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Chapter 57

COORDINATED EFFECTS

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The analysis of potential coordinated effects of mergers has moved from an unvarnished reliance on the "structural" presumption that simply a reduction in the number of competitors may likely facilitate collusion to a more sophisticated assessment of the likelihood that a transaction will facilitate or enhance coordination and harm consumers. While the reduction in the number of firms and the resulting increase in concentration is at best a starting point for such assessment, other considerations play an equal or possibly even more important role in merger assessment now. The 1992 *Merger Guidelines* now ask whether the relevant market is plausibly conducive to coordination, and then whether the transaction will change market conditions in a way that relaxes the constraints on market participants in a way that would make coordination more likely, stable, or complete. Reviews of coordinated effects of several recent mergers by U.S. and European regulatory agencies illustrate this approach and its focus on potential mechanisms of coordination, the impact of the merger on such mechanisms, and the importance of pricing complexity when assessing coordinated effects.

1. Introduction

The 1992 *Merger Guidelines*[1] postulate two distinct possible anticompetitive effects of concern from a horizontal merger: coordinated effects and the unilateral effects.[2] The 1984 *Merger Guidelines*[3]—as well as the prior years of antitrust enforcement policy—were built around the notion that anticompetitive mergers are those that make collusion more likely.[4] This public policy stance reflected the "structural" presumption that a reduction in the number of firms active in the market tends to facilitate tacit and explicit coordination to the detriment of purchasers. The 1992 *Merger Guidelines* incorporate this concern and state that "[a] merger may diminish competition by enabling the firms selling in the relevant market more likely, more successfully, or more completely to engage in coordinated interaction

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1. U.S. DEP'T OF JUSTICE & FEDERAL TRADE COMM'N, HORIZONTAL MERGER GUIDELINES (1992) (with Apr. 8, 1997 revisions to Section 4 on efficiencies) [hereinafter 1992 MERGER GUIDELINES], *reprinted in* 4 Trade Reg. Rep. (CCH) ¶ 13,104.
2. *Id*. § 2. Any given transaction, of course, can trigger both concerns.
3. U.S. DEP'T OF JUSTICE, MERGER GUIDELINES, 49 Fed. Reg. 26,823 (1984), *reprinted in* 4 Trade Reg. Rep. (CCH) ¶ 13,103.
4. *Id*. § 3.

that harms consumers."[5] However, the 1992 *Merger Guidelines* moved from an unvarnished reliance on the structural presumption to a more sophisticated assessment of the likelihood that a transaction will facilitate or enhance coordination and harm consumers. While the reduction in the number of firms and the resulting increase in concentration is (at best) a starting point for such assessment, other considerations play an equal or possibly even more important role in merger assessment. In particular, the 1992 *Merger Guidelines* ask first whether the relevant market is plausibly conducive to coordination, and, if so, then whether the transaction will change market conditions in a way that relaxes the constraints on market participants in a way that would make coordination more likely, stable, or complete.

The analytics of coordinated merger effects overlaps with, and is informed by, the economics of tacit collusion.[6] This chapter briefly reviews the pertinent portions of the literature on tacit collusion and shows how its learning is (or can be applied) in the assessment of horizontal mergers. It then quickly reviews several merger cases that were scrutinized through the lens of coordinated interactions and comments on the types of evidence that may be probative to the outcome of the review process.

The chapter closes with the discussion of the public policy issues that are triggered by potential challenges to a merger through coordinated effects. In this respect, it is important to recognize that, as compared to unilateral effects analyses, there is much less analytical rigor and much more reliance on a broad range of qualitative indicators when gauging the likelihood of coordinated effects. This is perhaps not surprising (as will be explored below), but makes counseling more difficult and litigation more unpredictable. Indeed, one often hears that while a reduction in the number of firms in the "relevant market" from "5 to 4" likely will be "okay" with the reviewing agency, going from "4 to 3" can create a serious risk of a challenge. The fact of the matter is that, given the economic foundations on which the analysis of coordinated effects rests, the apparent caliper-like precision that characterizes the unilateral effects analyses simply cannot be expected when gauging the dangers of coordinated interactions postmerger. Indeed, it is unrealistic—and possibly unnecessary—to expect that the antitrust enforcement agency reviewing the merger prove, as a precondition for challenging a merger, that the transaction actually would cause the relevant firms to engage in coordinated interaction. Still, it is and should be necessary for the reviewing agency to spell out the mechanism of

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5. 1992 MERGER GUIDELINES, *supra* note 1, § 2.1. In the European Union, "coordinated effects" go under the rubric of "joint dominance." In the technical economic literature, "coordinated effects" overlap with "tacit collusion."

