COMMUNICATION AMONG COMPETITORS: GAME THEORY AND ANTITRUST

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INTRODUCTION

Advances in technology have greatly reduced communications costs. Businesses are often able, at low cost, to make information available to consumers and investors and, either advertently or inadvertently, to competitors as well. This ease of dissemination and resultant proliferation of information makes antitrust policy towards communication among competitors of growing importance.

Direct and indirect communication among competitors often is attacked under Section 1 of the Sherman Act. In some cases, plaintiffs attempt to characterize practices centered upon informational activities as constituting an illegal "agreement" to which the "per se" rule against price fixing should apply. However, most information cases are simply not amenable to straightforward applications of the per se rule. The rationale underlying the per se rule against price fixing is the judicial economy associated with the condemnation of practices so "economically pernicious" and so lacking in any "redeeming social virtue" that their complete elimination is highly unlikely to hinder socially productive practices. This rationale is not applicable to most information cases.

We endorse the condemnation of explicit price fixing and market allocation schemes, as illustrated for example by the formation of "naked" cartels where the sole purpose is to raise price. Such schemes rarely benefit consumers. Naked cartels are rightfully condemned as per se violations of the Sherman Act and are routinely described by courts as illegal agreements.[1] However, attempts to determine the legality of many forms of communication by assessing whether or not they conform to some connotation of the word "agreement" are inappropriate—at least when viewed from the vantage point of economics. Game theory has taught us that it

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[1] *See, e.g.*, United States v. Trans-Missouri Freight Ass'n, 166 U.S. 290 (1897); United States v. Addyston Pipe & Steel Co., 85 F.2d 71 (6th Cir. 1898), *modified and aff'd*, 175 U.S. 211 (1899).

can be difficult to unambiguously define "agreement" when examining conduct among economic agents when no express exchange of enforceable assurances has occurred. To explain, legally enforceable contracts constitute agreements in the sense that each side knows what it is obligated to do and knows that if it breaches, it faces a penalty that will be enforced by courts—either specific performances or damages.

But what does "agreement" mean in the absence of a legally enforceable contract? Initially it seems sensible to determine that there is an "agreement" if competitors meet to set price and to restrict aggregate output and the meeting ends with an understanding of what each party is to do, and then each does what it promised. From an evidentiary standpoint, it is even more compelling if absent the "agreement" the outcome would have been much different. However, this is a determination of "agreement" that requires a causal analysis, an analysis of the "but for" world, and need not be simple to apply.

A very different case from explicit price fixing is presented when there is only evidence of mutual interdependence in pricing along with communication such as public statements of industry-wide events—for example, a public prediction by one or more firms that there is likely to be a glut of memory chips for the next ten months followed by a number of industry participants taking factory "downtime." Or alternatively, consider the ubiquitous display of information and knowledge among competitors at a trade show or convention. There may be no evidence that any detailed discussion on price or output took place or that any of the meetings had an effect on a firm's decisions. Much of the practice in Section 1 litigation revolves around a plaintiff's attempt to characterize facts like these as if they were equivalent to an express illegal cartel "agreement."

This problem—called the issue of "characterization"—cannot be solved in the communication context merely by using the "agreement" concept, because "agreement" does not have a sufficiently clear economic (or, in our view, even legal) meaning which allows one to decide independent of the industry facts whether a particular form of communication should be banned. There is, in general, no *economic* theory of the meaning of "agreement" wherein one may determine easily when communication leads to anticompetitive results irrespective of the context of the events. Nor do we think this is the right problem to solve.

We argue below that in the absence of direct evidence to form a "naked" cartel to restrict output or to raise price, the appropriate legal standard to judge the flow of information among competitors is the rule of reason.[2] Courts (and economists) should analyze how a specific type of

[2] Although agreeing that there is scope for a per se rule, we wish to draw narrowly the activities that fall within it, at least given our current knowledge and experience. For reasons explained

communication did in fact affect prices and output in a specific market setting. Using the per se sledgehammer to attack such communication without analysis of context or effect, by trying to label it an "illegal agreement," is not helpful and, in our judgement, is not wise.

Game-theoretic models of industrial organization can provide guidance on what to investigate in rule of reason analysis of information cases. These models yield insights into how different forms of communication can affect competition in a market. We analyze the following factors in assessing the effect of the communication on competition: *recipients*—competitors or competitors and customers; *timing*—historical actions and outcomes, current actions and market conditions, or future actions; and *frequency*—repeated or not. Our analysis in this paper points to the potential mechanisms by which the communication *may* affect market outcomes. Application of the rule of reason would necessarily include an analysis of many facts and factors including, importantly, the actual *effects* of the *specific* communication practices at issue in the *specific* market in which they occur. Our analysis derives sets of conditions under which an effect on competitive outcomes is consistent with economic reasoning.

