253]

Professor Posner proposed to analyze oligopoly "in terms of the theory of cartels."[254] He sketched what basically was Stigler's model, which he cited several times.[255] In this context, he argued that fewness of competitors was necessary for effective bargaining on the terms of coordination, but that it was not sufficient to provide a mechanism for detecting cheating on the agreed terms of coordination. In his most recent treatment of the subject, Professor Posner argued that it is not "inevitable" that oligopoly results in anything like the monopoly outcome, and he stressed that coordinated pricing "is not an unconscious state" and that competitors could elect not to coordinate prices.[256]

Professor Posner's analysis is inconsistent with modern oligopoly theory in one critical respect.[257] He has contended that any departure from the marginal cost

---

[251] *Id; see also In re* High Fructose Corn Syrup Antitrust Litig., 295 F.3d 651, 654 (7th Cir. 2002) (Posner, C.J.), *cert. denied,* 123 S. Ct. 1251, *and cert. denied,* 123 S. Ct. 1253, *and cert. denied,* 123 S. Ct. 1254 (2003).

[252] He first addressed the issue in Posner, *supra* note 98. He refined his analysis in RICHARD A. POSNER, ANTITRUST LAW: AN ECONOMIC PERSPECTIVE ch. 4 (1976).

[253] Posner, *supra* note 98, at 1566–69. Posner did not respond directly to Turner's point regarding inconsistent treatment of monopoly and oligopoly.

[254] *Id.* at 1569–75.

[255] *Id.* at 1569 n.24, 1572 n.31, 1572 n.33, 1574 nn.36–37 (all citing Stigler's model).

[256] POSNER, *supra* note 98, at 95–98.

[257] Roughly this point was made by Richard S. Markovits, *Oligopolistic Pricing Suits, the Sherman Act, and Economic Welfare: Part I, Oligopolistic Price and Oligopolistic Pricing: Their Conventional and Operational Definition*, 26 STAN. L. REV. 493, 494, 498–99, 508-10 (1974); Richard S. Markovits, *A Response to Professor Posner*, 28 STAN. L. REV. 919, 920–21, 936–38 (1976). Professor Markovits, however, attempted to reinvent oligopoly theory from scratch, and produced an analysis alien to both lawyers and economists. His

pricing of perfectly competitive equilibrium requires a sort of coordination that can be held to violate Section 1.[258] He also specifically indicated that Cournot conduct should be treated as the product of an unlawful agreement.[259] These views imply that Nash, non-cooperative equilibrium in one-shot game oligopoly models is necessarily the product of an agreement, and that is a proposition finding no support in modern oligopoly theory. It is also notable that Judge Posner used the model of perfect competition as his only hypothesis alternative to conspiracy in the *High Fructose Corn Syrup* case.[260] Doing so can easily catch Cournot conduct in the collusion net. On the other hand, in *Brand Name Prescription Drugs*, Judge Posner used what is essentially a Bertrand model with highly differentiated products as the hypothesis alternative to conspiracy.[261]

Professor Posner advocated dispensing with "proof of conspiracy" and instead taking an "economic approach" which "involves identifying those markets in which

---

benchmark model resembled Bertrand competition with spatially differentiated products, and on top of that he considered the prospect of pricing coordination and the appropriate Section 1 response. His analysis was continued in Richard S. Markovits, *Oligopolistic Pricing Suits, the Sherman Act, and Economic Welfare: Part II, Injurious Oligopolistic Pricing Sequences: Their Description, Interpretation and Legality under the Sherman Act*, 26 STAN. L. REV. 717 (1974); Richard S. Markovits, *Oligopolistic Pricing Suits, the Sherman Act, and Economic Welfare: Part III, Proving (Illegal) Oligopolistic Pricing: A Description of the Necessary Evidence and a Critique of the Received Wisdom About Its Character and Cost*, 27 STAN. L. REV. 307 (1975); Richard S. Markovits, *Oligopolistic Pricing Suits, the Sherman Act, and Economic Welfare: Part IV, The Allocative Efficiency and Overall Desirability of Oligopolistic Pricing Suits*, 28 STAN. L. REV. 45 (1976).

[258] *See* POSNER, *supra* note 98, at 95 (it "is objectionable . . . to . . . charge a higher than competitive price"); *id.* at 96–97 (the act triggering liability is "to sell at a price greater than marginal cost"); *id.* at 98 (raising the prospect of a "damages judgment supracompetitive pricing"); *see also* Richard A. Posner, *Oligopolistic Pricing Suits, the Sherman Act, and Economic Welfare: A Reply to Professor Markovits*, 28 STAN. L. REV. 903, 905 (1976) (in oligopoly there is "competitive pressure on each seller to expand his output to the point where his price is equal to his marginal cost" so "it is not irrational for oligopolistic sellers to behave competitively").

[259] *See* POSNER, *supra* note 98, at 98 (if an incumbent "monopolist responds to a new entrant . . . as in the Cournot oligopoly model" both have "tacitly colluded"); *see also id.* at 91 (arguing that one bit of evidence of collusion is "[m]arket price inversely correlated with the number of firms or elasticity of demand," which is characteristic of Cournot and Bertrand equilibria).

[260] *See supra* text accompanying notes 181–82.

[261] *See supra* text accompanying notes 169–71. Judge Posner explained that with patent protection and brand preference it "would not be surprising . . . if *every* manufacturer of brand name prescription drugs has some market power" so the non-competitive pricing practices complained of were "consistent with unilateral profit-maximizing behavior by the manufacturers" and hence lawful. *In re* Brand Name Prescription Drugs Antitrust Litig., 186 F.3d 781, 787 (7th Cir. 1999) (emphasis in original).

conditions are propitious for the emergence of collusion" and "determining whether there really is collusive pricing."[262] To do the former, he set out seventeen conditions conducive to successful collusion, while properly stressing the absence of bright lines with respect to most of these conditions, and he set out fourteen "types of economic evidence" suggestive of collusion.[263] Professor Posner's solution to the remedy problem was to enjoin practices that aid competitors in coordinating pricing and to have the Justice Department bring damages suits on behalf of consumers.[264] The latter remedy, of course, is unavailable under current law.

Judge Posner begins where Professor Posner leaves off, arguing that Section 1's "language is broad enough . . . to encompass a purely tacit agreement to fix prices, that is, an agreement made without any actual communication among the parties to the agreement."[265] But he takes the prevailing judicial view of Section 1 to be "that an express, manifested agreement, and thus an agreement involving actual, verbalized communication, must be proved in order for a price-fixing conspiracy to be actionable under the Sherman Act."[266] Translated into the vocabulary of this article, Judge Posner finds that unspoken agreements could be held to violate Section 1 but that the case law has declined to do so.[267]

---

[262] POSNER, *supra* note 98, at 69.

[263] *Id.* at 69–93.

[264] *Id.* at 98–99.

[265] *In re* High Fructose Corn Syrup Antitrust Litig., 295 F.3d 651, 654 (7th Cir. 2002), *cert. denied*, 123 S. Ct. 1251, *and cert. denied*, 123 S. Ct. 1253, *and cert. denied*, 123 S. Ct. 1254 (2003). Judge Posner aruged:

> If a firm raises price in the expectation that its competitors will do likewise, and they do, the firm's behavior can be conceptualized as the offer of a unilateral contract that the offerees accept by raising their prices. Or as the creation of a contract implied in fact. "Suppose a person walks into a store and takes a newspaper that is for sale there, intending to pay for it. The circumstances would create a contract implied in fact" even though there was no communication between the parties.

Id. at 654 (quoting A.E.I. Music Network, Inc. v. Bus. Computers, Inc., 290 F.3d 952, 956–57 (7th Cir. 2002) (Posner, C.J.)). *But see* Hovenkamp, *supra*, note 153, at 922–23 (Posner's analysis "seems to be a considerable stretch beyond the common law").

[266] *Id.* at 654. *See also* POSNER, *supra* note 98, at 93 ("Most courts hold . . . that . . . an overt agreement . . . is indispensable to finding that the Sherman Act has been violated."); *id.* at 94 (the cases imply that "there must be an explicit agreement based upon actual communications between the parties").

[267] Judge Posner, of course, has not used the term "unspoken agreement," nor has he been precise in his reference to communications. The case law has not required literally "verbalized communications," nor is it possible to have an agreement literally "without any actual communications among the parties."

Even though not able to dispense with "proof of conspiracy," Judge Posner undertakes essentially the analysis advocated by Professor Posner when evaluating economic evidence on the existence of an agreement. This is best illustrated by his decision in *High Fructose Corn Syrup*, which first considered "evidence that the structure of the market was such as to make secret price fixing feasible,"[268] then turned to "evidence of noncompetitive behavior."[269]

E. ECONOMIC PRINCIPLES GOVERNING THE INFERENCE OF AGREEMENT

The introduction to Section II quoted conventional formulations of what constitutes a Section 1 agreement. The formulation used most often in recent years appears to have been that of a "conscious commitment to a common scheme,"[270] while "meeting of minds" also appeared in some cases.[271] Both formulations lack the precision necessary for an operational definition. One might reasonably find a "meeting of minds" or a "conscious commitment to a common scheme" in the equilibrium of every oligopoly model; in Nash, non-cooperative equilibrium, competitors' actions depend on the observed actions of their rivals.