6. Although a transaction can also affect the likelihood of explicit collusion, this chapter focuses only on tacit coordination. Also, this chapter does not address the question whether "tacit collusion" falls under the rubric of "coordinated behavior" as that term is understood in the legal literature. Tacit collusion entails firms acting unilaterally in their own economic interest but in a manner that reflects their independent assessments of the consequences of their unilateral actions on the future course of competition in the relevant market. *See generally* Gregory J. Werden, *Economic Evidence on the Existence of Collusion: Reconciling Antitrust Law with Oligopoly Theory*, 71 ANTITRUST L.J. 719 (2004).

coordination and explain how the various elements of market conditions before and after the merger are related to the likelihood of coordinated effects through their impacts on terms of coordination, detection, and punishment. In particular, the reviewing agency may consider whether a small but significant nontransitory increase in price (SSNIP) could be sustained after the transaction, absent any direct communications from the remaining firms and absent any side payments among them. Recent advances in the empirical and theoretical literature on tacit collusion provide "new and improved" learning on which the analytics of coordinated interaction can be more soundly built.

2. Basic economics of coordinated effects

The basic economics underlying the structural presumption dates back to a 1964 paper by a University of Chicago economist, George Stigler.[7] The Stiglerian framework, properly interpreted, is a rich one that predicts that a lot more than simply the number of competitors affects the probability of coordination in a market.

2.1. Preliminaries

The 1992 *Merger Guidelines* identify two nonexclusive types of competitive concerns that a merger may engender. These are classified under the rubrics of unilateral effects and coordinated effects. Over the past several years, unilateral effects were in the forefront of both technical developments in antitrust economics and complex litigations.[8] At least some readers of this chapter have been exposed to sophisticated analyses by expert econometricians who, by means of complex models, were able to predict the price effects of a merger between brand A of a widget and brand X of a widget (or a gidget, which is a well-recognized substitute for a widget) to the second decimal point only to be confronted with calculations by the reviewing agency's econometricians showing these effects to be much larger.

From the standpoint of this chapter, it is important to note that there is a deep analytical link between unilateral effects and coordinated effects (as modeled by tacit collusion) and then to identify additional competitive considerations specific to coordinated effects.

Technically, unilateral effects reflect a move in the {price, quantity}-space from a (static) premerger equilibrium to a (static) postmerger equilibrium induced by the transaction. Thus, for example, if it is assumed that the industry participants play a quantity-setting (Cournot) game, then static effects can be described as a move from a premerger Cournot-Nash equilibrium to another Cournot-Nash equilibrium in which the number of independent firms is reduced by one.[9] And if firms play a price-setting (Bertrand) game, then the merger will induce a move from a premerger Bertrand-Nash equilibrium to a postmerger Bertrand-Nash equilibrium in which the

7. George J. Stigler, *A Theory of Oligopoly*, 72 J. POL. ECON. 44 (1964).
8. *See*, *e.g.*, Jonathan Baker & Carl Shapiro, Reinvigorating Horizontal Merger Enforcement (Oct. 2007), *available at* http://faculty.haas.berkeley.edu/shapiro/mergerpolicy.pdf.
9. For analysis of welfare effects in a Cournot model, see, e.g., Joseph Farrell & Carl Shapiro, *Horizontal Mergers: An Equilibrium Analysis*, 80 AM. ECON. REV. 107 (1990).

merged firm will reprice the products it now owns and may also withdraw some from the market. In both cases, the analyses can account for various efficiencies induced by the merger.

Economists have developed numerous merger simulation techniques that can be used to actually calculate the "static" postmerger equilibrium prices. The unfortunate conclusion, at least from the perspective of the merging parties, that emerges from these models is that a reduction in the number of independent firms or brands generally leads to higher prices. In order to defeat this "directional" forecast, the merging firms are impelled to develop compelling evidence that they will have no unilateral incentives to raise prices because of efficiencies, or no ability to raise prices because rivals will undercut them or expand output.

Thus, static (or unilateral) effects capture the impact of the transaction on the merging parties' postmerger incentives and ability unilaterally to elevate prices, restrict output, lower quality of their products, or modify other key dimensions of competition, holding unchanged market behavior of actual and potential rival firms. In other words, this partial equilibrium approach assumes that rivals maintain their premerger prices or outputs. In merger simulation, rivals' responses are factored in with the maintained assumption that the postmerger game will continue to be Cournot or Bertrand, as the case may be, consistent with the original modeling assumption.

Dynamic effects from a transaction, which are the subject of coordinated effects analysis, are linked to these static considerations in several ways. First, it is standard in economics to "model" tacit collusion as an equilibrium outcome of repeated interactions, where each interaction is just a play of the static Cournot or Bertrand game. Second, in such setting it is reasonable to ask whether the fact that firms interact repeatedly enables them to realize more profitable—that is, less competitive—outcomes relative to what could be achieved in a single (static) play of the game. Third, because a merger reduces the number of firms and also affects the profit functions of market participants and modifies the noncollusive Cournot (respectively, Bertrand)-Nash equilibrium, the merger also affects firms' incentives and ability to implement and sustain a collusive outcome. These effects can make tacit collusion more or less likely. As a result, the competitive assessment of coordinated effects can be quite complex but also less precise than encountered in unilateral effects analyses.[10] Moreover, as will be seen later, there is hardly unanimous agreement on which industry characteristics increase or decrease the likelihood of coordinated effects. For this reason, the wording of the 1992 *Merger Guidelines* clearly shows that the focus of the analysis is on the question whether the merger will make collusion more likely, more successful, or more complete without providing a precise metric that can used to gauge the likelihood of such impact.[11]

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10. *See* Carl Davidson & Raymond Deneckere, *Horizontal Mergers and Collusive Behavior*, 2 INT'L J. INDUS. ORG. 117 (1984) (showing how a merger can make tacit collusion more difficult in a differentiated goods industry).