I. THE ECONOMIC LOGIC OF THE PER SE RULE

The economic logic of the per se rule is that certain practices, such as the establishment among competitors of a "naked" cartel, are so unlikely to be procompetitive that the judicial efficiency of immediate condemnation without any detailed inquiry into the effects of the scheme outweighs the cost of banning any "efficient" or procompetitive cartels.[3] In the often-quoted language of the Supreme Court, practices that have a "pernicious effect on competition and lack any redeeming virtue" may be condemned per se because the cost of condemnation is slight and the benefit in judicial economy is great.[4] Courts since *Addyston Pipe* and *Trans-Missouri*, for example, have refused to analyze the reasonableness of a particular price or output restriction among competitors based on defenses such as "ruinous competition" and "fair price," concluding that the costs of any such inquiries into the effects of cartels or their pricing behavior outweigh any possible benefits.

Not all actions among competitors that restrict aspects of competition are analogous to express collusion, however. Courts have confronted the

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more fully later, we believe that much activity in the communication area is likely to be procompetitive.

[3] The classic statement is United States v. Socony-Vacuum Oil Co., 310 U.S. 150 (1940). In particular, see the famous footnote 59.

[4] *See* Northern Pac. Ry. Co. v. United States, 356 U.S. 1 (1958).

difficult problems posed by practices in which a restraint of trade is necessary to promote competition. Thus, limits on the scope of the per se rule in this context have been evolving in a series of cases beginning with *Chicago Board of Trade*,[5] and running through *ASCAP*[6] and *NCAA*.[7] Courts have stated that the tradeoff which drives the per se rule does not apply in many of these more complex situations.

Even if a practice bears a *close* resemblance (perhaps even an identity) to a "naked price fixing agreement," that label will give way if there is a reason to believe that the practice is not "inherently pernicious," or, put differently, if the practice might well be output-enhancing. That is why the per se rule was not applied in the *Board of Trade*, *ASCAP* and *NCAA* cases, in spite of claims in each case that literal "price fixing" and express (indeed, *contractual*) agreements among competitors were involved. Because particular features of these practices made their effect on output uncertain, a detailed rule of reason analysis was required. In the *Board of Trade* and *ASCAP* cases, the Court concluded that the effects of agreements among rivals, that plaintiffs challenged as express price-fixing agreements, were to increase output and, thus, the challenged practices were found to be reasonable. In *NCAA*, the Court applied the rule of reason, but found that output likely had been restricted and deemed the challenged practice unreasonable.

Certain recent antitrust developments, however, illustrate efforts to expand the per se rule to ambiguous settings. A good example is the recent investigation by the Antitrust Division of numerous airlines for "price fixing" in connection with the posting of fares by computer. The logic of this charge was that by posting and altering fares and classification codes on electronic bulletin boards, the airlines reached "agreement" with each other about fares. With the expansion of the internet driving communication costs lower, such cases are likely to continue to arise in the future.

The calculus which leads to applying the per se rule against price fixing, in our view, should not apply to many—probably most—forms of communication among competitors, such as posting prices on electronic bulletin boards and the internet, or sharing demand and cost information. That is because such communication can also bring significant benefits. The *incremental* anticompetitive harm of many of these practices may be less than their *incremental* procompetitive benefits. The effects of banning these practices is unclear without a detailed economic analysis of the industry in which they occur. Such an analysis must consider the ability to structure a remedy which leads to greater consumer welfare.

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[5] Board of Trade of Chicago v. United States, 246 U.S. 231 (1918).

[6] Broadcast Music, Inc. v. Columbia Broadcast System, Inc., 441 U.S. 1 (1979).

[7] NCAA v. Bd. of Regents of Univ. of Okla., 468 U.S. 85 (1984).

Under current antitrust practice, the attempts to characterize cooperative outcomes, parallel actions, and ambiguous communication as if it were the same as a cartel agreement, so as to involve the per se approach, does not result in inexpensive litigation and a straightforward legal standard for judge and jury. Recall that an important part of the calculus favoring the per se rule is its elimination of complex litigation by dispensing with detailed practice-by-practice and market-by-market analysis of effect. This does not occur when per se claims are part of a Section 1 case involving indirect communication that might bring potential benefits to consumers. In such cases, market- and practice-specific facts and a huge amount of evidence on *effect* of the challenged practices routinely are presented to a jury, which is then instructed to apply the per se rule if "agreement" is found and the rule of reason otherwise. This makes it impossible to claim that per se analysis is an economical time- or resource-saving rule.

The per se rule should be reserved for practices that have three components: (1) there is an extremely high likelihood—almost a certainty—that the practice can have only an anticompetitive effect and, thus, virtually no likelihood that forbidding the practice will injure competition; (2) it is very difficult and costly to investigate claims of procompetitive versus anticompetitive effect, making a per se approach economical (especially in light of (1) above); and (3) the practice can be defined specifically enough so that companies can identify what they are, and are not, allowed to do.[8]

If these conditions are not met, we believe that the inquiry should proceed under the rule of reason without prospect of per se instructions. This will allow focus on the incremental procompetitive or anticompetitive effects of the practice in question. The analysis should focus on whether the practice raised price or restricted output, not on its label.

