

EVALUATING MERGERS FOR COORDINATED EFFECTS AND THE ROLE OF “PARALLEL ACCOMMODATING CONDUCT”

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Jointly issued by the U.S. Department of Justice and the Federal Trade Commission, the 2010 Horizontal Merger Guidelines (HMGs) are thoughtful, constructive, and insightful.¹ In a document that touches upon so many challenging and well-examined issues, it is inevitable that one will find it difficult to agree with everything in it. This comment will critically examine one small but significant departure from previous guidelines.

One of the fresh additions to the new guidelines is that they expand the class of behavior categorized under “coordinated effects”:

Coordinated interaction can involve the explicit negotiation of a common understanding of how firms will compete or refrain from competing. Such conduct typically would itself violate the antitrust laws. Coordinated interaction also can involve a similar common understanding that is not explicitly negotiated but would be enforced by the detection and punishment of deviations that would undermine the coordinated interaction. Coordinated interaction alternatively can involve parallel accommodating conduct not pursuant to a prior understanding. Parallel accommodating conduct involves situations in which each rival’s response to competitive moves made by others is individually rational, and not motivated by retaliation or deterrence nor intended to sustain an agreed-upon market outcome, but nevertheless emboldens price increases and weakens competitive incentives to reduce prices or offer customers better terms. Coordinated interaction includes conduct not otherwise condemned by the antitrust laws.²

The departure from previous guidelines resides in the inclusion of parallel accommodating conduct (PAC). As described, PAC is distinct from other

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¹ U.S. Dep’t of Justice & Fed. Trade Comm’n, Horizontal Merger Guidelines (2010) [hereinafter 2010 Merger Guidelines], *available at* <http://ftc.gov/os/2010/08/100819hmg.pdf>.

² *Id.* at 24–25.

forms of coordinated effects in that it is not based on “retaliation or deterrence” and does not rely on “an agreed-upon market outcome.”³

To set the stage for analyzing PAC, let’s begin with a brief review of unilateral and coordinated effects for mergers. Suppose firms A and B offer products α and β , respectively, and decide to merge. The merger creates an incentive to raise the prices of those two products. Prior to the merger, firm A chose the price on product α to maximize the profit generated by product α . That a higher price on product α would also raise the demand and profit of product β was of no consequence to firm A. However, given that the merged firm benefits from the profits generated by both products α and β , it internalizes the effect of the price of product α on the profit coming from product β and, as a result, now prices product α higher relative to the premerger situation. This unilateral effect is present when the prices of the non-merged firms are held constant, and is magnified—both in terms of the positive impact on the merged firm’s profit and the negative impact on consumer surplus—when the non-merged firms optimally raise their prices in response to the higher prices charged by the merged firm.

As just described, the unilateral effect of a merger results in higher competitive prices (assuming, of course, the merger does not generate offsetting effects due to cost reductions). If the merged firm were to raise its prices beyond those new competitive prices, that would prove unprofitable *unless* it anticipated that those price increases would induce the non-merged firms to act in a similar fashion and raise *their* prices. But a non-merged firm would only find such a price increase profitable if it similarly anticipated price increases by the merged firm and other non-merged firms. These are coordinated effects because the profitability of each firm’s price increase relies upon the other firms also raising their prices. As stated in the HMGs, coordinated interaction is “conduct by multiple firms that is profitable for each of them only as a result of the accommodating reactions of the others.”⁴

The generation of coordinated effects requires firms to solve two challenges: coordination and implementation. Firms must coordinate on a supracompetitive outcome (for there are many such outcomes), and they must implement that outcome in the sense of having a self-enforcing mechanism that will make it in each firm’s best interests to select the supracompetitive outcome. In Part I below, I focus on the implementation of supracompetitive prices through PAC and argue that, contrary to the claim in the HMGs, PAC does involve “retaliation or deterrence” and, thus, an evaluation of PAC-generated coordinated effects should be conducted along standard lines. In Part II,

³ *Id.*

⁴ *Id.* at 24.

I examine PAC in light of the coordination challenge and argue that PAC involves a subtle but important difference in the coordination mechanism used to support supracompetitive prices. After reviewing how firms can achieve the mutual understanding needed to produce coordinated effects, some operational implications of PAC for merger analysis are offered. That section concludes by reviewing some recent research relevant to evaluating how a merger might affect the ability of firms to solve the coordination challenge. Part III explains that while PAC involves “retaliation or deterrence,” that is not the case with all coordinated effects.

I. IMPLEMENTATION OF A SUPRACOMPETITIVE OUTCOME

The HMGs draw a distinction between price increases that are “enforced by the detection and punishment of deviations” (commonly associated with explicit and tacit collusion) and those that are “not motivated by retaliation or deterrence” (which the HMGs associate with parallel accommodating conduct). In considering this distinction, the theory of collusion tells us that a supracompetitive outcome is sustainable only if it is self-enforcing; that is, each firm prefers the supracompetitive outcome to a deviation such as, for example, undercutting the supracompetitive price or bidding for the business of another firm’s customers.⁵ As originally explained by George Stigler,⁶ for firms to find it profitable to implement a supracompetitive outcome, they must anticipate that deviations are sufficiently likely to be detected (“detection”) and will be followed by a sufficiently lower future profit stream (“punishment”). Thus, compliance occurs when each firm prefers the supracompetitive outcome to deviating and exchanging a higher current profit for a lower future profit stream. Depending on the circumstances, this lower future profit stream can take various forms, including, for example, a temporary or indefinite return to the competitive outcome, a temporary stay at an outcome even less profitable than the competitive outcome (i.e., a “price war”), or a transfer of profits from the non-compliant firm to the other firms (e.g., by the former buying output from the latter).