11. *See* 1992 MERGER GUIDELINES, *supra* note 1, § 2.1.

2.2. The Stiglerian framework and the basic model of tacit collusion

Because the logic of coordinated effects is based on the economics of tacit collusion, it is most useful to start with a summary of Stigler's approach to the problem of collusion in oligopoly[12] and then show how that approach can be illuminated with a very simple mathematical model. Once this is explained it is a relatively simple matter to link these insights to the analysis of coordinated effects.[13] The coordinated effects section of the 1992 *Merger Guidelines* clearly reflects this Stiglerian framework.

Following Stigler's seminal paper, economists and national antitrust enforcement agencies worldwide have recognized that effective tacit coordination requires (1) that the potential coordinators can, by means of market signals (as opposed to explicit coordination and information exchange), reach an agreement on how and the extent to which competition can be suppressed; (2) that they can detect deviations from this putative agreement quickly and with a sufficient degree of precision; (3) that they can impose (or credibly threaten to impose) sufficiently effective punishments on the deviating firm(s) (at a cost to themselves) to dissuade the potential deviators from cheating in the first place; and (4) that the collusive outcome is not destabilized by outside economic forces, such as entrants, customers, noncolluding firms, or other external shocks.

Whereas these requirements can, in principle, be satisfied in a variety of theoretical scenarios, empirical evidence on the incidence of successful and persistent tacit coordination is actually quite scant.[14] Moreover, there is still no consensus on how various industry features—including those identified in the 1992 *Merger Guidelines*—affect these four requirements. Nevertheless, the main insights from the Stiglerian approach are very powerful because they impose a reasonably rigorous analytical structure on the analysis of coordinated effects. The next section lays out this structure in a context of a very simple model.

Basic model. Consider a rudimentary industry in which there are $N > 2$ identical firms, each producing an identical product at the same marginal cost c. If these firms do not collude, each will earn a profit of π^{comp}, which depends on the number of active firms, marginal costs, the parameters of demand for the product, and the nature of (static) competitive interactions.[15] If these firms could collude, each firm would (by assumption) earn a level of profit equal to $(1/N)\cdot\pi^{mon} > \pi^{comp}$, where π^{mon} is the level of profit that a (hypothetical) monopolist would earn in this market environment. With these assumptions, industry participants have incentives to collude and raise price (restrict output) to monopoly level. Even if these firms have an incentive as a group to collude, however, they may not be able to do so.

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12. Stigler, *supra* note 7.
13. *See* 1992 MERGER GUIDELINES, *supra* note 1, § 2.1.
14. For a review of evidence on explicit collusion, see Margaret C. Levenstein & Valerie Y. Suslow, *What Determines Cartel Success?,* 44 J. ECON. LITERATURE 43 (2006).
15. With these assumptions, the Cournot-Nash profits are positive while Bertrand-Nash profits are all zero (since price is equal to marginal cost) in such equilibrium.

Although all firms in this simple market earn more from colluding, each firm potentially has an incentive to cheat on the collusive agreement if it is more profitable to do so as compared to staying in the collusive agreement. Suppose that if a firm were to cheat, it does so by undercutting all tacit colluders by pricing just a little below the monopoly price and diverting all other firms' sales to itself. Then, the one-period payoff from cheating deviation is (approximately) the entire industry-level monopoly profit, π^{mon}. Suppose further that the deviation from collusion is detected after one period and, once detected, it is punished by all firms reverting to Cournot or Bertrand behavior and they act in that manner forever. This is, of course, a drastic assumption but it helps to identify the incentives. With this assumption, once collusion fails, each firm earns just π^{comp} each period forever.[16]

As a simplification, assume that competition takes the form of Bertrand price competition. Since products are undifferentiated, $\pi^{comp} = 0$. The profit stream earned over time by a firm that deviates from the collusive path is $V(d) = \pi^{mon} + \delta*0 = \pi^{mon}$, where δ (a fraction between 0 and 1) is the "discount factor" used to express future earnings in terms of today's dollars.[17] In assessing whether deviation is profitable, a firm has to compare $V(d)$ against the earnings over time from conforming to the collusive agreement. Let $V(m)$ represent earnings per period under collusion. It can be shown that $V(m) = (1/N)*\pi^{mon} + \delta V(m)$. That is, the net present value of sticking to tacit agreement today is equal to today's share of monopoly profit plus the net present value of sticking to the agreement starting tomorrow. There is no incentive to deviate if $V(m) > V(d)$. That is, collusion is sustainable if it is compatible with each firm's individual incentive to stick to a collusive agreement.[18] From the inequality above, we see that collusion will not be undermined by cheating as long as $1/N > (1-\delta)$, or

$$\delta > 1 - (1/N) \qquad (1)$$

Thus, in this simple model, collusion is made more likely (i.e., the incentive compatibility requirement $1/N > (1-\delta)$ is more likely to hold) when (1) the number of firms, N, is small, and/or (2) firms do not discount future profit flows heavily (i.e., are not "impatient," which would make δ "small"); since $\delta = 1/(1+r)$, we see that the degree of impatience is linked to the rate at which firms discount the future earnings.