Given the rationale for the per se rule, it is essential that market participants and courts easily be able to identify and quickly condemn those activities that are per se illegal. Meeting with competitors to establish a cartel to set price and to restrict output is an easily understood activity that is easy to forbid without prospect of confusion or mistake. However, responding to competitors' pricing by posting price changes on an electronic bulletin board does not have such clear borders. Certainly it cannot

[8] There can be benefits to coordinated price setting. That is one reason why firms with no market power can and do merge. One cannot argue, therefore, that a per se rule against price fixing bans a practice wholly lacking in efficiency. Instead, it forces the benefits to occur only where firms publicly combine, making their joint activities known to customers. In order to support the per se ban on price fixing, one must argue that, in general, the benefits of coordinated price setting are likely to be small, costly to discover, outweighed by harms from elevated pricing and, in any event, obtainable through other means such as public joint ventures or mergers which always are analyzed under the rule of reason. Hence, the practice of express price fixing is condemned under the per se rule even among firms lacking in market power.

always be a criminal violation to post prices on an electronic bulletin board, nor can it always be a criminal violation to respond to a competitor's prices. For these reasons, the rule of reason is the correct approach to new situations involving dissemination of information about prices; currently, there is insufficient experience and knowledge to classify these practices as ones that should be banned in all cases.

II. THE EFFECTS OF STRATEGIC INTERDEPENDENCE ON PRICING

The industrial organization literature shows that oligopolists who understand that their fortunes are fundamentally interdependent sometimes can achieve high price-cost margins even without the formation of an express cartel.[9] This can occur absent any direct communication among competitors. A highly-stylized example illustrates this point. A small town has two gasoline stations. They are located directly across the street from each other at the town's main intersection and are identical in terms of capacity, ancillary services, and quality of product. Almost all consumers will therefore buy from the lower-priced station. Prices are posted on pumps and large electronic signs; they can be changed virtually immediately and costlessly by typing in new numbers.[10]

If we assume, for the sake of the example, that entry cannot occur, one likely outcome of "competition" is that each station will charge the price that maximizes joint profits—the same price they would charge if they could merge. Neither gasoline station has an incentive to cut price below the monopoly level. Each realizes that it cannot steal customers from its competitor before its competitor can respond. And the competitor *will* respond because it is more profitable to match the price cut and share the market at a lower price than to permit the price-cutting station to steal market share. Each station should rationally anticipate immediate matching and, therefore, not cut price in the first instance. Cooperative pricing is thus a logical outcome of the "game" without any secret meetings or additional communication. If for some reason the joint profit-maximizing price were to rise, one station could raise price. Although the other station likes getting all the business, it should know that if it does not raise price to its competitor's level, the competitor will surely lower price very soon. Thus,

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[9] *See, e.g.*, DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION chs. 6-7 (1994).

[10] See Robert H. Gertner & Andrew M. Rosenfield, Price-Fixing Under the Sherman Act: The New Learning from Game Theory (draft 1996) (on file with author), for a fuller discussion of this and other examples in a general analysis of the relation of game theory to Section 1 litigation.

it should even be possible to coordinate a price increase in this setting.[11] This analysis is certainly not new.[12]

It is very unlikely that this behavior would create antitrust liability for the gas stations and most people would say that there is no "agreement" between them. Instead, there is what economists call a recognition on the part of each firm of their "mutual interdependence." In this setting, unilateral interest, by itself, leads to cooperative pricing. There is however certainly "communication" between the gas stations. Price information is communicated to competitors and consumers simultaneously. Although the communication may make cooperative pricing more likely, it is also the case that the information is useful to consumers.

This example demonstrates that cooperation and parallel behaviors are possible without secret communication about price or output and without "agreements." Immediate communication of prices to competitors can, therefore, facilitate cooperative pricing. We will return to this example later in the article.

It is very unclear whether the antitrust laws can or should do anything about cooperative pricing based on mutual interdependence and collateral interest. Restrictions on posting prices might not lead to any improvement in social welfare, because consumers would be poorly informed.[13] Restrictions on price changes may not only eliminate the ability of the gas stations to cooperate, but also reduce their ability to respond to changes in cost and demand conditions. Moreover, if we were to treat interdependence that leads to parallel pricing as if it were price-fixing and therefore illegal per se, entry into a monopolized or oligopoly market likely would become less attractive. The benefits of entry would likely be foregone because of the entrant's fear of potential felony exposure and possible treble damage claims in the hands of consumers. A per se rule against parallel pricing, therefore, could well have perverse dynamic effects on the exercise of market power and consumer welfare.[14]

The ease with which the gas stations can achieve cooperative prices without a cartel-like illegal agreement affects the *incremental* effect of any communication. For instance, mere discussions about future market conditions may have a net procompetitive effect in this setting. The inventory

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[11] Clearly, the model is very special, but the result does not depend on the products being perfect substitutes. Robert H. Gertner, Tacit Collusion with Immediate Responses: The Role of Asymmetries (draft 1994) (on file with author).