With PAC, the HMGs are suggesting that supracompetitive prices can be produced through a form of coordinated effects that does not require monitoring and punishing for non-compliance. It is here that I disagree. If a firm is expected to price above the competitive level—and thereby price higher than the level that maximizes current profit—what will induce it to do so? Forgoing the current profit that could be earned by deviating can only be rationalized by the prospect that doing so will result in a higher future profit stream.

⁵ See MASSIMO MOTTA, *COMPETITION POLICY: THEORY AND PRACTICE* (2004) (providing a non-technical discussion of the theory of collusion).

⁶ George Stigler, *A Theory of Oligopoly*, 72 J. POL. ECON. 44 (1964).

That this is, in fact, how PAC works was made clear in a speech by Carl Shapiro who, along with Joe Farrell, was a chief architect of the new HMGs. In the speech, Shapiro discusses a hypothetical merger in which the merged firm becomes the “industry price leader” and its “two rivals will likely follow price increases that it initiates.”⁷ He goes on to say: “This pattern of behavior does not involve any agreement that the merged firm will punish the other two firms if they fail to follow; but all three firms know that the merged firm will likely rescind its price increases in that event.”⁸ What makes it individually rational to follow the price increase is that, as Shapiro says, failure to do so will result in the merged firm lowering its price. In other words, a firm can match the price increase and expect to earn higher profit indefinitely or, alternatively, it cannot match it and receive higher current demand and profit (by pricing below the merged firm) and lower future profits (as the merged firm rescinds its price increase). This trade-off is exactly what underlies the stability of collusion: failure to comply with a supracompetitive outcome results in a lower future profit stream.

Shapiro’s argument for the efficacy of PAC relies upon firms’ prices being easily observed (so that failure to match a price rise is detected) and, in response to not following a price increase, the price leader lowers its future price (so that failure to match a price rise is punished). While one might retort that rescinding a price increase is hardly worthy of the term “punishment,” this expression is merely short-hand for a lower future profit stream and need not imply anything harsh—like a price war—though it is often given that connotation.⁹

Now, does all this really make a difference when it comes to analyzing a merger for coordinated effects? I think it does because, as stated, the HMGs suggest—and have been interpreted to mean—that an analysis of the propensity of a merger to induce PAC does not involve the relevant factors identified by the theory of collusion. If the capabilities to detect and punish are irrelevant for producing PAC, then the likelihood of PAC is not tied to whether market conditions are conducive to detection and punishment. To the con-

⁷ Carl Shapiro, Deputy Ass’t Att’y Gen., Antitrust Div., U.S. Dep’t of Justice, Update from the Antitrust Division, Remarks as Prepared for the ABA Section of Antitrust Law Forum 27 (Nov. 18, 2010), available at <http://www.justice.gov/atr/public/speeches/264295.pdf>.

⁸ *Id.* at 27.

⁹ In fact, the punishment deployed by many cartels is not a harsh price war but rather a milder transfer of sales among firms. See Joseph E. Harrington, Jr., *How Do Cartels Operate?*, 2 FOUNDATIONS AND TRENDS IN MICROECONOMICS 1 (2006) (providing examples). However, as shown in Harrington and Skrzypacz, the threat sustaining the implementation of those transfers may have the harshness of a return to competitive prices. Joseph E. Harrington, Jr. & Andrzej Skrzypacz, *Private Monitoring and Communication in Cartels: Explaining Recent Collusive Practices*, 101 AM. ECON. REV. 2425 (2011).

trary, the following two scenarios show that the usual market analysis regarding coordinated effects is just as relevant when they are generated by PAC.

For scenario #1, consider a market in which the merged firm may act as a price leader with regard to list price. Suppose firms can offer customer-specific discounts off the list price so that the list price need not be the transaction price. As a result of the merger, is this market prone to PAC? The answer depends on how easily a firm's discounts are observed by its competitors. If they are easily observed, then perhaps PAC could arise in the following form: the merged firm takes the lead with regard to raising the list price, all other firms follow, and no firms veer from selling at the list price. In contrast, if discounts are not easily observed, then price leadership will probably not work and a merger is unlikely to produce PAC in this form.

This scenario illustrates that a market analysis is required to assess whether there is adequate price transparency among firms to sustain PAC, exactly the type of analysis that is done with standard forms of coordinated effects. The susceptibility of the market for PAC depends on whether firms can determine that rivals have actually selected the supracompetitive outcome; in other words, *detection* is relevant to an assessment of possible coordinated effects generated by PAC.

A recent case for which the preceding discussion is applicable is the 2012 proposed merger of International Paper and Temple-Inland. In its Competitive Impact Statement, the DOJ stated:

The proposed merger would also likely cause International Paper to engage in parallel accommodating conduct. . . . Due to its additional containerboard volume obtained as a result of the merger, International Paper would benefit more from a price increase after the proposed merger. Thus, if a large rival attempted to raise the market price by reducing output, International Paper would likely accommodate its rival's actions by reducing or not increasing its own output. The rival would thus be likely to increase the market price by reducing output after International Paper and Temple-Inland complete the proposed merger.¹⁰

But how exactly would such an arrangement be enforced? Presumably these companies are negotiating prices with at least their largest customers. Would International Paper observe its rivals' negotiated prices so it could subsequently "accommodate"? If the accommodating response was to limit supply, how would that supply response be observed? These questions are of the sort raised when conducting a standard analysis of coordinated effects, and answering them requires drawing on the theory of collusion.