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16. For collusion to be a subgame perfect Nash equilibrium, it cannot be individually rational for any player to deviate at any point in the game, and if someone does deviate, the firms must be willing to impose the threatened punishment. It is always credible to punish deviation by reverting to playing Bertrand (or Cournot) strategy forever ("trigger strategies") but there are other more complex punishment strategies that could also sustain collusion. *See* Dillip Abreu, *Extremal Equilibria of Oligopolistic Supergames*, 39 J. ECON. THEORY 191 (1986). A less complicated exposition is in MASSIMO MOTTA, COMPETITION POLICY: THEORY AND PRACTICE 167-71 (2004).

17. The discount factor depends on the interest rate as the following formula indicates: $\delta = 1/(1+r)$, where r is the appropriate interest rate.

18. Tacit collusion must be individually incentive compatible (IIC), in other words, for a sufficient number of firms. In the simple model, if it is IIC for one firm, it is so for all. In richer settings, tacit collusion may be IIC for some but not all firms.

This simple model already yields several lessons for the analysis of the coordinated effects. First, ceteris paribus, a reduction in the number of firms may make tacit collusion more likely (as reflected in the structural presumption). Second, even if the market is potentially susceptible to coordinated interactions (tacit collusion), collusion will not be sustained if market participants are "impatient" enough. Third, if the merger affects the rate at which (some) firms discount the future and makes them more "patient," it can make collusion more likely, complete, and stable. Of course, as we examine later, if a merger can make (some) firms more "impatient," it can have precisely the opposite effect.

Basic model: Simple extensions. As noted above, the measure of impatience δ is an important parameter that bears on the likelihood of collusion. It can be interpreted as a portmanteau metric for the ability of the industry participants to sustain a tacitly collusive level of price (output). It is, therefore, important to examine what considerations affect the value of δ. The 1992 *Merger Guidelines*—building on Stigler's insight—explain that the likelihood of collusion is smaller if chances of getting caught are small or if it takes several periods for the cheater to be uncovered, for example, due to pricing being complex and volatile. In fact, it can be readily shown that the value of the "impatience" factor δ can be related to industry observables that are of relevance to the assessment of whether tacit collusion in the industry is likely, but not necessarily to whether a transaction will make tacit collusion more likely, stable, or complete.

For example, Luis Cabral[19] neatly shows how the critical value of the discount factor δ can be linked to h (the probability that the industry will "exist" in the next period), $1 + g$ (the industry's expected rate of growth), and f (the frequency with which firms interact) by means of a simple relationship, namely:

$$\delta = \left[1/\left(1+r/f\right)\right]h\left(1+g\right) \tag{2}$$

Along the same lines, lengthening the time between deviation and punishment is equivalent in the model to an increase in the discount factor; as is a decrease in the likelihood of getting caught. Various other extensions of this simple model are possible.[20] Two are of special interest in the analysis of merger effects.

Mavericks. The discussion so far has assumed that all firms have the same value of δ. In real settings, the value of δ likely varies across firms. Firms with relatively low discount factors (low δs)—that is, firms that "discount" future profit flows heavily—are a constraint on the ability of the incumbents to elevate the collusive price. The 1992 *Merger Guidelines* describe these firms as "mavericks" and define

19. LUIS M.B. CABRAL, INTRODUCTION TO INDUSTRIAL ORGANIZATION 128-30 (2000). Additional developments along these lines are in MARC IVALDI, BRUNO JULLIEN, PATRICK REY, PAUL SEABRIGHT & JEAN TIROLE, THE ECONOMICS OF TACIT COLLUSION (Final Report for DG Competition, European Commission, 2003).

20. It is also worth noting that if the underlying game is a homogenous goods Cournot or differentiated products Bertrand, then the expression of the critical value of the discount factor in Equation (2) becomes much more complicated. In particular, because the critical value of the discount factor depends on the values of profits under different competitive scenarios, the merger will affect it directly by changing these levels of profits.

them as those firms "that have a greater economic incentive to deviate from the terms of coordination than do most of their rivals (e.g., firms that are unusually disruptive and competitive influences in the market)."[21] That is, because mavericks have, by definition, more potent incentives than the nonmaverick firms to deviate from terms of coordination, any terms of coordination that will be sustainable in equilibrium must be immune to mavericks' deviations.[22] In fact, if market participants expect that the maverick firm will deviate from any tacitly collusive arrangement,[23] it may be impossible to implement such an arrangement in the first place. On the other hand, even if the industry contains a maverick firm—and there surely always are firms with differing incentives to engage in coordination—this does not necessarily doom the ability of the nonmaverick firms to sustain the industry price(s) above the competitive benchmark level. This can be the case if, for example, the maverick's product is not a perfect substitute for other products or if the maverick has an increasing cost of supplying to the market.