[12] It was discussed by Edward Chamberlin in his classic 1933 book which developed the theory of monopolistic competition, THE THEORY OF MONOPOLISTIC COMPETITION (1933).

[13] Studies often show that removal of advertising bans on prices leads to lower prices. *See, e.g.*, Lee Benham, *The Effect of Advertising on the Price of Eyeglasses*, 15 J.L. & ECON 337, 352 (1972).

[14] See Gertner & Rosenfield, *supra* note 10, for a fuller discussion of this point.

planning benefits, in this instance, may outweigh any anticompetitive effects, simply because the communication is not needed to achieve cooperative pricing. In other settings the net effect of similar communication may be anticompetitive.

III. NASH EQUILIBRIUM AND SELF-ENFORCING AGREEMENTS

Modern industrial organization, with its use of game theory, has much to say about the potential effects of communication on outcomes. No court will enforce a price-fixing contract, and this was generally true in the United States even before the passage of the Sherman Act.[15] Therefore, to have any incremental effect, the Sherman Act must attack something other than written cartel contracts that already were unenforceable. One obvious added incremental effect was to turn such behavior into a crime and to give all direct consumers a treble damage claim for all injuries caused "by reason of" price-fixing.

In any event, however, our central point is that any behavior which arises from interdependence and which cannot be enforced by contract, must be largely "self-enforcing" to raise any practical concern. That is, it must be in the interest of each party to any cartel to take agreed upon actions independent of legal recourse by the other parties to compel performance or the cartel will disintegrate. If this was not the case, a party could behave opportunistically, and there would be nothing the other parties could do about it, generally leading to no effect from interdependence or even an express cartel.

A common interpretation of the basic solution concept in game theory—Nash equilibrium—is that it represents a form of "self-enforcing agreement." A Nash equilibrium is simply a set of strategies such that each player's strategy is optimal given that other players choose their optimal strategies. Therefore, a "self-enforcing agreement" is equivalent to a Nash equilibrium. If the players were to get together prior to playing a game to agree on strategies to play but were unable to write enforceable contracts, the set of agreements they could reach defines the Nash equilibria of the game. But even if the players did not get together beforehand, a Nash equilibrium represents a standard assumed outcome of game theory. The relevant question for us is whether there is a difference between the two equilibria.

If Nash equilibrium provides a good prediction of outcomes in strategic settings, then the Nash equilibrium that emerges in the "com-

[15] *See* Craft v. McConoughy, 79 Ill. 346 (1875); Richard A. Epstein, *Intentional Harms*, 4 J. LEGAL STUD. 391, 442 (1975).

petitors do not communicate" setting and the one that emerges if they do communicate prior to playing the game is the precise measure of the effect of the communication.[16] Market outcomes, compared and contrasted with textbook indicia of perfectly competitive conditions, often are used as circumstantial evidence of "illegal agreement" in Section 1 litigation.[17] If the outcome with no communication is the same as the one with express price-fixing, one must treat such evidence as of very little probative value. The link between Nash equilibrium and self-enforcing agreements suggests that, in many settings, communication without an ability to write a legally-enforceable contract is unlikely to have any effect on strategies or outcomes. The most important way in which communication can affect strategies or outcomes is that it may transfer information which *changes the game* the firms play in an important way.[18] In Section V, we show how game theory can identify those situations where communication is most likely to provide competitors with an extra ability to raise prices which would be relevant in a rule of reason analysis.

IV. THE NET EFFECTS OF COMMUNICATION ON COMPETITION

We demonstrate, in this section, how the game-theoretic industrial organization literature[19] suggests at least three factors that should play a large role in any rule of reason analysis of communication. An understanding of the mechanisms by which communication may affect outcomes can help courts fashion rules which address the impact of communication across a variety of competitive environments.

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[16] There is the issue of how accurate are predictions from game theory. As with any theory based on simplifications, predictions are unlikely to be precise. It is also possible that players will not choose Nash equilibrium strategies or that there will be many Nash equilibria, so that the theory may not provide a precise prediction of behavior. Even though the predictions may not be precise, they still can provide useful guidance on when equilibria may differ.

[17] Two studies, Dennis A. Yao & Susan S. DeSanti, *Game Theory and the Legal Analysis of Tacit Collusion*, 38 ANTITRUST BULL. 113, 141 (1993); and Jonathan B. Baker, *Two Sherman Act Section 1 Dilemmas: Parallel Pricing, the Oligopoly Problem, and Contemporary Economic Theory*, 38 ANTITRUST BULL. 143, 219 (1993), recognize the difficulties in inferring price-fixing from market outcomes.