Nor does delving deeper into the case law provide the necessary precision. Agreement in antitrust law is a broad and ill-defined concept.[272] As one district court

---

[268] *High Fructose Corn Syrup*, 295 F.3d at 655; *see id.* at 656–58; *see also* JTC Petroleum Co. v. Piasa Motor Fuels, Inc, 190 F.3d 775, 777 (7th Cir. 1999) (finding conditions in asphalt paving "ripe for effective collusion").

[269] *High Fructose Corn Syrup*, 295 F.3d at 658; *see id.* at 658–61.

[270] Monsanto Co. v. Spray-Rite Serv. Corp., 465 U.S. 752, 768 (1984) (quoting Edward J. Sweeney & Sons, Inc. v. Texaco, Inc., 637 F.2d 105, 111 (3d Cir. 1980)); *see, e.g.*, Va. Vermiculite, Ltd. v. Historic Green Springs, Inc., 307 F.3d 277, 281 (4th Cir. 2002), *cert. denied*, 123 S. Ct. 1900 (2003); Toscano v. Prof'l Golfers Ass'n, 258 F.3d 978, 983 (9th Cir. 2001); Spectators' Communication Network Inc. v. Colonial Country Club, 253 F.3d 215, 220 (5th Cir. 2001); Blomkest Fertilizer, Inc. v. Potash Corp. of Sask., 203 F.3d 1028, 1039 (8th Cir. 2000) (Gibson, J.,dissenting); *In re* Baby Food Antitrust Litigation, 166 F.3d 112, 117 (3d Cir. 1999).

[271] Copperweld Corp. v. Independence Tube Corp., 467 U.S. 752, 771 (1984) (quoting Am. Tobacco Co. v. United States, 328 U.S. 781, 810 (1946)); *see, e.g.*, *Baby Food*, 166 F.3d at 117; Rossi v. Standard Roofing, Inc., 156 F.3d 452, 465 (3d Cir. 1998); Systemcare, Inc. v. Wang Labs. Corp., 117 F.3d 1137, 1143 (10th Cir. 1997) (en banc); Wallace v. Bank of Bartlett, 55 F.3d 1166, 1168 (6th Cir. 1995); Apex Oil Co. v. DiMauro, 822 F.2d 246, 257 (2d Cir. 1987).

[272] The same is true in contract law. *See* RESTATEMENT (SECOND) OF CONTRACTS § 3 (1979); 1 SAMUEL WILLISTON & RICHARD A. LORD, A TREATISE ON THE LAW OF CONTRACTS § 1:3 (4th ed. 1990).

bemoaned, "the law has developed so as to provide little guidance to determine when an inference [of agreement] is reasonable . . . . [T]he line is ephemeral."[273] Courts seem to know Section 1 agreements when they see them, just as Justice Stewart knew pornography when he saw it.[274] This presents a challenge in articulating when it is reasonable to infer agreement.

With respect to the types of agreements considered here—price fixing, bid rigging, and market allocation—this challenge is compounded by the fact that the agreement itself is the offense.[275] It matters neither whether the parties to the agreement succeeded in their objectives, nor even whether they took any steps to effectuate their agreement. Plainly, the nonexistence of an agreement is inherently unprovable because an agreement need not leave any traces behind.[276] This article, however, addresses only cases in which private plaintiffs seeking damages propose to infer the existence of an effectuated agreement that they contend did leave tracks in the economic sands. These plaintiffs have the burden of proof, and the main focus of this article is the role of economic analysis in carrying that burden.

Synthesizing modern oligopoly theory and the case law, four general principles emerge governing inferences economists may draw, and courts should draw, on the existence of agreements:

1. Something more than interdependence must be shown before agreement can

[273] Holiday Wholesale Grocery Co. v. Philip Morris, Inc., 231 F. Supp. 2d 1253, 1270 (N.D. Ga. 2002), *aff'd sub nom.* Williamson Oil Co. v. Philip Morris USA, 346 F.3d 1287 (11th Cir. 2003).

[274] Jacobellis v. Ohio, 378 U.S. 184, 197 (1964) (Stewart, J., concurring) (unable to define hard-core pornography "intelligibly," the Justice remarked: "I know it when I see it . . . .").

[275] *See* United States v. Socony-Vacuum Oil Co., 310 U.S. 150, 225 n.59 (1940) ("[A] conspiracy to fix prices violates § 1 . . . though no overt act is shown, though it is not established that the conspirators had the means available for the accomplishment of their objective . . . .").

[276] Quite the opposite position was taken by Blair & Herndon II, *supra* note 2. *See id.* at 19 ("[E]xpert economic testimony may prove to be most valuable in providing *negative* inferences—that is, identifying economic evidence that is *inconsistent* with collusion."). To illustrate their point, they asserted that "stable market shares are as consistent with a collusive arrangement as with a noncollusive equilibrium," while "unstable market shares indicate the absence of collusion." *Id.* at 18. But this proposition exaggerates the import of unstable market shares, *see infra* text accompanying note 358, and fails "to distinguish between the existence of a conspiracy and its efficacy." *In re* High Fructose Corn Syrup Antitrust Litig., 295 F.3d 651, 656 (7th Cir. 2002) (Posner, C.J.), *cert. denied*, 123 S. Ct. 1251, *and cert. denied*, 123 S. Ct. 1253, *and cert. denied*, 123 S. Ct. 1254 (2003).

be inferred. Interdependence is normal and innocent in oligopoly.[277] Rational oligopolists typically monitor rivals closely and react to their price changes or other strategic moves. There is nothing even remotely suspicious about such actions.

2. The existence of an agreement cannot be inferred from actions consistent with Nash, non-cooperative equilibrium in a one-shot game oligopoly model. A competitor acting in accord with the predictions of such models cannot be said to have acted contrary to its unilateral interest,[278] and only action contrary to unilateral self interest provides a basis in oligopoly theory for inferring agreement.[279]

3. The existence of an agreement can be inferred from actions inconsistent with Nash, non-cooperative equilibrium in a one-shot game oligopoly model, even though they are consistent with Nash, non-cooperative equilibrium in an infinitely repeated oligopoly game (or with Chamberlin-Fellner oligopoly). Action contrary to self-interest is the critical "plus factor" used to make an economic inference of agreement, and there is practically no such thing if it is defined with respect to infinitely repeated games.

4. The existence of an agreement should not be inferred absent some evidence of

[277] The case law sometimes is ambiguous as to what conduct is "merely interdependent" but always is clear that such conduct does not violate Section 1. *See, e.g.*, *Williamson Oil*, 346 F.3d at 1299 ("conscious parallelism is the practice of interdependent pricing in an oligopolistic market" and "it is not in itself unlawful") (first phrase quoting City of Tuscaloosa v. Harcros Chems., Inc., 158 F.3d 548, 570 (11th Cir. 1998); second phrase quoting Brooke Group Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209, 227 (1993)); Blomkest Fertilizer, Inc. v. Potash Corp. of Sask., 203 F.3d 1028, 1042 (8th Cir. 2000) (Gibson, J., dissenting) ("Even though oligopoly pricing harms the consumer in the same way monopoly does, interdependent pricing that occurs *with no actual agreement* does not violate the Sherman Act . . . ."); *In re* Coordinated Pretrial Proceedings in Petroleum Prods. Antitrust Litig., 906 F.2d 432, 444 (9th Cir. 1990) ("[I]nterdependent pricing . . . *standing alone*, is generally considered insufficient to establish a violation of the Sherman Act.").

[278] If conduct is consistent with some models and not others, it may be possible for a plaintiff make a case for rejecting models with which the conduct was consistent on the basis of a lack of fit between the models and the facts of the case. It must be recognized, however, that models are abstractions—simplifications of reality that never perfectly describe the real world.

[279] On point is *FTC v. Abbott Laboratories*, 853 F. Supp. 526 (D.D.C. 1994), in which the court entered judgment for the defendant on the charge that it submitted collusive bids. The FTC's expert economist testified that the defendant's bids "made no economic sense without the existence of a conspiracy." *Id.* at 534. The defendant's expert in game theory, however, persuaded the court that the defendant's bids were in its "unilateral and independent self interest." *Id.* at 534–35.

communications of some kind among the defendants, through which an agreement could have been negotiated.[280] In other words, the evidence must support the existence of a spoken agreement. Unlike the first three principles, which flow directly from modern oligopoly theory, this principle is primarily based on policy and practical considerations: First, there is little reason to believe that unspoken agreements are a significant phenomenon. Second, permitting a jury to find a Section 1 violation when an agreement is unspoken gives it license to find a Section 1 violation when there is no agreement at all. Third, liability should not attach unless a workable remedy is available, and there is apt to be none for an unspoken agreement. Finally, Judge Posner probably is correct in reading the case law to require a spoken agreement.[281]

Applying the foregoing principles is not without difficulties, but tremendous progress can be made merely by exorcising Chamberlin's ghost. Courts can avoid the worst pitfalls simply by recognizing that, in the absence of an agreement, monopoly prices cannot be expected to emerge from oligopoly. As discussed in the next section, insisting that expert economists rigorously apply modern oligopoly theory and the foregoing principles offers substantial additional improvements in the adjudication process.