¹⁰ Competitive Impact Statement at 7–8, *United States v. Int'l Paper Co. & Temple-Inland, Inc.*, No. 1:12-0027 (D.D.C. Feb. 10, 2012).

For scenario #2, consider a market in which the merged firm may act as a price leader with regard to (transaction) price. As a result of the merger, is this market prone to PAC? Let us suppose the merged firm raised its price and the other firms did not follow. Further suppose that with the lower price they are charging relative to the merged firm, the merged firm's rivals aggressively seek to lock customers into long-term contracts. Of course, the merged firm will rescind its price increase when it discovers that the other firms did not follow, but the impact on the other firms' future profit streams will be minimal if they have already tied up future demand with long-term contracts. In this scenario, whether PAC is likely to be effective depends on how quickly the price leader can rescind its price increase relative to the rate at which its rivals can sign contracts with customers. The likelihood that this market exhibits PAC depends on the ability of the merged firm to inflict lower future profit upon those firms that do not comply with the supracompetitive outcome; in other words, *punishment* is relevant to an assessment of coordinated effects, including PAC.

In sum, as is the case for other theories of supracompetitive prices, evaluation of the potential for coordinated effects from PAC will need to consider detection and punishment. This evaluation requires assessing how the merger influences the ability of firms to monitor prices and their capacity to effectively punish deviations from supracompetitive prices.

II. COORDINATION ON A SUPRACOMPETITIVE OUTCOME

The HMGs distinguish three types of coordinated interaction: (1) firms undertake an "explicit negotiation of a common understanding," (2) firms achieve "a similar common understanding that is not explicitly negotiated," and (3) firm behavior is not predicated on "an agreed-upon market outcome but nevertheless emboldens price increases" (parallel accommodating conduct).¹¹ In contrast to the first two sources of coordinated effects, PAC is "not pursuant to a prior understanding."¹² In other words, PAC is distinct in how firms solve the coordination challenge associated with achieving a supracompetitive outcome. This distinction is real but subtle.

This Part begins with a discussion of how the mutual understanding necessary for sustained supracompetitive prices can be achieved. Next, the coordination mechanism in PAC and its operational implications for merger analysis are examined. Finally, I conclude with some additional thoughts on evaluating how a merger might affect the ease with which firms solve the coordination challenge.

¹¹ 2010 Merger Guidelines, *supra* note 1, at 24, 25.

¹² *Id.* at 24.

To begin, my examination of the coordination challenge will focus on the practical concept of mutual understanding rather than the legal concept of agreement. As it is prosecuted under Section 1 of the Sherman Act, unlawful collusion involves an agreement among firms as reflected in “a conscious commitment to a common scheme designed to achieve an unlawful objective”¹³ or a “unity of purpose or a common design and understanding, or a meeting of minds.”¹⁴ A narrow interpretation of these judicial statements is that collusion involves firms forsaking conflicting goals—such as increasing market share—for the pursuit of common goals—such as charging a high price. While collusion can take such an unadulterated form, it rarely does, and, in fact, collusion can involve continued conflict among firms. Collusive behavior can be as modest as a coordinated effort to maintain price when costs decrease, while continuing to compete aggressively in non-price dimensions such as advertising. What collusion *does* require is that firms have *some mutual understanding* regarding the pursuit of some common plan to suppress competition. Coordinated effects do not then require firms to have an agreement in the narrow sense but do require some mutual understanding which supports supracompetitive prices.

In particular, to produce coordinated effects, firms must have a mutual understanding that they are seeking to produce and maintain a supracompetitive outcome (that is, that they are trying to collude) and as regards the mechanism by which they are colluding (for example, price leadership and matching). Firm A is not going to price above the competitive level unless it believes that firm B is likely to do so, and firm B is not going to do so unless it believes it is likely that firm A will do so. Thus, there needs to be some mutual understanding among firms that they will set supracompetitive prices and that these prices will persist because of the presence of a self-enforcing mechanism to sustain them.

Whether firms can achieve the necessary level of mutual understanding depends on their initial level of mutual understanding, the devices available to them to enhance mutual understanding, and their incentives to utilize those devices.¹⁵ There are a variety of “mutual understanding mechanisms” (MUMs) that firms have historically used to acquire the common set of beliefs

¹³ *Monsanto Co. v. Spray-Rite Serv. Corp.*, 465 U.S. 752, 764 (1984).

¹⁴ *Am. Tobacco Co. v. United States*, 328 U.S. 781, 810 (1946).

¹⁵ What the law declares to be coordinated effects in violation of Section 1 of the Sherman Act is determined by the devices used by firms to achieve mutual understanding. Those legal issues will not detain us here. For insightful examinations of those issues, see Louis Kaplow, *On the Meaning of Horizontal Agreements in Competition Law*, 99 CALIF. L. REV. 683 (2011); William E. Kovacic, *The Identification and Proof of Horizontal Agreements Under the Antitrust Laws*, 38 ANTITRUST BULL. 5 (1993); Gregory J. Werden, *Economic Evidence on the Existence of Collusion: Reconciling Antitrust Law with Oligopoly Theory*, 71 ANTITRUST L.J. 719 (2004).

needed to produce a supracompetitive outcome.¹⁶ The most efficacious—and the most egregious in the light of the law—is direct verbal communication that ultimately leads to an exchange of assurances that firms will raise and maintain prices above the competitive level (or engage in some other conduct that serves to restrain competition).