[18] There are two other ways that communication could affect outcomes. Pre-play communication in a game could reduce strategic uncertainty if players' statements about playing their Nash equilibrium strategies are believed. If a player is more confident that other players will choose their Nash strategies, it is more attractive to do so oneself. Thus, communication could increase the likelihood of Nash outcomes. Similarly, if there are many Nash equilibria, as is the case in many dynamic oligopoly models, pre-play communication may improve the players' ability to coordinate on a particular Nash equilibrium. We suspect it may be difficult to show that these mechanisms are at work in a particular industry setting.

[19] *See generally* CARLTON & PERLOFF, *supra* note 9, chs. 6-7; JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION (1988); HANDBOOK OF INDUSTRIAL ORGANIZATION (Richard Schmalensee & Robert Willig eds., 1989).

First, whether or not the communication is public is important because consumers may benefit from the information externalized. However, this does not mean that the exchange among rivals of information that is not public should necessarily be subjected to a per se rule—just the opposite. Despite our suspicions about secret communication among rivals, we would apply the rule of reason in this context as well. This is because even an exchange of private information (*e.g.*, of cost information) among competitors can reduce the dispersion or even the level of price. This private exchange of information is not certain to be anticompetitive and, furthermore, consumers may be uninterested in the information.[20]

Second, whether the information is about historical or current strategies and outcomes can be very important. The mechanisms by which communication of information can affect outcomes differs depending upon what type of information is disseminated.

Finally, the question of repetition and reputation, especially relating to communication of future actions, may be very important. In many settings, repeated communication may be necessary to achieve credibility of the information or to make the information useful in facilitating cooperative pricing. We discuss these issues in some detail below.

A. *Public Communication of Current Market Actions to Both Consumers and Competitors*

The enormous declines in the cost of information storage, manipulation, and transmission continue to transform our economy at an amazingly rapid pace. Information technology is changing the way numerous goods and services are marketed and sold. Consumers shopping on computer networks have access to far more information about products, suppliers, and prices than they could possibly receive through mail-order, physical search, and word-of-mouth.

The same technological advances which lead to better information among consumers also lead to better information among rival sellers. It is impossible to inform consumers electronically without also informing competitors; if necessary a competitor can always pretend to be a consumer.

Compare the outcome in the gas station example with the two major auto dealers in the same town. Although list prices of cars may be observable by rivals, since each sale involves significant interactions between the

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[20] *See, e.g.*, Richard Posner, *Information and Antitrust: Reflections on the* Gypsum *and* Engineers *Decisions*, 67 GEO. L.J. 1187, 1187-91 (1979). However, if the information is secretly transmitted to rivals in order to prevent consumers from acting upon the information (e.g., buying from the lower priced firm), then that could be troubling.

seller and the buyer, the possibility of negotiated prices is real. It becomes impossible for competitors to determine a rival's transaction prices and therefore, it becomes difficult to ascertain whether or not a rival is undercutting a cooperative price. Since it is difficult to detect cheating, it becomes more difficult to enforce cooperative pricing. For example, a seller may mistakenly believe when its sales decline that a rival has undercut price and may respond with a price cut of its own.

Imperfect information among sellers, costly price changes, or long-term commitments to prices all make it more difficult for firms to coordinate pricing at non-competitive levels. The theoretical literature analyzing the circumstances fostering coordination includes Stigler's classic article,[21] followed by a large amount of game-theoretic literature which refines Stigler's insights. The main factors which affect the ability of an industry to sustain cooperative pricing include reaction times, extent of incomplete information, industry concentration, and asymmetries among the firms.

A decision by one firm to post list prices electronically, which its competitor follows, may help transform the industry to one where competition looks like the gas station example. Thus, communication can have, at least theoretically, an anticompetitive effect. This is no more powerful than saying that telephony can be "anticompetitive" because it might enhance express collusion. Since it may be impossible to communicate with consumers without communicating with competitors, the welfare impact of communication is ambiguous. Hence, the mere possibility of an anticompetitive effect is not sufficient justification for an argument that posting prices electronically is, or ought to be, illegal per se.

In fact, communication with consumers is typically procompetitive; competition prospers when consumers are fully-informed.[22] Consumers who can find out about competitor's prices, product selection, and delivery and service policies, are more likely to make an informed choice. A store which is more attractive to a consumer because it has lower prices is more likely to succeed in a market where consumers can become informed at low cost. This is exactly how competition is supposed to work. A new entrant may compete more effectively if it can communicate to consumers

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[21] George Stigler, *A Theory of Oligopoly*, 72 J. POL. ECON. 44, 61 (1964).