It follows that if a merger extinguishes a maverick firm or if it weakens the incentives of a maverick to deviate from the putative terms of coordination, it creates the risk that postmerger coordination will become more likely, stable, or complete. In the alternative, if a merger makes a maverick even more aggressive or if it creates a new maverick, then a merger will reduce the likelihood of coordination. In fact, Baker suggests that the most coherent approach to the assessment of coordinated risks from the transaction is by examining the effects of the merger on the competitive role of maverick firm(s).[24] He notes a variety of ways in which a merger can affect an industry maverick: the maverick can be absorbed by the transaction, can be more effectively deterred by the transaction from engaging in destabilizing strategies, or can be further emboldened by the transaction. In addition, the transaction can transform the merged firm into a maverick by, for example, significantly lowering the combined firm's marginal costs.[25]

Uncertainty and transparency. So far, I have assumed that the relevant market is not subject to any shocks (such as fluctuations in demand or in firms' costs, for example) and that publicly observed market data, when coupled with each firm's knowledge of its actions, adequately reveal whether colluders are cheating or not. Not surprisingly, rigorous modeling of collusion in markets that are beset by imperfect and asymmetric information is quite difficult. More importantly, in these types of markets, successful collusion is less likely, less sustainable, and less complete. Imperfect and asymmetric information may impede reaching an

21. 1992 MERGER GUIDELINES, *supra* note 1, § 2.12.

22. A firm can be a maverick for a variety of reasons. Impatience is just a shorthand for the business considerations that make it less inclined to accept terms of coordination that would appeal to other industry participants.

23. That is, from any putative equilibrium price that exceeds a proposed static benchmark level (i.e., Bertrand or Cournot).

24. *See* Baker & Shapiro, *supra* note 8.

25. Jonathan B. Baker, *Mavericks, Mergers and Exclusion: Proving Coordinated Effects under the Antitrust Laws*, 77 N.Y.U. L. REV. 135 (2002); *see* Andrew R. Dick, *Coordinated Interaction: Pre-Merger Constraints and Post-Merger Effects*, 12 GEO. MASON L. REV. 65 (2003).

agreement on the collusive level of price or other competitive variables of concern, may necessitate adjustments in firms' behavior and so confound the detection of cheating, and may reduce incentives to collude if coordination requires the participants to follow rigid behavioral rules. Moreover, in such markets it may be very difficult to arrive at terms of coordination absent direct communications among firms because such terms may have to specify complex responses to changing market conditions, for example.

To illustrate, a path-breaking paper by Green and Porter, which examines tacit collusion in a market subject to random demand shocks, shows that the putative colluders must not only agree on the level of output (which will exceed the monopolist's output) but also on the "trigger price"—that is, the price such that if observed price falls below that level, putative colluders will engage in a "price war"—and on the duration of the price war following that triggering event.[26]

In theory, such a complex collusive mechanism can be devised. Whether these can be devised and implemented without direct and frequent exchanges of information is another matter. We will return to this point below when we address how these informational requirements enter into the articulation of the collusive mechanism. It is my view that before challenging any merger on the basis of coordinated effects, the regulator ought to establish, at least in broad outline, whether an effective collusive mechanism can be designed, or how the merger materially reduces the impediments to the design and implementation of the mechanism.

3. Traditional approaches to coordinated merger analysis

In his very insightful comments on the *Arch Coal* case,[27] Dick characterized the traditional approach as resting on "three legs: a structural presumption, the checklist of market factors . . . , and evidence about premerger conduct, such as history of attempted collusion or facilitating practices."[28] I comment on these three legs first and then outline the elements of the more "modern" approach. In the next section I consider the aspects of this more recent approach to merger assessment in the context of several recent coordinated effects investigations.

The structural presumption. It is quite clear from the earlier discussion that a reduction in the number of firms and concomitant increases in concentration do not necessarily make collusion inevitable or even more likely, stable, or complete. It is now well understood that it is not sufficient when gauging the likelihood of coordinated effects from a merger to simply observe that because the merger reduces the number of firms, it automatically lessens the coordination problem facing the firms and enhances their incentives to engage in tacit collusion; far from it. In fact, a merger may turn a docile market participant into a maverick as it improves its cost

26. Edward J. Green & Robert H. Porter, *Noncooperative Collusion under Imperfect Price Information*, 52 ECONOMETRICA 87 (1984). For a less difficult exposition, see MOTTA, *supra* note 16, at 175-77.