Another MUM is a publicly announced strategy which, if adopted by all firms, would produce a supracompetitive outcome.¹⁷ For example, in the one-way truck rental market, the CEO of U-Haul announced during an earnings conference call that U-Haul was “very, very much trying to function [as] a price leader “ and that it did not make sense for Budget to “price off of us but down.”¹⁸ U-Haul’s CEO was, in effect, announcing its strategy as price leader and suggesting that Budget’s strategy should be to match U-Haul’s prices.

Yet another MUM is for a firm to take an action that would be optimal only if it expected rivals to subsequently collude in price. I argue that this MUM was used to gain a mutual understanding that enabled collusive pricing in the turbine generator market.¹⁹ General Electric adopted a new pricing policy whereby it no longer negotiated price with customers and instead issued a price book. That policy would be distinctly unprofitable if GE expected to compete with Westinghouse (as Westinghouse could then simply undercut the price book and take a lot of GE’s business) but would be profitable if GE expected the two firms to engage in collusive pricing. In fact, Westinghouse responded by adopting the same policy, which then served to create the common belief that the two firms would not compete in price. Over the next twelve years, GE acted as a price leader and Westinghouse routinely matched GE’s price book.²⁰

¹⁶ I use the term “mutual understanding mechanism” to refer to any device that produces the commonly held belief among firms that they will collude. The rudiments of a critical examination of how the law treats these mechanisms can be found in Joseph E. Harrington, Jr., *Game-Theoretic Ruminations on Section 1 of the Sherman Act*, Bayard Wickliffe Heath Memorial Lecture, Univ. of Florida Levin College of Law (Mar. 30, 2012), available at http://www.econ2.jhu.edu/People/Harrington/Harrington_UFL%20Heath.pdf.

¹⁷ Interestingly, experimental work finds that one-way communication can be more effective than two-way communication in producing coordinated behavior in some settings. See Russell W. Cooper et al., *Communication in the Battle of the Sexes Game: Some Experimental Results*, 20 RAND J. ECON. 568 (1989); Russell W. Cooper et al., *Communication in Coordination Games*, 107 Q.J. ECON. 739 (1992).

¹⁸ Complaint at 5–6, U-Haul Int’l Inc., FTC Docket No. C-4294 (July 14, 2010). Other notable cases in which this type of MUM was used include *Interstate Circuit, Inc. v. United States*, 306 U.S. 208 (1939), and *Toys “R” Us v. FTC*, 221 F.3d 928 (7th Cir. 2000).

¹⁹ Joseph E. Harrington, Jr., *Posted Pricing as a Plus Factor*, 7 J. COMPETITION L. & ECON. 1 (2011).

²⁰ Some other cases which I believe involve this same type of MUM—whereby a firm takes an action that would be optimal only if it expected rival firms to subsequently collude in price—include *C-O-Two Fire Equipment Co. v. United States*, 197 F.2d 489 (9th Cir. 1952); *United*

The MUMs mentioned thus far produce an understanding prior to firms choosing price. For example, firms verbally communicate their intention to collude, or one firm unilaterally announces a collusive strategy. Then, upon achieving the necessary mutual understanding, firms set supracompetitive prices. With PAC, the HMGs raise the possibility that coordinated effects can occur even when “not pursuant to a prior understanding.”²¹ How is this consistent with my claim that coordinated effects require some level of mutual understanding? While there may be no prior mutual understanding (or, more precisely, there is insufficient mutual understanding to produce coordinated effects), the mere act of raising price—if rivals match—could simultaneously generate the mutual understanding that is needed for coordinated effects. This form of coordination can be distinguished from coordination achieved through public statements, such as those by U-Haul’s CEO, which establish a prior understanding of the common plan to be used to achieve supracompetitive prices. This argument can be traced back to Richard Posner, who first stated it as a scholar and then later as a judge in the High Fructose Corn Syrup case:

[O]ne seller communicates his “offer” by restricting output, and the offer is “accepted” by the actions of his rivals in restricting their outputs as well. It may therefore be appropriate in some cases to instruct a jury to find an agreement to fix prices if it is satisfied that there was a tacit meeting of the minds of the defendants on maintaining a noncompetitive pricing policy.²²

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.²³

In other words, firms may attain the necessary mutual understanding by engaging in conduct, such as price leadership and matching, which is capable of producing and sustaining a supracompetitive outcome.

Through PAC, the HMGs are focusing on the possibility that coordinated effects can emerge with little prior mutual understanding among firms. However, I would be hesitant to claim there could be none. For firm A to take the initiative and raise its price, it must believe it is sufficiently likely that firm B will properly interpret the increase as an invitation to collude rather than attribute it to a firm-specific cost or demand shock. This means that firm A recognizes that firm B is likely to share the belief that they ought to try and collude; there is then some prior mutual understanding before firm A takes the daring move of raising price. If instead firm A leads by announcing a future price increase, then there is far less risk to firm A because, if its rivals do not match

States v. Container Corp. of Am., 393 U.S. 333 (1969); and *Wall Products Co. v. National Gypsum Co.*, 357 F.Supp. 832 (N.D. Cal. 1971).