IV. ADMISSIBILITY OF ECONOMIC TESTIMONY ON THE EXISTENCE OF COLLUSION

A. THE FEDERAL RULES OF EVIDENCE AND THE *DAUBERT* LINE OF CASES[282]

Rule 401 defines "relevant evidence" as that "having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence."[283] Rule 402 provides that only relevant evidence is admissible, while Rule 403 states that even

---

[280] *Cf.* Baker, *supra* note 120, at 48 (focusing on evidence of "negotiations" to determine whether an agreement exists).

[281] *See supra* notes 266–67 and accompanying text.

[282] *See generally* Margaret A. Berger, *The Supreme Court's Trilogy on the Admissibility of Expert Testimony*, *in* REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 9 (Federal Judicial Center, 2d ed. 2000).

[283] FED. R. EVID. 401.

relevant evidence "may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury."[284]

Expert testimony is also governed by Rule 702:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.[285]

This current version of Rule 702 incorporates significant developments in the case law, beginning with the Supreme Court's 1993 *Daubert* decision,[286] the main holding of which was that the "general acceptance" standard of *Frye*[287] had been superseded by the adoption of the Federal Rules of Evidence.[288] More importantly, the Court also held that the trial judge must serve in a "gatekeeping role" by making a "preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue."[289] The Court explained that this "inquiry . . . is . . . a flexible one" focused "solely on principles and methodology, not on the conclusions that they generate."[290] The *Daubert* Court also explained that expert testimony is admissible only if it "is sufficiently tied to the facts of the case that it will aid the jury in resolving a factual dispute," i.e., only if there is a good "fit" between the testimony and the pertinent inquiry.[291]

In *Joiner*, the Court further held that a district court's rulings on the admissibility

---

[284] FED. R. EVID. 402, 403.

[285] FED. R. EVID. 702.

[286] Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579 (1993).

[287] Frye v. United States, 293 F. 1013 (D.C. Cir. 1923).

[288] *Daubert*, 509 U.S. at 586-89.

[289] *Id.* at 592–93, 597.

[290] *Id.* at 594–95.

[291] *Id.* at 591 (quoting United States v. Downing, 753 F.2d 1224, 1242 (3d Cir. 1985)).

of expert testimony are reviewed for abuse of discretion.[292] And the *Joiner* Court cautioned that a court should not "admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert. A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered."[293]

Most recently, in *Kumho Tire*, the Court made clear that "the trial judge's general 'gatekeeping' obligation . . . applies not only to testimony based on 'scientific' knowledge, but also to testimony based on 'technical' and 'other specialized' knowledge."[294] This holding eliminates any doubt about whether Rule 702 and *Daubert* apply to expert economic testimony in antitrust cases.[295] The Court also explained the meaning of "*Daubert*'s gatekeeping requirement" in a manner applicable to both scientific and other specialized knowledge:

> The objective of that requirement is to ensure the reliability and relevancy of expert testimony. It is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field.[296]

This explanation is significant because *Daubert* had held that the "subject of an expert's testimony must be 'scientific . . . knowledge'"[297] and explained that "in order to qualify as 'scientific knowledge,' an inference or assertion must be derived by the scientific method."[298] The *Daubert* Court, thus, suggested a standard of reliability

---

[292] Gen. Elec. Co. v. Joiner, 522 U.S. 136, 141–43 (1997).

[293] *Id.* at 146; *cf.* Brooke Group Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209, 242 (1993) (expert opinion cannot sustain a verdict if it "is not supported by sufficient facts to validate it in the eyes of the law, or when indisputable record facts contradict or otherwise render the opinion unreasonable").

[294] Kumho Tire Co. v. Carmichael, 526 U.S. 137, 141 (1999); *see also id.* at 147–49.

[295] At least two antitrust cases had suggested that *Daubert* did not apply to expert economic testimony. *See* Brooks Fiber Communications of Tucson, Inc. v. GST Tucson Lightwave, Inc., 992 F. Supp. 1124, 1132 (D. Ariz. 1997); Bell Atl. Bus. Sys. Servs. Inc. v. Hitachi Data Sys. Corp., 1995-2 Trade Cas. (CCH) ¶ 71,259, at 76,130–31 (N.D. Cal. 1995).

[296] *Kumho Tire*, 526 U.S. at 152; *see also* City of Tuscaloosa v. Harcros Chems., Inc., 158 F.3d 548, 566 n.25 (11th Cir. 1998) (holding in an antitrust case involving expert economic testimony that an important factor omitted in *Daubert* is whether "the methods used by the expert to derive his opinion satisfy the standards for scientific methodology that his profession would require of his out-of-court research") (quoting People Who Care v. Rockford Bd. of Educ., 111 F.3d 528, 537 (7th Cir. 1997)).

[297] *Daubert*, 509 U.S. at 589–90 (ellipsis in original).

[298] *Id.* at 590.

that economics and many other disciplines would have difficulty meeting.[299]

While indicating that the inquiry was "a flexible one," *Daubert* listed criteria for "determining whether a theory or technique is scientific knowledge that will assist the trier of fact."[300] The criteria were: "whether a theory or technique . . . can be (and has been) tested," whether it "has been subjected to peer review and publication," its "known or potential rate of error" and the "existence and maintenance of standards controlling the technique's operation," and whether it has gained "[w]idespread acceptance."[301] *Kumho Tire* stressed that the *Daubert* criteria "do *not* constitute a 'definitive checklist or test'"[302] and agreed with "the Solicitor General that '[t]he factors identified in *Daubert* may or may not be pertinent in assessing reliability, depending on the nature of the issue, the expert's particular expertise, and the subject of his testimony.'"[303]

The Federal Rules of Evidence and the case law essentially establish that the admissibility of expert economic testimony turns on three questions: Is the witness an expert in the relevant field of economics? Does the testimony employ sound methods from the relevant field of economics? And does the testimony reliably apply sound methods to the facts of the case? If any of these questions are answered in the negative, the testimony must be excluded.

In the words of Rule 702, a witness offering economic analysis must possess

---

[299] Indeed, it was suggested by one commentator that the bulk of economics used in antitrust would not meet the *Daubert* standard. *See* Charles D. Weller, *Antitrust Economics as Science after* Daubert, 42 ANTITRUST BULL. 871 (1997). Other commentators have made far more limited arguments relating to the game theoretic models of the past quarter century for which there is little empirical verification. *See* Malcom B. Coate & Jeffrey H. Fischer, *Can Post-Chicago Economics Survive* Daubert?, 34 AKRON L. REV. 795 (2001); Kobayashi, *supra* note 207.

[300] *Daubert*, 509 U.S. at 593–94.

[301] *Id.*

[302] *Kumho Tire*, 526 U.S. at 150 (quoting *Daubert*, 509 U.S. at 593).

[303] 526 U.S. at 150. *See also* Seatrax, Inc. v. Sonbeck Int'l, Inc., 200 F.3d 358, 372 (5th Cir. 2000) ("But whether *Daubert*'s suggested indicia of reliability apply to any given testimony depends on the nature of the issue at hand, the witness's particular expertise, and the subject of the testimony."); Bailey v. Allgas, Inc., 148 F. Supp. 2d 1222, 1235 (N.D. Ala. 2000) (holding that the *Daubert* criteria did not apply to relevant market testimony by an economist), *aff'd*, 284 F.3d 1237, 1251 (11th Cir. 2002).

expert "knowledge, skill, experience, training, or education."[304] In several antitrust cases, testimony on critical issues such as the relevant market was excluded because the witness lacked specialized training and experience in industrial organization economics.[305] A critical issue not directly confronted by the case law is just how specialized the training and experience must be. Within industrial organization economics, there is so much highly specialized knowledge, including specialized knowledge developed just to address antitrust issues, that even the most experienced industrial organization economist cannot be an expert on every issue in every antitrust case. Although no court appears to have done so, it is within the discretion of a court to exclude the testimony of any economist either totally unfamiliar with mainstream economic literature directly relevant to the issues on which the witness offers an opinion, or entirely inexperienced in methods the witness purports to apply.[306]

Rule 702 also requires that expert testimony be "the product of reliable principles and methods," and expert economic testimony must be based on reliable principles and methods within the relevant field of economics.[307] A few cases have found

---

[304] FED. R. EVID. 702.

[305] Berlyn, Inc. v. Gazette Newspapers, Inc., 214 F. Supp. 2d 530, 537 (D. Md. 2002) (relevant market testimony by a non-economist, lacking "specific education, training, or experience in economics or antitrust analysis," excluded); Va. Vermiculite Ltd. v. W.R. Grace & Co.-Conn., 98 F. Supp. 2d 729, 733 (W.D. Va. 2000) (relevant market testimony by a non-economist, lacking the "skill and training of a professional economist necessary to define a relevant market for antitrust purposes," excluded). *See also* Nelson v. Monroe Reg'l Med. Ctr., 925 F.2d 1555, 1572 (7th Cir. 1991) (concurring opinion) (relevant market testimony by a Ph.D. economist, with "no background in antitrust markets" and not "a member of any associations or industrial organization groups which form the bulwark of economists specializing in antitrust law and economics," should have been excluded).