27. FTC v. Arch Coal, Inc., 329 F. Supp. 2d 109 (D.D.C. 2004).

28. *Coordinated Effects Analysis: The Arch Coal Decision*, ANTITRUST SOURCE, Mar. 2005, at 3 (comments of Andrew Dick).

position or makes it more able and determined to go after market share. A merger may also change incentives to cheat because it changes the level of deviation profits relative to coordination profits for some participants. Furthermore, if we acknowledge that the merger can generate efficiency gains for the parties, then this effect will have to be factored into the analysis of tacit collusion in the same way that an efficiencies defense is factored into the unilateral (static) analyses of merger effects.

Moreover, a merger may affect the intensity and direction of innovation in the relevant market, thereby destabilizing the putative collusive outcome. Unfortunately, economists know even less about how to account for these types of dynamic effects of efficiency gains than they know about how to account for the short-term effects.[29] Yet, in my view, these dynamic effects are likely to be very important, at least in industries in which dynamic competition is at the center of market rivalry. For example, the merged firm may use the increased cash flow from fixed cost savings to finance new research and development projects, which could be inimical to sustained coordination over the long run.

It is fair to say that, historically, concerns with enhanced risks of postmerger collusion (or stabilization of preexisting coordination) facilitated by the reduction in the number of firms provided the main intellectual basis for antitrust challenges to horizontal mergers. The empirical evidence underlying that public policy concern is, however, weaker than one might think. There is a plethora of econometric studies showing correlations between concentration and price-cost margins,[30] but those correlations have been attacked by industrial organization economists on the basis that the directionality and causality of these correlations is dubious.[31] Rather than evidencing some kind of better cooperation among firms, the correlations can be viewed as demonstrating that in markets with few successful firms, the winners will earn substantial margins.[32]

The fact that the empirical evidence was less than compelling undermined the importance of the structural presumption, as it should have. But the structural presumption is far from dead and is never likely to disappear, as it should not. The 1992 *Merger Guidelines* ascribe an important role to market concentration and to changes in concentration in merger assessment. When the number of firms goes down from some comfortable level to four, three, or two, it is reasonable for the

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29. *See* Michael L. Katz & Howard A. Shelanski, *Mergers and Innovation*, 74 ANTITRUST L.J. 1 (2007) (discussing the potential trade-offs between competition and innovation and offering a "dynamic" approach to merger assessment that accounts for impact on innovation incentives).

30. *See*, *e.g.*, ANTITRUST LAW AND ECONOMICS 239, 241-42 (Oliver E. Williamson ed., 1980) (referring to 46 studies showing a positive "relationship between concentration and profits or price-cost margins").

31. *See*, *e.g.*, Richard Schmalensee, *Inter-Industry Studies of Structure and Performance*, *in* 2 HANDBOOK OF INDUSTRIAL ORGANIZATION 951, 976 (Richard Schmalensee & Robert D. Willig eds., 1989) ("The relation, if any, between seller concentration and profitability is weak statistically, and the estimated concentration effect is usually small. The estimated relation is unstable over time and space and vanishes in many multivariate studies.").

32. Of course, ceteris paribus, an exit of a Cournot or Bertrand competitor following a merger also leads to higher margins for the survivors.

regulator to become concerned that such reduction in the number of firms may enable the incumbents to more successfully coordinate on prices and other key dimensions of competition.[33] Reasoning back from a merger to monopoly, there must be a level of concentration in a given market such that concerns with enhanced likelihood of coordination are not implausible.

In a recent paper, Baker and Shapiro have given interesting support to this argument by suggesting that the structural presumption should be given greater weight because, in part, the "workhorse" industrial organization models predict that (absent efficiencies) increased concentration leads to higher prices and that "two is not enough" to ensure a competitive outcome.[34] More interestingly, they note that in the context of coordinated effects analysis "[t]he reduction in the number of sellers raises the odds that a merger involves a maverick—the type of merger most likely to enhance seller coordination—and those odds generally grow the most when the number of sellers is few."[35] Of course, when it can be shown directly that a merger "takes out" or weakens a maverick, the structural presumption is of lesser importance as compared to the situation where the maverick's identity is not known, as the authors observe. The Baker and Shapiro development of the structural presumption makes clear that for it to retain its relevance for merger assessment, it has to be linked as directly as possible to answering the question of whether a merger will make coordination more likely, complete, or stable—and how.

The checklist factors. Traditional analysis of coordinated effects relied also on the so-called checklist factors that are supposed to help assess whether the relevant market is susceptible to collusion or not. In fact, the 1992 *Merger Guidelines* list several illustrative factors that may be conducive to (or be an impediment to) successful coordination.[36] I have already noted the relevance of such factors as market concentration or likelihood of entry, but there are numerous other factors that bear on the likelihood of successful coordination and its sustainability, such as firm and product homogeneity, certain industry practices (which, as the *Guidelines* point out, are "not necessarily themselves antitrust violations"), the extent of excess capacity and its distribution among the incumbent firms, transparency of pricing and other competitive decisions, stability of demand, contracting practices, and many others.[37]

The value of such a checklist in merger assessment cannot be disputed but it is important to appreciate its limitations. First of all, every market will be characterized by numerous "checklist" factors with potentially different directional impacts on the

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33. I stress the notion of other key dimensions of competition because the 1992 *Merger Guidelines* as well as common sense suggest that the price is only one focus of the analysis. Competition can also take place on a variety of dimensions, including for example the quality of service, capacity, innovation, licensing, advertising, and marketing. These other dimensions of competition should be part of the analysis.