²¹ 2010 Merger Guidelines, *supra* note 1, at 24.

²² RICHARD A. POSNER, *ANTITRUST LAW* 94–95 (2d ed. 2001).

²³ *In re High Fructose Corn Syrup Antitrust Litig.*, 295 F.3d 652, 654 (7th Cir. 2002).

with a similar announcement, the announcement could be retracted before firm A actually raised its price and lost sales to its rivals. In that case, even less mutual understanding is required in order for a firm to take the lead with the intent of initiating collusion.²⁴ Still, some common belief as to the collusive mechanism—price leadership and matching, for example—would seem to be necessary, although there might be no common belief as to who will lead or at what price. The implications of that low level of mutual understanding for achieving collusive outcomes will be discussed more fully below.

A. IMPLICATIONS OF PAC FOR MERGER POLICY

Having explained how PAC solves the coordination challenge to support a collusive outcome, I now discuss how PAC affects the evaluation of a merger's potential for producing coordinated effects. While this issue is not explored in the HMGs, let me put forth an argument rooted in PAC taking the form of one firm leading on price and its rivals matching that price—that is, price leadership and matching. A market for which price is very transparent and a firm can react to a rival's price quickly is a market that is especially ripe for coordinated effects because implementation conditions are easy to satisfy and, if price leadership and matching is likely to be embedded in firms' prior beliefs, then coordination may not to be too difficult. Thus, a market for which price leadership and matching can work is a market for which one should be especially concerned with PAC-generated coordinated effects.

This perspective has implications for merger policy because a merger could be approved subject to behavioral restraints that make price leadership and matching more difficult. For example, concerns about a policy of no discounting, such as was used by General Electric and Westinghouse to collude in the turbine generator market, could be addressed through behavioral restraints. Or, if one was concerned that price leadership and matching, buttressed by a policy of no discounting, might emerge from a merger—such as the one between International Paper and Temple-Inland—then the behavioral restriction that firms could not announce policies of no discounting could be imposed.²⁵

²⁴ The use of advance price announcements to produce coordinated effects has been observed, for example, in steel, airlines, and diesel and petrol fuel in Taiwan. See F.M. SCHERER, *INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE* 178–80 (2d ed. 1980) (steel); Severin Borenstein, *Rapid Price Communication and Coordination: The Airline Tariff Publishing Case (1994)*, in *THE ANTITRUST REVOLUTION* 233 (John E. Kwoka, Jr. & Lawrence J. White eds., 4th ed. 2004) (airlines); Decision on Chinese Petroleum Corp. & Formosa Petrochemical Corp., Fair Trade Comm'n (Taiwan, Oct. 14, 2004) (diesel and petrol fuel in Taiwan), available at <http://www.apeccp.org.tw/doc/Taipei/Case/D094q108.htm>.

²⁵ The implications of behavioral restraints related to MUMs go beyond PAC-generated coordinated effects. For example, the consent decree in *ATPCO*, which does not appear to have involved PAC, imposed behavioral restraints that made coordination more difficult. In particular, the consent decree prohibited airlines, for a span of ten years, from announcing future fare changes for fares with limited availability (widely publicized fare changes could be announced in

B. RECENT RESEARCH ON MUTUAL UNDERSTANDING MECHANISMS

Motivated by the concept of PAC, the preceding discussion emphasized the importance of considering how a merger affects coordination conditions, such as: (1) To what extent does a merger increase the mutual understanding of firms? (2) How does the merger affect the amount of mutual understanding necessary to produce coordinated effects? (3) Are there devices for enhancing mutual understanding? (4) What are the incentives for firms to produce the required mutual understanding?

Experimental evidence has robustly shown that coordinated effects can emerge in a laboratory market setting without any communication among subjects. Such outcomes are common when there are two firms (that is, subjects), very rare with three firms, and non-existent with four or more firms.²⁶ In these experiments, implementation conditions were satisfied so that, in principle, firms could collude—that is, there were self-enforcing mechanisms available that could be used to support supracompetitive outcomes if firms could achieve the requisite mutual understanding without any communication among subjects. In sum, the experimental evidence supports the hypothesis that achieving mutual understanding regarding collusion without any communication among subjects is far more difficult with three or more firms than with two firms.

This body of research suggests that a merger resulting in two firms encompassing most of the market could be at significant risk of coordinated effects. Compare what happens when firm A raises price (in the spirit of PAC) with two rivals versus just one. With two rivals, firm B has to properly interpret firm A's price increase as an invitation to collude *and* it must believe that firm C has the same interpretation. In addition, firm C must have an analogous belief and interpretation. At a minimum, firm A is probably not going to raise price unless it believes: (1) firms B and C will interpret it as an invitation to collude; (2) firm B believes firm C will interpret it as an invitation; and (3) firm C believes firm B will interpret it as an invitation. In comparison,

advance). See Borenstein, *supra* note 24 (describing the *ATPCO* consent decree). If there was a concern that a merger might result in coordinated effects via signaling with advance price announcements, then behavioral restrictions like those in *ATPCO* could be considered. The more general point is that mutual understanding is essential to firms producing coordinated effects, and therefore, competition authorities ought to consider behavioral remedies to make achieving such understanding more difficult. Nonetheless, in making this suggestion, I do not want to understate the difficulty in assessing *ex ante* the manner in which firms might coordinate. It is one thing to conclude that a merger could produce collusion and quite another to determine how firms would collude in the postmerger environment.