[306] Physicist Werner Heisenberg usefully defined an expert as "someone who knows some of the worst mistakes that can be made in his subject and who manages to avoid them." THE OXFORD DICTIONARY OF QUOTATIONS 331 (Angela Partington ed., 4th ed. 1992). Economists with many years of antitrust consulting experience nevertheless may lack the training and experience needed to avoid the worst mistakes on particular issues and in the application of particular methods.

[307] *Cf.* Hovenkamp, *supra* note 2, at 122 ("[I]t would be an inappropriate use of *Daubert* to exclude the testimony of an economist who was using methodologies and assumptions that are acceptable within the discipline of economics . . . ."); Blair & Herndon II, *supra* note 2, at 18 ("As long as the expert's analysis is consistent with the theory and methodology of the mainstream economics literature, it is unlikely to fall victim to a *Daubert* challenge.").

expert economic testimony wanting in this regard,[308] particularly when empirical analyses clearly failed to meet professional standards.[309] As Judge Posner has explained, if an expert "failed to conduct a study that satisfied professional norms," the testimony may be inadmissible even though the witness is "a Ph.D. in economics from a reputable university and an experienced consultant in antitrust economics, and hence qualified to offer expert economic evidence."[310]

A pre–*Kumho Tire* decision, applying *Daubert*, held that an expert "is not permitted to offer evidence that he has not generated by the methods he would use in his normal academic or professional work, which is to say in work undertaken without reference to or expectation of possible use in litigation."[311] This holding could have far reaching implications, because expert economists often employ methods developed solely to address the particular questions posed by antitrust law. But for the existence of antitrust law, economists would not normally delineate

---

[308] Lantec, Inc. v. Novell, Inc., 306 F.3d 1003, 1025 (10th Cir. 2002) (affirming exclusion of testimony not employing "the same level of intellectual rigor that characterizes an expert in the field of economics and industrial organization"); *Bailey*, 148 F. Supp. 2d at 1237 (excluding relevant market testimony because the "methodology is not professionally sound and valid"), *aff'd*, 284 F.3d 1237 (11th Cir. 2002) (affirming summary judgment without considering issue of exclusion of this testimony). *See also* Holiday Wholesale Grocery Co. v. Philip Morris, Inc., 231 F. Supp. 2d 1253, 1272 (N.D. Ga. 2002) ("[F]allacious reasoning is akin to unsound methodology."), *aff'd sub nom.* Williamson Oil Co. v. Philip Morris USA, 346 F.3d 1287 (11th Cir. 2003).

[309] *See, e.g.*, Blue Dane Simmental Corp. v. Am. Simmental Ass'n, 178 F.3d 1035, 1039–41 (8th Cir. 1999) (affirming exclusion of before-and-after damage estimate because it inferred "causation without considering all independent variables that could affect the conclusion"); *In re* Aluminum Phosphide Antitrust Litig., 893 F. Supp. 1497, 1504 (D. Kan. 1995) (rejecting as unreliable a before-and-after damage estimate that failed to account for several important factors). *See also* Blomkest Fertilizer, Inc. v. Potash Corp. of Sask., 203 F.3d 1028, 1038 (8th Cir. 2000) (finding a regression analysis not probative of collusion because it failed to account for events affecting prices). Although the testimony at issue in *Blomkest* could have been excluded, the court did specifically address admissibility. *See* Gavil II, *supra* note 2, at 863–66.

Undoubtedly, the most high-stakes *Daubert* challenge came in *Conwood Co. v. U.S. Tobacco Co.*, 290 F.3d 768, 791–94 (6th Cir. 2002), *cert. denied*, 537 U.S. 1148 (2003). The courts rejected a challenge to an econometric study used to establish both liability and damages, even though it arguably had serious flaws. *See* D.H. Kaye, *The Dynamics of* Daubert: *Methodology, Conclusions, and Fit in Statistical and Econometric Studies*, 87 VA. L. REV. 1933, 1988–2013 (2001). The court of appeals refused to accept the amicus brief of Nobel Prize–winning economist Daniel McFadden, who was far more expert than the witness, and who urged the exclusion of the testimony. *See id.* at 1997 n.294.

[310] Kahn v. State Oil Co., 93 F.3d 1358, 1365 (7th Cir. 1996) (Posner, C.J.), *vacated on other grounds*, 522 U.S. 3 (1997).

[311] *Kahn*, 93 F.3d at 1365.

relevant markets or attempt to infer the existence of collusive agreements. Consequently, methods for performing such tasks would not be used in "normal academic or professional work." *Kumho Tire*, however, must be understood to permit the use of methods specially crafted for use in antitrust litigation, provided they were developed and applied in an intellectually rigorous manner.[312] On the other hand, an expert economist may not pass off an analysis dictated by case law precedent as having been developed by, and employed in, economics.[313]

Given the Supreme Court's admonition that a court should not "admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert,"[314] it may be within the discretion of a district court to exclude economic testimony for failing to identify a basis in economics for the conclusions offered.[315] And even if a court would not go quite that far, *Daubert* clearly calls for an inquiry into the theoretical or empirical underpinnings of any inference an expert economist draws. While litigants appear not to have challenged proffered expert economic testimony on the basis that it lacks a firm foundation in theoretical or empirical economics, such a challenge might well succeed.

Rule 702 also requires that expert testimony apply the principles and methods of the expert's discipline "to the facts of the case," and as noted above, *Daubert* and

---

[312] *Kumho Tire* suggests that some traditional expert economic testimony may no longer be permitted. Economists have on occasion applied the *Brown Shoe* "practical indicia" for market delineation. *See* Brown Shoe Co. v. United States, 370 U.S. 294, 325 (1962); Gregory J. Werden, *The History of Antitrust Market Delineation*, 76 MARQ. L. REV. 123, 146–51, 154–55, 172–79 (1992). Because these "practical indicia" are not economics at all, much less intellectually rigorous economics, it would appear that economists no longer can testify that these indicia support an opinion on the scope of the relevant market, although descriptive testimony relating to the indicia remains admissible as long as the courts consider the indicia relevant.

[313] An expert economist may employ any particular analysis, e.g., a largely structural analysis of a horizontal merger, that the law dictates, but the witness may not testify that the analysis is the standard practice of economics unless that actually is true. Expert economic witness have been known to employ analyses dictated by the case law but to describe that analysis as "what an economist does."

[314] Gen. Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997); *see supra* note 293 and accompanying text.

[315] To do so only a modestly extends the principle that purely conclusory expert testimony is accorded no weight. *See* SMS Sys. Maint. Servs., Inc. v. Digital Equip. Corp., 188 F.3d 11, 25 (1st Cir. 1999) ("Expert testimony that offers only a bare conclusion is insufficient to prove the expert's point."); Mid-State Fertilizer Co. v. Exch. Nat'l Bank of Chicago, 877 F.2d 1333, 1339 (7th Cir. 1989) ("An expert who supplies nothing but a bottom line supplies nothing of value to the judicial process.").

Joiner required that an expert's analysis "fit" the facts of the case.[316] Fit has been a significant issue in some antitrust cases. Most notably, in *Concord Boat* a substantial damage award was vacated because the oligopoly model used by the plaintiffs' expert economist in estimating damages was "not grounded in the economic reality of the" industry.[317] The Eighth Circuit held that "a theory that might meet certain *Daubert* factors . . . should not be admitted if it does not apply to the specific facts of the case."[318] The analysis in question assumed that the defendant's market share would have been fifty percent in the absence of the challenged practices, even though it was seventy-five percent before the practices began, and the analysis ignored several events that obviously affected shares significantly.[319]

Finally, Rules 703 and 704 should be mentioned. The former provides that the "facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing" or they may be "of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject."[320] One possible implication of this rule is that an expert economist cannot rely on the more specialized expertise of another economist, unless the latter testifies.[321] Rule 704

---

[316] *See supra* notes 291, 293 and accompanying text.

[317] Concord Boat Corp. v. Brunswick Corp., 207 F.3d 1039, 1056 (8th Cir. 2000). The expert was not a specialist in industrial organization economics.

[318] *Id.*

[319] *Id.* at 1056–57; *see also* Group Health Plan, Inc. v. Philip Morris USA, Inc., 344 F.3d 753, 760–61 (8th Cir. 2003) (plaintiffs' expert testimony, although "thorough, sophisticated, and often well-grounded in the relevant scientific literature," excluded because of "excessive speculation" and a "disconnect" between the expert's analysis and the plaintiffs' "theory of liability"); Am. Booksellers Ass'n, Inc. v. Barnes & Noble, Inc., 135 F. Supp. 2d 1031, 1041 (N.D. Cal. 2001) (expert's model excluded for purposes of proving damage causation, and summary judgment on damage claims granted, because it contained "too many assumptions and simplifications that are not supported by real-world evidence"); Johnson Elec. N. Am., Inc. v. Mabuchi Motor Am. Corp., 103 F. Supp. 2d 268, 280–87 (S.D.N.Y. 2000) (analysis of expert economist excluded in part because it did "not 'fit' the facts of [the] case because it fail[ed] to take into account" key facts).