34. *See* Baker & Shapiro, *supra* note 8.

35. *Id.* at 36.

36. *See* 1992 MERGER GUIDELINES, *supra* note 1, §§ 2.11-.12.

37. *Id.* § 2.11. For an excellent and quite up-to-date review of the various factors, see MOTTA, *supra* note 16, at 142-66.

likelihood of successful collusion. For example, pricing may be transparent (which facilitates collusion) but transactions in the market are infrequent and large (which creates incentives to cheat). What is worse, the directional impact of some factors is ambiguous. For example, industry excess capacity can stabilize collusion because it enables swift and potent punishment but also creates incentives to cheat. Hence, whether excess capacity is a factor that facilitates coordination or not depends in complex ways on which firms hold it and why. For another example, multimarket contacts might be seen as a facilitating factor but, as Bernheim and Whinston show, this need not be the case.[38] Moreover, as recent work by Thomas and Willig shows, when different markets are subject to local shocks, linking competitive responses across such disparate markets may, in fact, undermine coordination.[39] Hence, from the enforcement standpoint, it makes sense to focus on the most salient features of a given market (as opposed to running through the checklist ticking off pluses and minuses) and build a case for or against the merger from these key market features. For example, if the main factor impeding coordination is the difference in the range of products offered by various firms or in their vertical structure, then a transaction that "homogenizes" these features can be more problematic than a transaction that does not substantially affect these salient features.

Second, and related to the points above, because the checklist factors do not offer measurable links between the factors and the likelihood of tacit collusion, or the magnitude of the coordinated effects from the merger, their potentially disparate qualitative impacts cannot be readily aggregated into summary statistics. As such, they leave a good deal of uncertainty and ambiguity, which is inimical to sound merger enforcement. This explains perhaps why the structural presumptions are still in place so that, after all is said and done, a reduction in the number of effective competitors below a threshold number (say three or four) in a market protected by barriers to entry and expansion is the likely trigger for coordinated concerns. At the same time, an unfortunate and perhaps unintended side effect of the checklist is that when the relevant market exhibits various features that are conducive to coordination, an analyst may draw the unwarranted conclusion that there is already coordination ongoing in the market. Such a presumption, which raises the chance of a challenge to a merger, may be both unwarranted and difficult to disprove. It may be unwarranted because, even if the market is conducive to collusion, firms may not be able to implement it due to maintained incentives to deviate from a putative collusive scheme.[40] It may be difficult to disprove because it may be impossible to

38. B. Douglas Bernheim & Michael D. Whinston, *Multimarket Contact and Collusive Behavior*, 21 RAND J. ECON. 1 (1990).

39. Charles J. Thomas & Robert D. Willig, *The Risk of Contagion from Multimarket Contact*¸ 24 INT'L J. INDUS. ORG. 1157 (2006).

40. The predictions of the standard model of tacit collusion regarding ability to sustain supracompetitive pricing are rather unrealistic. For example, Louis Kaplow & Carl Shapiro**,** Antitrust **(**Harvard Law School, John M. Olin Center for Law & Econ., Discussion Paper No. 575, Jan. 2007) (noting that the basic model of tacit collusion suggests that a market comprising more than 100 identical firms could, in principle, implement and sustain monopoly price, provided that

test whether the premerger market outcomes deviate materially from static Cournot or Bertrand benchmarks (assuming these are the appropriate benchmarks for such an exercise).

Third, the checklist approach can be seen as essentially focused on the current state of the market (static, in this sense), while the central question in coordinated effects analysis is the impact of the transaction on the relaxation of constraints on the likelihood and sustainability of coordinated interactions that exist premerger. Hence, the checklist is most useful when combined with the analysis of the impact of the merger on any particular factor that affects the likelihood of postmerger coordination. Thus if, for example, a merger homogenizes firms' costs or product portfolios, it may make it easier to agree on prices. But if the merger exacerbates dispersion along some important dimensions, it may have precisely the opposite effect. Similarly, if the merger takes out the maverick firm (as discussed earlier), it can facilitate coordination, while a transaction that strengthens or creates a maverick firm will likely have an opposite effect.