²⁶ See, e.g., Christoph Engel, *How Much Collusion? A Meta-Analysis of Oligopoly Experiments*, 3 J. COMPETITION L. & ECON. 491 (2007); Steffen Huck, Hans-Theo Normann & Jörg Oechssler, *Two Are Few and Four Are Many: Number Effects in Experimental Oligopolies*, 53 J. ECON. BEHAV. & ORG. 435 (2004).

with only one rival, it may be enough that firm A believes that firm B will interpret the price increase as an invitation to collude. Thus, a merger that reduces the number of strategic-minded firms to two (there could still be a competitive fringe) could substantially reduce the amount of mutual understanding needed to generate coordinated effects.

Consistent with this discussion, Shapiro mentioned two cases in which coordinated effects through PAC were of particular concern to the DOJ and were challenged: the proposed mergers of WorldCom and Sprint, and of Alcan and Pechiney.²⁷ Both of these mergers would have produced a market structure with two large firms and a collection of small firms. As the pre-merger market structure was already highly concentrated, the effect of the merger on implementation conditions may not have been large. However, its effect on coordination conditions could have been significant. For example, consider supracompetitive pricing that takes the form of keeping price constant in response to a reduction in cost across all suppliers.²⁸ We can compare the incentives for WorldCom to take a price leadership role by holding the line on price when there is no merger—so WorldCom has two large rivals in AT&T and Sprint—to when there is a merger—so there is just one large rival (Sprint is now part of WorldCom). The potential cost from keeping price fixed is the loss in demand if one's rivals lower price. This potential demand loss is smaller when rival capacity is smaller. Thus, the downside risk from keeping price fixed is smaller after the merger, when AT&T has the only rival capacity, than when the rival capacity encompasses the capacities of both AT&T and Sprint. The reduced downside risk makes WorldCom more likely to act as a price leader for keeping price fixed following a common reduction in cost. Furthermore, a collusive outcome with supracompetitive pricing—in which other suppliers also keep price fixed—is more likely to be realized when WorldCom only needs AT&T to go along than when it needs both AT&T and Sprint to do so. A merger that reduces the number of firms from three to two could then have a potentially significant impact on the ability to enact PAC through its effect on the costs and benefits of being a price leader.²⁹

²⁷ Shapiro, *supra* note 7, at 28, 29.

²⁸ Supracompetitive pricing means pricing above a competitive benchmark, and this can entail raising price above the competitive level when the competitive price is unchanged, holding price fixed when the competitive price has fallen, or lowering price by an amount less than a decline in the competitive price.

²⁹ A recent analysis of European Commission merger cases concluded that the EC is concerned about collective dominance (that is, coordinated effects) only when the merger would result in two large firms with reasonably symmetric market shares. Stephen Davies, Matthew Olczak & Heather Coles, *Tacit Collusion, Firm Asymmetries and Numbers: Evidence from EC Merger Cases*, 29 INT'L J. INDUS. ORG. 221 (2011).

If we are to evaluate a merger for coordinated effects through its impact on mutual understanding among firms, it is essential that we understand how market conditions impact mutual understanding and how mutual understanding impacts firm behavior. This is a research avenue that I have recently pursued. The objective in Harrington (2012b) is to develop a theory of tacit collusion involving informational assumptions that could plausibly be satisfied without express communication of the variety that would be a Section 1 violation.³⁰ It is postulated that two essential elements of tacit collusion are: (1) a plausible amount of mutual understanding among firms; and (2) a transparent mechanism for coordinating on a collusive outcome. The coordination mechanism considered is price leadership and matching and thus is in the spirit of PAC. In terms of mutual understanding, it is assumed to be common knowledge that each firm acts to maximize the expected present value of its profit stream, that each firm will at least match price increases (up to some maximum price) and that a failure to match will result in reversion to the competitive outcome. However, the leadership protocol is not common knowledge: Which firm will lead? What price will it set? Is another firm expected to lead the next round of price hikes? In other words, there is a mutual understanding among firms that a price increase will be matched, but there is no understanding about who will enact those price increases. I show that the incomplete mutual understanding constrains price in that the highest price that firms are able to produce and sustain is strictly less than what could be attained with complete mutual understanding.³¹ Furthermore, if reasonable assumptions are made on how each firm learns about other firms' strategies, then it follows that supracompetitive prices are almost sure to emerge in spite of the incomplete mutual understanding; it is sufficient for supracompetitive prices that firms know that price increases will be at least matched.

Related to this line of analysis is recent work that seeks to quantify how a merger may impact the incentives of a firm to take the lead on price. Moresi et al. develop an index—referred to as the Coordinated Price Pressure Index (CPPI)—which is the largest price increase that a firm would be willing to initiate and its rival would be willing to follow.³² The change in the CPPI from

³⁰ Joseph E. Harrington, Jr., *Exploring the Boundaries of Unlawful Collusion: Price Coordination when Firms Lack Full Mutual Understanding* (The Wharton School, Univ. of Pa., Oct. 2012) [hereinafter Harrington (2012b)], available at <https://bepp.wharton.upenn.edu/profile/21516/research>.

³¹ *Id.* The standard theory of collusion is based on the game-theoretic concept of equilibrium, which imposes the condition that each firm's strategy is common knowledge among firms. In contrast, it is only assumed in Harrington (2012b) that it is common knowledge that a firm's strategy is a member of some collection of strategies.