[320] FED. R. EVID. 703.

[321] *See* Dura Auto. Sys. of Ind., Inc. v. CTC Corp., 285 F.3d 609, 614 (7th Cir. 2002) (Posner, C.J.), which held:

> A scientist, however well credentialed he may be, is not permitted to be the mouthpiece of a scientist in a different specialty. That would not be responsible science. A theoretical economist, however able, would not be allowed to testify to the findings of an econometric study conducted

specifically bars an admissibility objection to testimony on the grounds that "it embraces an ultimate issue to be decided by the trier of fact."[322] Although this might seem to require the admission of expert opinion on the ultimate question of whether an agreement exists, not all courts have not permitted such testimony.[323]

B. OBSERVATIONS ON THE APPLICATION OF ADMISSIBILITY PRINCIPLES TO EXPERT ECONOMIC TESTIMONY ON THE EXISTENCE OF COLLUSION

Kumho Tire required expert witnesses to employ "the same level of intellectual rigor that characterizes the practice of an expert in the relevant field,"[324] and intellectually rigorous economic analysis on the existence of an agreement has a foundation in game theory. This does not mean that a witness must adopt any particular posture on, for example, repeated game oligopoly models. In rejecting *Frye*'s general acceptance standard,[325] *Daubert* made it clear that significantly differing points of view are welcome. But any point of view on the existence of a collusive agreement must be informed by an understanding of modern oligopoly theory. Critically, a witness may not take the pre-game theory view that Cournot conduct is irrational and monopoly pricing is to be expected in oligopoly without an agreement. A witness with views more than a quarter century behind developments in a field cannot reasonably be considered to have the expertise required by Rule 702. For expert economic testimony on the existence of an agreement in violation of Section 1, the most basic and most important implication of *Daubert* is that the testimony must be grounded in modern oligopoly theory.

---

by another economist if he lacked expertise in econometrics and the study raised questions that only an econometrician could answer. If it were apparent that the study was not cut and dried, the author would have to testify; he could not hide behind the theoretician.

[322] FED. R. EVID. 704.

[323] *Compare* Ohio ex rel. Montgomery v. Louis Trauth Dairy, Inc., 925 F. Supp. 1247, 1254 (S.D. Ohio 1996) (citing Berry v. City of Detroit, 25 F.3d 1342, 1353 (6th Cir. 1994)) (Rule 704 refers to ultimate factual issues rather than ultimate legal issues, and "the existence of an illegal conspiracy" is the latter), *with* Petruzzi's IGA Supermarkets, Inc. v. Darling-Del. Co., 998 F.2d 1224, 1236–41 (3d Cir. 1993) (expert testimony that "concluded that there was collusive activity" held admissible). *See generally* Milne & Pace, *supra* note 2, at 39–41 (collecting cases).

[324] Kumho Tire Co. v. Carmichael, 526 U.S. 137, 152 (1999); *see supra* note 296 and accompanying text.

[325] *See supra* notes 287–88 and accompanying text.

It should be within the discretion of a court to exclude expert economic testimony even if firmly grounded in modern oligopoly theory, if it is unclear what the witness is saying because critical terms are not defined. Expert economists are prone to use the word "collusion" in reference to both spoken and unspoken agreements, and may use it even in the absence of an agreement.[326] If a witness uses the word this broadly, or if it is impossible to determine how the witness uses it, testimony that the defendants engaged in "collusion" cannot "assist the trier of fact to understand the evidence or determine a fact issue" as required by Rule 702.[327] Moreover, in the minds of most jurors, "collusion" surely has a sinister connotation, so any testimony using the word "collusion" to refer to lawful conduct is subject to exclusion under Rule 403 because of "the danger of unfair prejudice, confusion of the issues, or misleading the jury."[328]

Definitive conclusions about the existence of an agreement in violation of Section 1 also should be excluded, even if permissible under Rule 704. The world is too complicated and economic tools are insufficiently precise for *economic analysis* to lead to a definitive determination as to the existence, or non-existence, of a collusive agreement. Definitive conclusions based on economic evidence cannot be "the product of reliable principles and methods" as required by Rule 702, and they create "the danger of unfair prejudice" and hence are subject to exclusion under Rule 403.

When an expert economist clearly goes further than economics permits, by reaching a definitive conclusion on the existence of a collusive agreement, it should be within the court's discretion to exclude the entire testimony of the witness.[329] The

---

[326] In *Williamson Oil Co. v. Philip Morris USA*, 346 F.3d 1287 (11th Cir. 2003), the testimony of a distinguished economist was excluded on the grounds that it "could not have aided the finder of fact." *Id.* at 1323. He "defined 'collusion' to include conscious parallelism" and thus "not differentiate between legal and illegal pricing behavior." *Id.*

[327] FED. R. EVID. 702.

[328] FED. R. EVID. 403.

[329] Few expert economists would reach a definitive conclusion as to the existence of a collusive agreement absent intense pressure to do so applied by counsel. The sanction of total exclusion of the testimony is appropriate because it creates proper incentives for counsel. The mere exclusion of the overreaching conclusions themselves provides no discouragement for inappropriately pressuring expert economists because there is no downside risk in doing so.

failure to apply "reliable principles and methods" in reaching definitive conclusions casts a pall over every opinion offered. It suggests that the witness lacks necessary expertise, however qualified the witness otherwise may appear to be. Or it suggests that the witness failed to employ "the same level of intellectual rigor that characterizes the practice of an expert in the relevant field."

The role of the expert economist in antitrust cases is to apply microeconomic theory to the messy facts of a case and thereby clarify for the trier of fact how competitors are interacting with each other and their environment. Understanding the implications of any observed marketplace action or outcome often requires considerable knowledge of the industry. And like much of antitrust analysis, inferring an agreement from an economic analysis of circumstances tends to be highly fact intensive. Rule 702 requires that expert testimony be "based on sufficient facts or data" and that experts apply "principles and methods reliably to the facts of the case." Consequently, expert economic testimony must be excluded whenever the witness lacks a sufficient command of the facts to reliably reach the particular conclusions offered.

No bright-line tests are possible for determining when an expert economist lacks a sufficient command of the facts,[330] but there are clear warning signs. One is that the witness has no experience in the particular industry and has devoted little time to the preparation of the particular testimony being offered. A second warning sign is that the witness has incorporated few facts into the analysis undertaken. Testimony with a "one size fits all" quality may not satisfy *Daubert*'s requirement that it be "sufficiently tied to the facts of the case that it will aid the jury in resolving a factual dispute."[331]

"[C]ommentators and economists generally agree that economic experts should be permitted to testify on such issues as whether structural aspects of the market in

[330] In *Brand Name Prescription Drugs*, the district court excluded expert economic testimony on the basis that the witnesses lacked command of basic facts. The court of appeals, however, found that was not a proper basis for exclusion because the testimony's conclusion was simple and obvious (although beside the point). *See supra* note 170.

[331] Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 591 (1993); *see also supra* note 291 and accompanying text.

question are conducive to" collusion.[332] Plaintiffs' expert economists thus often testify that industry conditions are conducive to collusion, while defendants' expert economists often testify that the reverse is true.[333] Although courts normally admit such testimony, there may be sufficient grounds for excluding it.

Such testimony need not be "sufficiently tied to the facts of the case," and if not, it should be excluded. The significance of structural conditions depends critically on how a conspiracy is organized.[334] A market or customer allocation, for example, may avoid a host of complications that would arise with an agreement on prices. Thus, a high degree of product heterogeneity may be a significant structural element if the alleged conspiracy entails an agreement on prices, but have no significance if the conspiracy entails an agreement to allocate customers. Similarly, the inability to observe rivals' prices may make it difficult to detect cheating on an agreed price, yet it may be easy to detect cheating on a customer allocation, if it is possible to observe each customer's supplier. Testimony that conditions are favorable to collusion

---

[332] Milne & Pace, *supra* note 2, at 38. *See supra* note 262–63 and accompanying text. *See also* Hovenkamp, *supra* note 2, at 141 ("an economist can contribute many observations relevant to the fact finder's determination," including "whether market structure would make agreement rational or worthwhile"); Blair & Herndon II, *supra* note 2, at 19 ("The observation that the structural conditions of [an] industry are conducive to collusion is consistent with the mainstream economics and antitrust law literature.").