[22] In general, empirical studies support the proposition that bans on price advertisements harm consumers. *See, e.g.*, Benham, *supra* note 13, at 352; Maurizi, *The Effect of Laws Against Price Advertising: The Case of Retail Gasoline*, 10 W. ECON. J. 321, 329 (1972); Steiner, *Does Advertising Lower Consumer Prices?*, 37 J. MARKETING 19, 26 (1973); Cady, *An Estimate of the Price Effects of Restrictions on Drug Price Advertising*, 14 ECON. INQUIRY 493, 510 (1976); Luksetich & Lofgren, *Price, Advertising, and Liquor Prices*, 4 INDUS. ORG. REV. 13, 25 (1976); BOND, ET AL., BUREAU OF ECON., FTC, STAFF REPORT ON EFFECTS OF RESTRICTIONS ON ADVERTISING AND COMMERCIAL PRACTICE IN THE PROFESSIONS: THE CASE OF OPTOMETRY (1980); Ippolito, *Consumer Protection Economics: A Selective Survey*, *in* EMPIRICAL APPROACHES TO CONSUMER PROTECTION ECONOMICS (Ippolito & Scheffman eds., 1986).

at low cost to both parties. In turn, this may encourage entry and its corresponding procompetitive effects. On-line bookstores, CD retailers, and computer retailers are providing real competition to community retailers.

The anticompetitive effects described above are merely possibilities. For instance, it is possible that competing firms were pricing cooperatively prior to communicating prices and availability. Then, the only incremental effects are procompetitive. It is also possible that sharing information has no incremental effect on prices because, under both regimes, prices are constrained by potential entry, buyer bargaining power, and substitute products. Electronic communication with consumers could make it easier to cut prices secretly, not more difficult. For example, it may be possible for a consumer to play competitors off against one another when getting price quotes through electronic mail and make offers and counteroffers among a large number of sellers at very low cost. If electronic haggling becomes important, it will be more difficult for competing firms to know what prices rivals are charging and, thus, cooperative outcomes become less likely.

These arguments should make clear that a careful analysis, rich in industry structure and practice, which employs all available data would be necessary to determine if the net incremental effects, if any, of particular information sharing is beneficial or harmful to consumers.

B. *Type of Information: Historical and Current*

One form of communication which can change the game competitors play—often in a procompetitive way—is sharing of recent historical information about prices, production, revenue, and other relevant factors. This is often accomplished through a trade association which collects the data and then disseminates it to its members. Other mechanisms include consulting firms which collect data from industry participants and share it with their clients. This is very common among compensation consultants who collect industry data on professional and managerial pay. In many cases, the data is aggregated before it is distributed, making it difficult to identify actions of specific competitors. Typically the information is not shared with the public, except sometimes at a very aggregate level.

Such sharing can be procompetitive—it can make possible "benchmarking" or the adoption of "best practices," for example, and thereby sharing of information can lower cost and price. Sharing of this type of information, however, also can facilitate cooperative pricing in the same way that communicating current price data can. It may become easier to detect cheating when individual competitor's historical and current prices, costs, and output are observed. On the other hand, aggregating the data largely removes the value of information in facilitating collusion. Further-

more, there can be procompetitive benefits of information on past and current conditions. Information about market conditions will allow firms to plan more effectively and produce more efficiently.

The early jurisprudence of trade associations demonstrates the potential procompetitive and anticompetitive effects.[23] Although there is much to criticize in the courts' analyses of the markets, the decision to apply a rule of reason based on the effects in a particular market is correct. Comparisons of these cases to those that could arise today from the communication of information indicates that there is little justification for applying a rule of reason in the trade association cases but using a per se approach to attack current information transmission.

C. *Repetition, Reputation and Communication of Future Actions*

Some communication is about future actions. Communication may be about future unilateral actions—"We plan to raise prices across-the-board by 2% next month"—or contingent actions—"we will follow any price increase less than 5% by competitors," or vague statements which could be unilateral or contingent—"we believe that price increases on the order of 3% are in order."

There is no direct commitment to be truthful. Antitrust issues can be raised by a firm issuing such a statement about future actions especially if the speaker does do what it said. Such communication is called "cheap talk" in the economic literature. This economic term refers to communication which neither reveals verifiable information nor is costly to the sender, in that it has no direct effect on anyone's profits. A statement that a firm plans to raise price "costs nothing," and creates no commitment. Nonetheless, cheap talk can have an effect by revealing information.[24]

Consider telling a competitor that, "if you raise price tomorrow we will follow the next day." This is an action which reveals no verifiable information nor does it signal information since it has no cost. If hearing the message increases the recipient's belief in the likelihood that its price increase will be matched, it makes the price increase more attractive. The question becomes why the statement changes the belief—presumably the sender will match the price increase if it is profit-maximizing and will not if it is not. The answer, we believe, is that the sender could have or develop a reputation for truthfulness. When this is the case, if the sender

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[23] *See* American Column & Lumber Co. v. United States, 257 U.S. 377 (1921); Maple Flooring Mfrs. Ass'n v. United States, 268 U.S. 563 (1925).

[24] *See, e.g.*, Farrell & Gibbons, *Cheap Talk Can Matter in Bargaining*, 48 J. ECON. THEORY 2-21, 237 (1989).

fails to follow the competitor's price increase it will reap a short-run benefit, which will be offset by the costs from a future lack of credibility.