³² See Serge X. Moresi et al., Gauging Parallel Accommodating Conduct Concerns with the CPPI (Sept. 8, 2011); see also Yuanzhu Lu & Julian Wright, *Tacit Collusion with Price-Matching Punishments*, 28 INT'L J. INDUS. ORG. 298 (2010) (providing the collusive theory that underlies the CPPI).

a prospective merger is designed to capture the change in the prospects for PAC. Though the CPPI is based upon the concept of PAC—which, as stated in the HMGs, presumes there is no prior understanding—the CPPI is calculated assuming the price leader expects the other firm will certainly match its price. It thus presumes some prior mutual understanding among firms.³³

Additional study of the incentives for a firm to take the lead in initiating collusion could prove valuable. Furthermore, some of this analysis can draw heavily upon the existing theory of collusion because there is a duality between the conditions for a firm to optimally initiate collusion and the conditions for a firm to optimally sustain collusion. For example, consider the role of firm demand elasticity. When firm demand is more elastic, implementation conditions are more stringent because the gain from undercutting the collusive price is greater (as more demand is gained) and thus the incentive to sustain collusion is weaker.³⁴ Similarly, more elastic demand means coordination conditions are more stringent since the loss to a firm from acting as a price leader and raising price is greater (as more demand is lost) and thus the incentive to initiate collusion is weaker.

Let me note one other situation for which the evaluation of a merger for coordinated effects is usefully viewed through the lens of how the merger can enhance mutual understanding regarding collusion. In the HMGs, a *maverick* is “a firm that plays a disruptive role in the market to the benefit of consumers,”³⁵ and one example given is of “a firm that has often resisted otherwise prevailing industry norms to cooperate on price setting or other terms of competition.”³⁶ The elimination of a maverick through a merger is well-recognized as a basis for possible coordinated effects. Even if the premerger market structure satisfies the implementation conditions for sustaining supracompetitive

³³ As noted, some prior mutual understanding appears necessary for PAC.

The specific presumption in Moresi et al. is that failure to follow a price increase is believed to induce the price leader to rescind the most recent price increase, rather than, say, rescind all recent price increases or return to the competitive outcome or price aggressively for a period or two and try the price increase again. Moresi et al., *supra* note 32. It is not immediately clear to me which beliefs are more compelling. In Harrington (2012b), I argue there is a salience to the competitive outcome on the grounds that, in response to some departure from coordinated behavior, firms will retreat from the reasoning upon which tacitly collusive behavior—including PAC—rests, and revert to what preceded it, which is competition. Harrington (2012b), *supra* note 30. That is, given the lack of mutual understanding as exemplified by a failure to follow a price increase, firms return to the most recent solution for which there was mutual understanding, which is presumed to be the competitive solution preceding this collusive episode. The argument is far from airtight, but the point here is less to argue that firms should hold a particular set of beliefs and more to recognize that no single set of beliefs is so natural as to rule out alternative belief assumptions, and that any assumption should be explicitly recognized and justified.

³⁴ More elastic firm demand may also mean a more severe punishment—which makes the implementation condition less stringent—and that can be a countervailing force.

³⁵ 2010 Merger Guidelines, *supra* note 1, at 3.

³⁶ *Id.* at 4.

prices, the presence of a maverick may prevent satisfaction of the coordination conditions. In particular, if all firms but the maverick understand the appeal of PAC, then acquisition of the maverick could produce the necessary mutual understanding to collude. Indeed, the intent to acquire the maverick may produce that mutual understanding if the acquisition of the maverick is profitable *only* if the remaining firms were to collude in price. In other words, the act of acquiring the maverick may not only eliminate an impediment to collusion but also induce the remaining firms to have the expectation that they will coordinate their pricing.

III. COORDINATED EFFECTS WITHOUT DETECTION AND PUNISHMENT

Supracompetitive prices are defined as prices in excess of some competitive benchmark. The competitive benchmark used in this article is a static (Nash) equilibrium, which is a price for each firm that maximizes its current profit given the other firms' prices.³⁷ Static equilibrium prices are an appealing competitive benchmark because they represent the prices that would emerge in many circumstances without any coordination among firms. The preceding analysis has made the standard argument that if a merger produces supracompetitive prices, then detection and punishment are necessary to sustain those prices over time. Given that PAC has firms pricing at supracompetitive levels, it necessarily involves monitoring compliance and punishing evidence of noncompliance.

While sustaining supracompetitive prices requires detection and punishment, this does not mean that all coordinated effects require detection and punishment. When a market has multiple static equilibria, coordinated effects can arise when firms agree to move from a static equilibrium with low prices to a static equilibrium with high prices. For example, consider the standard Cournot setting in which firms choose quantities, price is set to equate supply and demand, and there are both variable and fixed costs (the latter are avoided by exiting the market). This setting can have multiple static equilibria.³⁸ In particular, it could be an equilibrium for each of n firms to choose quantity to maximize its profit (that is, the static equilibrium with n firms), but there could also be an equilibrium in which each of $n - 1$ firms chooses quantity to maximize its profit and the n th firm exits the market (that is, the static equilibrium with $n - 1$ firms).³⁹

³⁷ Nash equilibrium is a standard competitive benchmark used by economists.

³⁸ The analysis is from Joseph E. Harrington Jr., *Collusion in Multiproduct Oligopoly Games Under a Finite Horizon*, 28 INT'L ECON. REV. 1 (1987).