[333] Professor Hovenkamp has suggested that a proper subject of expert economic testimony is "whether market structure makes an agreement unnecessary." Hovenkamp, *supra* note 2, at 141; *see also* Baker, *supra* note 120, at 49–50 ("[A] court should consider whether it was necessary for the firms to engage in the forbidden process to reach a coordinated, high-price equilibrium . . . ."); Blair & Herndon II, *supra* note 2, at 19 ("In fact, the structural conditions that predispose a market to collusion, by reducing the need for explicit agreement, may make tacit collusion more likely than an actual conspiracy."). In the terminology used here, the suggestion is that conditions may be so hospitable to pricing coordination that a lawful, unspoken agreement is likely. Such testimony, however, is apt to ignore the insights of Stigler's model and the Prisoner's Dilemma game. If so, it should be excluded on the grounds discussed *supra* at notes 324–25 and accompanying text.

[334] Some argue that conditions of entry are always highly relevant. *See* John E. Lopatka, *Solving the Oligopoly Problem: Turner's Try*, 41 ANTITRUST BULL. 843, 895, 906 (1996). But the evidence indicating that entry sometimes has frustrated the achievement of cartel objectives tends to demonstrate that relatively easy entry has failed to deter the formation of cartel agreements. Moreover, there is high known error rate to using a conventional analysis of entry conditions to predict cartel formation. That analysis suggests entry is relatively easy in highway construction, which has spawned more prosecuted conspiracies than any other industry over the history of the Sherman Act. During 1955–80, for example, there were 83 indictments in highway construction, and no other industry had more than 22. *See* 2 JAMES M. CLABAULT & MICHAEL K. BLOCK, SHERMAN ACT INDICTMENTS 1955–1980, at 1053–70 (1981).

should be excluded unless one or more theories of collusion are specified and those theories are used to tie the testimony to the issues in the case. And if the plaintiff specifies one or more theories of collusion, defense expert economic testimony on the conduciveness of conditions to collusion should be excluded unless based on the collusion theories specified.

The "known or potential rate of error" *Daubert* criterion could be applied to testimony about structural conditions.[335] While it is impossible to know the extent of undiscovered cartel activity, it is generally believed that cartel conduct normally does not occur even under conditions highly conducive to it.[336] Given the extremely high error rate in predicting collusion under favorable conditions, it would be within the discretion of a court under Rules 702 and 403 to exclude testimony on structural conditions by plaintiffs' expert economists. Such testimony does not significantly "assist the trier of fact to understand the evidence" and "its probative value [may be] substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury." Moreover, cartel activity has been observed even when structural conditions were not particularly conducive to it. The error rate in predicting the absence of collusion under unfavorable conditions may be high enough to call the admissibility of defense expert testimony into question.[337]

Econometric evidence of various sorts may be admissible if competently

---

[335] *See supra* note 301 and accompanying text.

[336] This observation would be less significant if unspoken agreements were believed to be a significant phenomenon and were deemed in violation of Section 1.

[337] Economic literature on the structural characteristics of industries in which conspiracies were prosecuted criminally indicates that conspiracies have occurred despite unfavorable conditions. *See* Peter Asch & Joseph J. Seneca, *Characteristics of Collusive Firms*, 23 J. INDUS. ECON. 223 (1975); Arthur G. Fraas & Douglas F. Greer, *Market Structure and Price Collusion: An Empirical Analysis*, 26 J. INDUS. ECON. 21 (1977); George A. Hay & Daniel Kelly, *An Empirical Survey of Price Fixing Conspiracies*, 17 J.L. & ECON. 13 (1974); Margaret C. Levenstein & Valerie Y. Suslow, *Studies of Cartel Stability: A Comparison of Methodological Approaches*, *in* HOW CARTELS ENDURE AND HOW THEY FAIL: STUDIES OF INDUSTRIAL COLLUSION (Peter Grossman ed., forthcoming 2004). More significantly, there has been one attempt actually to measure the error rate of structural characteristics in predicting the formation of export cartels, which are exempt from the Sherman Act. In an experiment designed so that coin flipping would predict correctly half of the time, the most predictive function of structural characteristics did so three-quarters of the time, with equal numbers of false positives and false negatives. *See* Andrew R. Dick, *Identifying Contracts, Combinations and Conspiracies in Restraint of Trade*, 17 MANAGERIAL & DECISION ECON. 203 (1996).

prepared, but it is almost certainly infeasible to determine the existence of an agreement by evaluating the relationship between prices and cost. While economics provides the necessary theoretical and empirical tools to draw the required inferences, these tools are of little use without precise measurements of costs and demand, which pose significant challenges.[338] It is even less likely to be feasible to infer an agreement from the responsiveness of prices to changes in costs. Such responses in monopoly are similar to those in Cournot or Bertrand oligopoly, and both depend on demand curvature, which is exceedingly difficult to measure.[339] Hence, econometric evidence on the pass-through of cost increases or the relationship between price and cost is unlikely to assist the trier of fact and may confuse the issues.

A more useful (and far more common) type of econometric evidence entails a comparison of prices or bids between some control time or place and the time and place at which the plaintiff alleges an agreement in violation of Section 1. There are many variations on this theme. One of the most important is the comparison of the defendants' prices or bids during the period of the alleged conspiracy to their prices or bids before or after that period. This, of course, is a damage study, but if properly conducted, with relevant costs and demand factors accounted for, it also indicates whether the defendants changed their pricing or bidding when the agreement allegedly was formed or abandoned.[340] Another variation on this theme is to compare the bidding behavior of the defendants during the alleged conspiracy with the behavior of non-conspiring bidders or with a theoretical non-conspiring bidder. There is a substantial literature using a variety of approaches to make these comparisons.[341] If competently prepared, this sort of econometric evidence clearly

[338] For interesting demonstrations of the difficulty in distinguishing a Cournot equilibrium from a maximally successful collusive equilibrium, see PHLIPS, *supra* note 41, ch. 8; Phlips, *supra* note 231.

[339] On the effects of cost changes under monopoly, see Robert L. Bishop, *The Effects of Specific and Ad Valorem Taxes*, 82 Q.J. ECON. 198 (1968); Jeremy I. Bulow & Paul Pfleiderer, *A Note on the Effect of Cost Changes on Prices*, 91 J. POL. ECON. 182 (1983). On the effects of cost changes under Bertrand and Cournot oligopoly, see Simon P. Anderson et al., *Tax Incidence in Differentiated Product Oligopoly*, 81 J. PUB. ECON. 173 (2001); Sheldon Kimmel, *Effects of Cost Changes on Oligopolists' Profits*, 40 J. INDUS. ECON. 441 (1992).

[340] *Accord* POSNER, *supra* note 98, at 88 ("Simultaneous price increases and output reductions unexplained by any increases in cost may . . . be good evidence of the initiation of a price-fixing scheme").

[341] For an accessible review of the literature, see Bajari & Summers, *supra* note 195. Significant

is admissible, and potentially even sufficient to survive a summary judgment motion.

Expert economists often draw inferences that may be reasonable but that do not involve the practice of economics. For example, competitor communications relating to price increases, or to which seller should serve which customer, especially if covert, may warrant the inference of a price-fixing or market allocation agreement. And documentary evidence may contain recognizable tracks of a cartel. Courts have relied on such evidence to infer agreement for nearly a century, but as a general matter, economic expertise cannot contribute to drawing this inference,[342] and any opinions from economic experts on the import of such evidence should be excluded under Rule 702 because such opinions are not based on the application of economics.[343]

Rule 403 also might properly be invoked to prevent "misleading the jury" on the import of documentary evidence or competitor communications. The jury may defer to the expert, even if the interpretation of such evidence by the witness did not rely on specialized knowledge. Worse still, expert economic testimony, especially on competitor communications, may run contrary to both common sense and economic learning. It is irresponsible to draw an inference of agreement from the bare fact of competitors' communications.[344] Competitors face common problems and may

---

contributions are: Bajari & Ye, *supra* note 193; Laura H. Baldwin, Robert C. Marshall & Jean-Francois Richard, *Bidder Collusion at Forest Service Timber Auctions*, 105 J. POL. ECON. 657 (1997); Pesendorfer, *supra* note 195; Porter & Zona, *supra* note 199; Robert H. Porter & J. Douglas Zona, *Detection of Bid Rigging in Procurement Auctions*, 101 J. POL. ECON. 518 (1993). *See also* Chantale LaCasse, *Bid Rigging and the Threat of Government Prosecution*, 26 RAND J. ECON. 398 (1995) (bid riggers can defeat detection efforts by imitating competitive bidding).

[342] *See* George J. Stigler, *What Does an Economist Know?*, 33 J. LEGAL EDUC. 311 (1983) (economists have "no special skill in reading documents").

[343] *See* City of Tuscaloosa v. Harcros Chems., Inc., 158 F.3d 548, 565 (11th Cir. 1998) (expert "characterizations of documentary evidence as reflective of collusion" excluded "because the trier of fact is entirely capable of determining whether or not to draw such conclusions without any technical assistance").