It is possible that a reputation for credibility will allow a competitor to signal specific information. For example, an announcement about demand conditions may be credible if competitors will eventually find out if the announcement was truthful and the sender values a reputation for truthfulness.

Economists have analyzed game-theoretic models of reputation and the conditions needed to make the acquisition of a reputation possible.[25] One insight from this literature is that reputation usually requires repeated interactions. The reputation holder only has an incentive to maintain his reputation if the parties with whom he will interact in the future will base their future purchase decision on the reputation of the firm. A stand-alone restaurant on an interstate highway has less of an incentive to maintain a reputation for high quality than a neighborhood restaurant because future customers of the stand-alone restaurant will not usually base their purchase decisions on the reputation of the restaurant.

The dynamic requirements of reputation arguments imply that an isolated statement like, "we would be willing to go along with an industry-wide price increase" may not provide any credible information to the recipient and may have no effect on the ability of firms to price cooperatively. A rule of reason inquiry should look at whether or not such statements are likely to have an effect and whether in a particular case they likely did have any effect given the details of industry structure and competition.

V. ILLUSTRATIVE APPLICATIONS

The recent action against the airline industry by The Antitrust Division[26] and the related class action case against the airlines are good examples to illustrate our points.[27] In those cases, the airlines were alleged to have "conspired" and to have reached a "price-fixing" agreement with each other through the use of an electronic bulletin board. With the development of new information technologies, airlines are able to post, in electronic form, their fares on computer screens (actually each night they submit a computer tape to the Airline Tariff Publishing Company which

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[25] The classic game-theoretic articles on reputation are Milgrom & Roberts, *Predation, Reputation, & Entry Deterrence*, 27 J. ECON. THEORY 280 (1982); Kreps & Wilson, *Reputation & Imperfect Information*, 27 J. ECON. THEORY 253 (1982); and Kreps, et al., *Rational Cooperation in the Finitely Repeated Prisoners' Dilemma*, 27 J. ECON. THEORY 245 (1982).

[26] United States v. Airline Tariff Publ'g. Co., 1994-92 Trade Cas. 2854 (CCH) P 70,687 (1994).

[27] Carlton, along with Lexecon, served as a consultant to the airlines.

then disseminates the information to the public, including travel agents). To avoid irrelevant details, suppose that fares can be instantaneously changed and disseminated to competitors and travel agents.

For our purposes, there are three possible antitrust concerns. First, prices were being communicated among rivals. Second, some of the fares were not current fares, but fares to go into effect in the future. So, for example, a fare increase would be indicated to go into effect next month. Third, some of the "notes" accompanying the fare changes and appearing on the bulletin board were alleged to contain messages of the following sort: "I, airline X, will lower my fare at your hubs, airline Y, unless you rescind your fare cuts at my hubs." Let us look at each concern in light of the theories of this paper.

If two firms sat together in a room to establish a naked cartel by agreeing to set specific prices and to serve specific routes, antitrust would likely condemn—indeed condemn per se—that cartel. The mere meeting by itself could not literally lead to a binding agreement for the reasons we have already described—even if the rivals talk about and agree to specific prices they will charge, there is no assurance that each will follow the price recommendation and no court would enforce the cartel agreement. Yet, the practice of explicit secret price fixing among rivals is a practice that the antitrust laws have had experience with, and, after weighing the benefits of allowing such activity, concluded that it is undesirable. Hence, most courts (and we concur) undoubtedly would characterize the behavior as a per se illegal price fixing scheme.

But how does a meeting to fix price, in which prices are discussed, differ from a situation in which two firms are sitting at their computer terminals rapidly changing prices in response to the others' actions? As long as firms react more quickly than consumers, there may be no difference in effect or outcome (assuming that in each case only current prices are communicated). Yet, in the case in which the firms do not meet but instead use an electronic bulletin board to communicate prices, we would apply the rule of reason.

The application of the rule of reason begins here with two questions. First, if only rivals can see the information, should the antitrust laws allow the practice? Second if rivals and consumers see the information, should the antitrust laws allow the practice?

If the computer system has been designed specifically so that rivals can communicate without allowing consumers to "hit" the low price carrier, then that design may facilitate cooperative pricing. In a normal market, those offering goods to sell at a high price stand the risk that they will lose sales, while those with the low price incur the gain of increased sales. In a system allowing rivals to first play a pricing game, and then prices being shown to consumers, there is an increased risk that pricing

coordination could occur compared to the case in which no pricing game occurs beforehand. Although we still would apply the rule of reason, we suspect that in such a case it is more likely that the effect would be to injure consumers, making the practice unreasonable.