³⁹ The intuition for multiplicity is as follows. When a firm is active and expects $n - 1$ other firms to be active, it supplies less than when it expects only $n - 2$ other firms to be active; fewer competitors means more residual demand for a firm so it produces more. Thus, if each of $n - 1$

To consider coordinated effects in this setting, suppose there are initially four firms and firms 1 and 2 merge. The merger could result in a postmerger static equilibrium having the merged firm 1/2 and firms 3 and 4 all being active, or it could have firm 1/2 and firm 3 coordinate to produce at a high enough rate to rationalize firm 4's exit. The merger would then have unilateral effects if there was no subsequent exit—the three remaining firms produce according to a triopoly equilibrium—but it would have coordinated effects if firms 1/2 and 3 agree to produce at a high rate—consistent with a duopoly equilibrium—and thereby induce firm 4 to leave the market.

Another source of multiple static equilibria is with firms' decisions regarding how many products to offer and where to locate them in product space (that is, with what traits to endow the products).⁴⁰ Consider, for example, a setting with three firms and four quality levels—high (H), moderately high (MH), moderately low (ML), and low (L). Quality is a choice variable for a firm and higher quality incurs higher cost but sells for a higher price. Assume market demand and a product's fixed cost are such that the market can support only one product at each quality level; assume that is so both with and without the merger. In the premerger environment, firm 1 offers products of qualities H and ML, firm 2 offers a product with quality MH, and firm 3 offers one with quality L. Now consider a merger between firms 2 and 3. It is not difficult to construct an example in which there are multiple equilibria in the postmerger environment. There could be an equilibrium in which firm 1 continues to offer products H and ML and firm 2/3 offers products MH and L (that is, firms maintain their premerger products). But, there could be another equilibrium in which firm 1 upgrades a product's quality from ML to MH, and firm 2/3 reduces the quality of a product from MH to ML. Now, compared to the postmerger equilibrium in which products are not relocated, firm 1 has more market power with respect to consumers who are more willing to pay for higher quality goods (it has a monopoly over products of qualities H and MH) and firm 2/3 has more market power with respect to consumers who are less willing to pay for higher quality goods (it has a monopoly over products of qualities ML and L). By segmenting the market, firms can charge higher prices. If firms 1 and 2/3 agree to relocate their products in order to achieve that market segmentation, then this is a coordinated effect.

firms expects the n th firm to exit the market then each could end up supplying at a high enough rate to rationalize that exit, and the n th firm would not have residual demand sufficient to earn the variable profit it needs to cover its fixed cost. If instead each of $n - 1$ firms expects the n th firm to remain in the market, then each will produce at a lower rate, and that rate could be low enough to rationalize the n th firm remaining in the market.

⁴⁰ For a model in which firms can be multiproduct, and in which multiple equilibria can arise with respect to firms' product offerings, see Avner Shaked & John Sutton, *Multiproduct Firms and Market Structure*, 21 RAND J. ECON. 45 (1990).

The situations just described encompass two critical features that have the potential to produce coordinated effects. First, competition (that is, static equilibrium) can result in different outcomes. Second, a merger may allow firms to coordinate on selecting the outcome that is more profitable for firms but more harmful for consumers. An evaluation of a proposed merger for this type of coordinated effect would not draw on the traditional theory of collusion—with its focus on whether market conditions are conducive to detection and punishment and how a merger would impact those conditions—but would instead focus on how the merger would make a coordinated move to a different equilibrium more likely.

To summarize, there are two types of coordinated effects that can arise from a merger. First, a merger may allow firms to charge supracompetitive prices (that is, prices in excess of static equilibrium prices) by easing implementation conditions or coordination conditions. Second, a merger may allow firms to coordinate a move to a different static equilibrium with higher prices (that is, there are multiple static equilibria in the postmerger environment, and the merger makes it more likely that one with higher prices is achieved). Though these two types of coordinated effects are distinct, they are similar in that both rely on the presence of multiple equilibria. With the second type, there are multiple static equilibria. With the first type, the multiplicity is due to the existence of dynamic (collusive) equilibria along with a static (competitive) equilibrium. With both types, a merger affects the set of possible equilibria and the selection of an equilibrium from that set. It affects the set of static equilibria and, by influencing implementation conditions, the set of dynamic equilibria that are capable of sustaining supracompetitive prices. A merger also affects the selection of an equilibrium by making it easier for firms to coordinate; whether that involves firms coordinating on a detection-punishment scheme to support supracompetitive prices or on a move to a different static equilibrium with higher prices.

IV. CONCLUSION

For firms to achieve and sustain a supracompetitive outcome, they must both coordinate on that outcome, and implement it in the sense of structuring incentives so that each firm finds it optimal to abide by that outcome. The theory of collusion identifies detection and punishment as the two linchpins to successful implementation, and an extensive body of theoretical and empirical work has identified market conditions that are conducive to effective detection and punishment. Contrary to what is suggested in the 2010 Merger Guidelines, “detection and punishment” are as relevant for parallel accommodating conduct as they are for the traditional mechanisms by which coordinated effects are produced. Where the 2010 Merger Guidelines are valid and constructive is in emphasizing that coordinated effects could emerge even where

mutual understanding is far from the level that is associated with the concept of an agreement among firms. That is a substantive inclusion for practitioners engaging in merger analysis. It is also a useful observation for scholars because it highlights the importance of research to better understand how the level of mutual understanding affects the emergence and extent of coordinated effects.