[344] *Cf.* Holiday Wholesale Grocery Co. v. Philip Morris, Inc., 231 F. Supp. 2d 1253, 1276 (N.D. Ga. 2002) ("Because in competitive markets, particularly oligopolies, companies will monitor each other's communications with the market in order to make their own strategic decisions, antitrust law permits such discussions even when they relate to pricing . . . ."), *aff'd sub nom.* Williamson Oil Co. v. Philip Morris

legitimately address them collectively, or merely commiserate.[345]

The foregoing does not mean that expert economic interpretation of documentary evidence and competitor communications is never admissible. An expert economist may attribute special significance to such evidence. Perhaps the most powerful evidence of a collusive agreement are actions to punishing cheating, and such actions likely take the form of aggressive price competition, either generally, or directed at the suspected cheater's customers. To distinguish legitimate competition from punishment requires synthesizing data and documentary evidence in a manner that requires the expertise of the industrial organization economist.

Also admissible is competent expert economic testimony explaining whether a pattern of competitor communications reasonably can be interpreted as a negotiation to consensus on price or output. In the PCS auctions and *ATP* cases discussed above,[346] the inference of agreement may have been sufficiently straightforward that expert economic testimony was not necessary, but it nevertheless would have been admissible, and other cases may require more subtle inferences involving a greater degree of economic expertise. Expert testimony on the existence of an agreement might have been not only admissible, but also decisive, in leading cases such as *Eastern States* and *Interstate Circuit*, in which the courts conducted their own economic analyses to infer agreement.[347]

There are countless other ways in which expert economic testimony might "assist the trier of fact" in determining the existence, or non-existence, of an agreement in violation of Section 1. Economists can offer many insights into the consistency of observed actions with Nash, non-cooperative equilibrium. The most important general rule for evaluating the admissibility of expert economic testimony is that

---

USA, 346 F.3d 1287 (11th Cir. 2003).

[345] While some might argue the point, it is also perfectly legitimate for competitor *A* to educate competitor *B* about *B*'s unilateral self-interest. There is no agreement when *A* convinces *B* that *B* has been making a mistake in its pricing or output decisions, for example, based on an erroneous belief about the elasticity of demand. On the other hand, the trier of fact may be entitled to infer that something else occurred in the conversations between *A* and *B*.

[346] *See supra* notes 213–16 and accompanying text.

[347] *See supra* notes 71–74, 81–85 and accompanying text.

inferences may not be based on the "*ipse dixit* of the expert" but rather must have a basis in economic theory. To be admissible, an inference must find support in an economic model that is generally accepted by industrial organization economists or that is of a type that has general acceptance.[348] And to be admissible, that model must fit the industry in the sense that it reflects key attributes of the product, the competitors, and the manner in which competitors interact.

C. USING *DAUBERT* TO DISCOVER THE ECONOMICS UNDERLYING EXPERT OPINIONS

Expert economists frequently do not volunteer a detailed exposition of the theoretical or empirical basis for any inferences drawn about the existence of an agreement in violation of Section 1.[349] This leaves the trier of fact in near total darkness as to the heart of the disagreement between opposing experts and makes evaluating the merits of the testimony almost impossible. It also affords an inadequate basis for assessing the admissibility of testimony in ruling on a *Daubert* motion, or for assessing the sufficiency of the plaintiff's evidence in ruling on a motion for summary judgment.

Daubert motions are an excellent mechanism for forcing an expert economist to provide a detailed exposition of the theoretical or empirical basis for any inferences drawn about the existence of an agreement. In this way, *Daubert* can serve the extraordinarily useful purpose of prying open the expert economist's black box and bringing the economics that underlies the testimony into the light of day.[350]

---

[348] *Cf.* Blair & Herndon III, *supra* note 2, at 48 ("[T]here must be a theoretical or empirical foundation for . . . testimony. Proof by assertion is simply inadequate."). Courts have granted summary judgment on conspiracy claims despite conclusory economic expert testimony on action contrary to self-interest. *See* Cleveland v. Viacom Inc. 73 Fed. Appx. 736, 740–41 (5th Cir. 2003); *In re* Citric Acid Litig., 191 F.3d 1090, 1105 n.9 (9th Cir. 1999). If other evidence precluded summary judgment, it would be appropriate to exclude the purely conclusory evidence on action contrary to self-interest.

[349] It is understandable that actual courtroom testimony is short on such details, particularly in jury cases, but expert reports should provide them. Rule 26(a)(2)(B) of the Federal Rules of Civil Procedure requires that expert testimony be preceded by a report containing "a complete statement of all opinions to be expressed and the basis and reasons therefor." On its face, this language would seem to bar an expert from taking the stand without disclosing the basis for any significant inference, but that does not appear to have been the practical effect of the requirement.

[350] Taking the expert's deposition obviously plays a constructive role as well, but there are limits to what can be accomplished in a deposition. For example, a witness probably would not be expected to be

When confronted with expert economic testimony failing to state, or incompletely stating, its basis in economics, the opposing party generally is well served by filing a motion *in limine* to exclude the testimony. The proponent of any evidence has a burden of persuasion on its admissibility,[351] so merely pointing out the failure to articulate a basis in economics for an inference should require the proponent to provide such a basis. The proponent's papers opposing the motion to exclude, therefore, must reveal whatever basis for an inference the witness cares to assert. The expert also may be called to testify in a hearing on the motion, at which the asserted basis can be probed in depth.

Whatever the process may be, getting *all* an expert's cards on the table may bear fruit in several important ways: It may become clear that the expert is unable to assert any theoretical or empirical basis in economics for an inference. It may become clear that the asserted theoretical or empirical basis for an inference does not logically support that inference. And it may become clear that the asserted basis for an inference runs contrary to modern oligopoly theory. In all three cases, the testimony does not meet the standards for admissibility and must be excluded. In addition, it may be come clear that the testimony does not suffer from flaws so fundamental as to warrant its exclusion, but it nevertheless has serious limitations. In that event, the testimony may be found insufficient to withstand a motion for summary judgment.[352]

Consider, for example, the assertion that a particular observed action or outcome

---

able to state from memory all the economic literature relied upon or every technical detail of any modeling or econometric analysis undertaken. Moreover, oral testimony tends to leave a great deal of ambiguity.

[351] *See, e.g.*, Oddi v. Ford Motor Co., 234 F.3d 136, 144 (3d Cir. 2000) ("The proponent [of expert testimony] must satisfy [the *Daubert* standard] 'by a preponderance of proof.'") (quoting Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 593 n.10 (1993)); Lust v. Merrell Dow Pharms., Inc., 89 F.3d 594, 598 (9th Cir. 1996) ("It is the proponent of the expert who has the burden of proving admissibility."); Baker v. Urban Outfitters, Inc., 254 F. Supp. 2d 346, 353 (S.D.N.Y. 2003) ("The proponent of expert testimony bears the burden of establishing its admissibility by a preponderance of the evidence."); Bouchard v. Am. Home Prods. Corp., 213 F. Supp. 2d 802, 808 (N.D. Ohio 2002) ("The party offering the expert has the burden of proving admissibility."); Blanchard v. Eli Lilly & Co., 207 F. Supp. 2d 308, 314 (D. Vt. 2002) ("The party who proffers the expert testimony has the burden of establishing its admissibility 'by a preponderance of proof.'"); *see generally* Gavil II, *supra* note 2, at 849–50.

[352] *See generally* 2 AREEDA, HOVENKAMP & BLAIR, *supra* note 154, ¶ 309c2, at 129–36; Gavil I, *supra* note 2, at 698–708.

would not have occurred in a competitive market and therefore that its occurrence is evidence of an agreement.[353] There are three ways in which such a assertion may be seen as the "*ipse dixit* of the expert" economist.[354] First, the competitive market is a straw man.[355] Defendants rarely argue the market is competitive, so the issue actually is whether the action or outcome is consistent with Nash, non-cooperative oligopoly in one-shot game models. Second, the witness most likely is only asserting that there is no apparent innocent explanation for the action or outcome. There is, however, much that goes on in the economy that may seem odd, but for which economics sooner or later provides rational, non-conspiratorial explanations. Third and most importantly, the witness may have no explanation of why the action or outcome would be more likely to be observed with a monopoly or cartel. There is a basis in economics for the inference of an agreement only if the observed action or outcome is better explained under the hypothesis of an agreement violating of Section 1 than under the hypothesis of Nash, non-cooperative equilibrium in a one-shot game oligopoly model.

Another common "*ipse dixit* of the expert" economist is the sweeping over generalization, which can be exposed for what it is by enquiring into the theoretical or empirical basis for it. For example, expert economists on both sides of a case may overstate the import of the stability of market shares. On plaintiff's side, an expert economist may invoke Professor Posner's observation that "[i]f the major firms in a market have maintained identical or nearly identical market shares relative to each other for a substantial period of time, this is a clue that they have divided the market."[356] This observation is valid, but the expert economist may be tempted to go much further and assert that stable market shares would not be observed in the

---

[353] An expert economist also may assert that certain actions or outcomes would be observed in the absence of an agreement, and to infer an agreement on the basis that different actions or outcomes actually were observed. The following discussion applies to such arguments as well.

[354] An example of admissible expert economic testimony in much the same vein is testimony that the industry-wide adoption of practices served no apparent legitimate business purpose but facilitating pricing coordination. *Cf.* George A. Hay, *The Meaning of "Agreement" under the Sherman Act: Thoughts from the "Facilitating Practices" Experience*, 16 REV. INDUS. ORG. 113, 128–29 (2000) (proposing to define agreement by reference to the use of enjoinable facilitating practices).