Suppose now that everyone (rivals plus consumers) sees the price information at the same time. The rapid response of rivals to each other may still be able to produce an outcome no different than that had they met in a room. We see no single way to use antitrust to deal with the problem and again no role for the per se rule. The price dissemination is necessary for efficiency and its unavoidable consequence is that rivals can respond. It is the standard oligopoly problem and our inclination is to follow the traditional antitrust treatment that oligopoly behavior alone is not actionable. This is a good case where, in order to determine whether an action is bad, one must understand what the alternative is and whether it is competitively better. Without being able to specify a superior alternative, it is inappropriate for the antitrust laws to condemn an action. We suspect that cases like this would tend to involve practices that benefit consumers and thus likely are reasonable.[28]

The second antitrust issue relates to preannouncement of future actions. This preannouncement is not binding and therefore allows rivals to coordinate their pricing without bearing the usual cost of a high price. So, for example, airline A announces that it will raise fares to $300 in four weeks. Rival airline B announces a fare increase of $290 to take effect in four weeks, at which point airline A fears a loss of sales and rescinds its fare increase and matches the $290. Such communication can raise the price by reducing the cost to a firm of being first to announce a fare increase. But, and this is a big "but," the preannouncement of price increases can provide a planning benefit to consumers. Even on monopoly routes, airlines engage in announcements of future fare changes. Therefore, the clear implication is that consumers must benefit from this practice. We think it wrong to needlessly ban practices that can sometimes benefit consumers significantly. Again, a rule of reason analysis is called for.

Moreover, it is always important to analyze what would occur if there were a ban on the announcement of future prices. There are alternatives to announcing future fares that still allow coordination. For example, future fares could be tested out on a few seats. The fares could go into effect immediately, but be limited to only a few seats. The fares would be extended to all seats only if rivals signal that they will go along with such

[28] Even if a superior alternative exists, there is the thorny issue whether antitrust liability can be imposed on firms who have not adopted business practices that economists and lawyers believe would produce more competition. As we will see, this issue is most difficult when the business practices in question can sometimes be efficient.

a general fare increase by matching their rival's fare on the few seat basket. Because this alternative is so good a substitute (from a cooperative pricing perspective) for preannouncement, a ban on preannouncement would only be effective if this alternative were also banned. However, a ban on this alternative may be very costly, because fares limited to a few seats are often efficient and the regulatory costs to enforce the ban may be large. Furthermore, there may be other alternatives, which allow the initial equilibrium to be reestablished.[29] The third antitrust issue has to do with allegations that explicit messages were sent from one rival to another, interpretable only by other rivals. Assuming the allegations were accurate, there are at least two reasons to raise antitrust concerns here. First, the extra communication is designed to facilitate reaching an equilibrium in a complex product space of many routes. This type of signal would be very hard to send if rivals were able to send information on only current prices. Second, the signals were allegedly meant only for rivals, so it amounts to secret communication among rivals unbeknownst to consumers. Again, we would apply the rule of reason as the rule of decision, but we think the practice likely would injure consumers and, therefore, be deemed unreasonable in this specific context.

CONCLUSION

We have explained that the logic of the per se rule—that some practices are so clearly anticompetitive that there are benefits in condemning them categorically—has little or no place in the emerging communication area. Instead the rule of decision in such cases must be the rule of reason. This is so because communication can have ambiguous effects, and because our experience with certain forms of communication is limited. To determine whether a particular set of communication activities is or is not anticompetitive one must understand the practice, the market and the context in which the communication is occurring and then examine the likely incremental effect of any challenged communication. Furthermore, one must keep in mind that communication can help promote interdependence among rivals and at the same time be essential to consumers in making decisions and thus in enhancing competition.

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[29] Price announcements of future air fares have now been banned, but the effect of the ban is in doubt. *See* Holman W. Jenkins, *In Pursuit of Price Fixing*, WALL ST. J., Apr. 9, 1996, at A19; "Airlines have already shown that they can raise fares without benefit of electronic signals . . . , the carriers will raise fares on weekends, when few tickets are sold. If rivals don't match the increase, the carrier withdraws the fare on Monday. If everyone agrees, the increase sticks. The process may not be as smooth as electronic signals, but the effect is the same." Joe Davidson, *Six Big Airlines Settle U.S. Suit on Price Fixing*, WALL ST. J., Mar. 18, 1994, at A2.

We propose that, at least for now, the rule of reason be the rule of decision in cases involving communication, especially new forms of information dissemination. Although we do not consider here the full details of rule of reason analysis, it suffices to say that such inquiries always begin with an analysis of market power and that the core issues generally include market power, the actual *effect* of any challenged practice and an analysis of the likely benefits as well as the costs of all of the challenged activities under investigation. We have mentioned a few issues likely to be of particular relevance in information cases—whether information is public or purely private, the currency of the information and the repetitive nature of the information. These are general points and the particular effects of information can not be ascertained in simple categories. The use of the rule of reason implies that, as a practical matter, plaintiffs will not be able to argue that communication itself is proof—either direct or circumstantial—of price-fixing per se. Instead they will be forced to show that a particular challenged communication practice has an anticompetitve effect. That is the procedure we advocate because we are convinced that communication is so important to the competitive process that broader sanctions would likely chill competition rather than promote it.