[355] *See* Blair & Herndon II, *supra* note 2, at 18.

[356] POSNER, *supra* note 98, at 79.

absence of a market allocation, and there is no basis in economics for that assertion.[357] On the defendant's side, the expert economist might rely on the converse of Professor Posner's observation, and go so far as to assert that "unstable market shares indicate the absence of collusion."[358] Enquiring into the basis for this assertion will reveal it as an over-generalization. Market share stability speaks more to the effectiveness of a collusive agreement than to its existence, because cheating on a cartel agreement and punishment create market share instability. And a cartel might not allocate the market, in which case market shares are apt to vary over time.

Much was made in several litigated cases about the significance of high incumbency rates in procurement auctions; indeed, the Eleventh Circuit reversed summary judgment in one case on the basis of this fact alone.[359] While high incumbency rates are an interesting fact, no inference can be drawn from the height of incumbency rates without the use of an oligopoly model that predicts what they likely would be in the absence of an agreement.[360] In order to perform the statistical test plaintiff's expert proffers in such a case, the expert must assume a particular probability model generating a probability of retaining a customer. Thus, the plaintiffs' experts in these cases did have some kind of model, even if it was never disclosed, and even if it had no basis in economics.

The first issue in a *Daubert* challenge to the testimony of the expert statistician should have been whether the probability model was entirely arbitrary. If so, Rules 401 and 702 command its exclusion. If the probability model was not arbitrary, the choice of the model should have been reviewed for reliability and fit. To meet reliability standards, the probability model must have been predicated on a formal auction model that generates a distribution of bids using the Nash, non-cooperative equilibrium concept. Such models are standard tools. To meet fit standards, the auction model would have had to capture the key features of the market, at least as

---

[357] *See* Blair & Herndon III, *supra* note 2, at 48.

[358] Blair & Herndon II, *supra* note 2, at 18.

[359] *See supra* note 159 and accompanying text.

[360] Increases in incumbency rates are more significant because (if not explainable as random fluctuations) they necessarily imply a change in competitors' bidding patterns of the sort that may be produced by the adoption of a customer allocation agreement.

perceived by the plaintiff's experts.

Leading commentators suggest that "*Daubert*-style exclusion of economic testimony should be used sparingly in antitrust cases and should be limited to situations where the economist's methodology is obviously and seriously deficient as measured by the standards of that discipline."[361] They suggest that summary judgment normally is "the more appropriate way to address expert testimony of dubious value."[362] A strong case, however, can be made for very liberal use of *Daubert* motions, both because a significant amount of expert economic testimony should be excluded and because *Daubert* proceedings serve an even more important purpose—that of educating the court.

Judges know little about oligopoly theory, and most judges have learned what they do know from legal opinions and antitrust treatises. Because judges cannot be expected to read and understand the economic literature on their own, the best sources of learning are exposure to the testimony of expert economists and reading the economic literature they, or their counsel, cite. Because the average federal judge is apt to know next to nothing about modern oligopoly theory at the outset of a case, reviewing this material in the course of deciding a *Daubert* motion is likely to increase the judge's grasp of the subject dramatically. Having to rule on a *Daubert* motion forces a judge to reflect on modern oligopoly theory, probably for the first time, and to learn not from the somewhat distorted and badly out of date expositions in antitrust cases and treatises, but rather from the testimony of expert economists and the economic literature on which they rely.

In principle, an even greater reflection on modern oligopoly theory is required to rule on a motion for summary judgment. *Daubert* only requires a court to decide whether expert economic testimony comports with professional standards, while the applicable summary judgment standard[363] "forces the antitrust judge to get into the expert's discipline itself" and determine whether the conclusions proffered are

---

[361] 2 AREEDA, HOVENKAMP & BLAIR, *supra* note 154, ¶ 309d, at 136.

[362] *Id.*

[363] *See supra* notes 146–56 and accompanying text.

warranted by the evidence and analysis.[364] Summary judgment proceedings, however, may provide less opportunity to assist the judge in getting into the expert's discipline. In this regard, the *Daubert* process is an important complement to summary judgment.

V. CLOSING OBSERVATIONS

Opposing expert economists may come to quite different conclusions, even when confronted with precisely the same evidence, and even when employing a high level of intellectual rigor.[365] The reason is that they make different judgments about which facts are most important and especially about which models are most relevant. Professor Posner has identified a "lack of professional consensus" as a problem with the use of expert witnesses, arguing that it is particularly acute with economists in antitrust cases.[366]

There is indeed something of a lack on consensus on modern oligopoly theory. Placing great stock in models of repeated games, some economists may believe that pricing coordination commonly arises from unspoken agreements. These economists may find most circumstantial evidence utterly ambiguous as to whether there was a spoken agreement. Focusing instead on the Prisoner's Dilemma game and Stigler's model, other economists may believe that unspoken agreements are at best rare, and they may readily infer the existence of a spoken agreement from circumstances.

As long as expert economists offer intellectually rigorous analysis premised on

---

[364] Hovenkamp, *supra* note 2, at 137.

[365] This explains the divergent conclusions economists may reach outside the courtroom on the existence of an agreement in violation of Section 1. For an illustrative difference of opinion relating to an actual collusion case, *compare* Frank A. Scott, Jr., *Great School Milk Conspiracies Revisited*, 17 REV. INDUS. ORG. 325 (2000), *with* Robert F. Lanzillotti, *Great School Milk Conspiracies Revisited: Rejoinder*, 17 REV. INDUS. ORG. 343 (2000).

[366] *See* Richard A. Posner, *The Law and Economics of Economic Expert Witness*, J. ECON. PERSP., Spring 1999, at 91, 96 ("Where the use of economic experts is most problematic is in the areas of economics in which there is no professional consensus. This used to be, and to some extent still is, the situation with regard to antitrust economics. A perfectly respectable economist might be an antitrust 'hawk,' another equally respectable economist a 'dove.'").

modern oligopoly theory, their testimony is admissible. By rejecting the *Frye* standard of general acceptance, the Federal Rules of Evidence and *Daubert* permitted the expression of divergent points of view. But *Daubert* also provided a means to ensure a solid foundation for any point of view expressed in court. A motion to exclude expert economic testimony is a useful device for first exposing, then probing, its theoretical or empirical basis in economics. The result likely will be more common ground among opposing experts as well as more sharply focused disputes on choices made by the experts in performing their analysis.

For expert economists, a great deal is at stake. Having one's testimony excluded as not up to professional standards can have a devastating effect on future income. Thus, the threat of *Daubert* exclusion helps spur expert economists to "employ[] . . . the same level of intellectual rigor that characterizes the practice of an expert in the relevant field."[367] Perhaps more importantly, it spurs counsel to allow, encourage, and even require, greater rigor from the expert economists they employ.[368]

The problem of a lack of consensus on modern oligopoly theory may be more acute among judges than among economists. As noted above, Professors Posner and Turner reached different conclusions about the application of Section 1 to oligopoly because they based their analyses on very different models of oligopoly.[369] A similar difference among judges, notably between Judge Posner and most other judges, explains some of the divergence in decisions on summary judgment. A large part of the divergence, however, results from judicial ignorance of modern oligopoly theory, making judges ill equipped to evaluate economic evidence on the existence of agreements in violation of Section 1. More refined and more consistent decisions

---

[367] Kumho Tire Co. v. Carmichael, 526 U.S. 137, 152 (1999); *see supra* note 296 and accompanying text.

[368] One reason for a lack of rigor in the testimony of expert economists may be that counsel believe that rigorous analysis would not be understood by the jury or judge. Rigorous economic analysis, however, generally can be explained in ways that permit non-experts to get the gist of it. Moreover, expert reports are written largely for other experts, so there is no need to simplify things, and it is better to use technical jargon if it communicates with a precision and economy not otherwise achievable. Another reason counsel may opt for lesser rigor in the testimony of expert economists is that greater rigor would cost more, perhaps requiring additional, more specialized and possibly higher paid, experts.

[369] *See supra* notes 236–64 and accompanying text.

would follow if courts came to grips with the basics of modern oligopoly theory.[370] *Daubert* motions can facilitate that process by inducing experts to ground inferences about the existence of agreements in modern oligopoly theory, and by requiring courts to assess the basis in modern oligopoly theory for inferences drawn by expert economists.

[370] Judicial analyses of inferences of collusive agreements can never be truly consistent unless the courts reason from a common understanding of modern oligopoly theory. To achieve a common understanding would require judicial pronouncements, presumably from the Supreme Court, on oligopoly theory. But it probably would be undesirable to have the Court make such pronouncements. The Court likely would not get things quite right, and any pronouncements could freeze judicial thinking on oligopoly for decades, even as thinking in economics continued to evolve. Illustrative of the potential for difficulties is the Court's dictum on oligopoly theory from *Brooke Group*, which may be read to support the discredited Chamberlin-Fellner view of oligopoly. *See supra* notes 209–12 and accompanying text.