Of course, the 1992 *Merger Guidelines* go beyond the mechanistic application of the checklist approach to merger assessment. They directly link various market conditions ("factors") to their relevance for reaching the terms of coordination[41] and detection and punishment of deviations[42] and, as such, are the basis for the "new" approach to the analysis of coordinated effects.[43] It is perhaps fair to say, however, that the *Guidelines* do not make it sufficiently clear—other than in the context of removal or creation of a maverick firm—that the purpose of the checklist (and whole analytical exercise) is not only to identify those factors and market conditions that make coordinated interaction more likely, more successful, or more complete premerger, but primarily to assess whether the transaction affects the pertinent factor (or factors) in a way that potentially enhances the risks of coordinated interaction postmerger. As Bishop and Walker observe in connection with their review of merger control in the European Union (EU):

> [A]lthough economic theory has provided many useful insights into the conditions that are necessary for reaching and sustaining a tacit understanding, it has been less successful in identifying the characteristics of an industry that are sufficient for such tacit coordination to be reached and sustained. A particular problem for the practical application of merger control is that neither the theoretical nor empirical economics literature provides much guidance as to when a merger, by reducing the number of suppliers in a particular industry, will cause the nature of the competition in the industry to "tip" from being competitive to being tacitly collusive.[44]

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the firms are reasonably patient (i.e., do not discount the future profits too rapidly)). While this is plainly unlikely, as a matter of principle it cannot be ruled out.

41. 1992 MERGER GUIDELINES, *supra* note 1, § 2.11.
42. *Id*. § 2.12.
43. *See infra* Section 4.
44. SIMON BISHOP & MIKE WALKER, THE ECONOMICS OF EC COMPETITION LAW: CONCEPTS, APPLICATION AND MEASUREMENT 280 (2d ed. 2002).

The importance of history. The last element of traditional approach, as outlined by Dick, is the past evidence of attempted or successful collusion. There is no question that such evidence should have some probative value in the assessment of the competitive dangers from a transaction under review. This is especially true if it can be reasonably shown that the transaction precisely lessens some of the constraints that undermined the past attempts at coordination or made it less complete or stable. However, there are risks inherent in reliance on such historical evidence where the evidence is murky or subjective.

For example, in its assessment of the Sony/BMG joint venture in recorded music, the European Commission (EC) investigating staff brought out, as a factor weighing against the clearance, alleged evidence of coordination among the major record companies.[45] Yet the evidence put forth by the staff was hardly clear-cut. For example, the staff pointed to a relatively slow decline in prices in the face of falling sales as being consistent with implicit collusion without, however, developing a coherent explanation of how much faster prices should have declined in the highly product-differentiated market in which elastic purchasers were downloading music for free. Similarly, in *Arch Coal*,[46] the Federal Trade Commission (FTC) pointed to a price spike in 2001 for Southern Powder River Basin coal, which had been preceded by public statements from industry executives regarding a perceived oversupply in the marketplace and the need to produce less coal and by mine closures that presumably reduced production from what it otherwise would have been as probative evidence of risks of coordination postmerger.[47] The court, however, found that there were independent, legitimate business reasons for the mine closures[48] and price spike was a short-term phenomenon primarily explained by factors other than tacit coordination that unexpectedly increased the demand for coal, including reduced stockpiles, severe weather conditions, and higher prices for natural gas.[49]

Of course, the lesson here is not that premerger history should have no bearing on the assessment of risks of postmerger coordination. Clearly, successful past coordination—if it can be demonstrated—indicates that the industry participants have found a way to solve the incentive compatibility problem. Rather, the lesson to be drawn is that historical evidence is likely to be ambiguous at best, its interpretation hotly disputed, and, unless linked to the transaction under review, of only limited probative value.

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45. I acted as an expert for Sony/BMG during the merger review. My observations here are the result of my participation in these proceedings and not necessarily from the reported decisions. The Commission cleared the transaction initially in 2004. Sony/BMG, Case No COMP/M.3333, Commission Decision of 19 July 2004. This decision was annulled by the Court of First Instance in 2006. Case T-464/04, Independent Music Publishers and Labels Association (Impala) v. Comm'n, 2006 E.C.R. II-02289. The Commission reopened its investigation in February 2007 and again cleared the transaction in October 2007. *See* Case COMP/M.3333, Sony/BMG, Commission Decision of 3 October 2007.
46. FTC v. Arch Coal, Inc., 329 F. Supp. 2d 109 (D.D.C. 2004).
47. *Id*. at 131-35, 137.
48. *Id*. at 134-35.
49. *Id*. at 133-34.

4. The new approach to coordinated effects: The mechanism of coordination

The simple model of tacit collusion presented in Section 2 vastly understates the difficulties faced by any would-be tacit or explicit colluders in that it assumes that cartel members can clearly identify a certain course of action. Assuming that there exists some common course of action to which industry participants could in principle agree and no firm would have an incentive to deviate, there is still the "coordination problem" to be solved. The coordination problem arises for several reasons. First, there may be several possible collusive outcomes that could, in principle, be agreeable to market participants, but different firms may prefer different outcomes.[50] There may be several plausible focal points on which to coordinate, but to collude successfully market participants must first discover what these possible outcomes are and then select and implement one of them. If firms disagree on which outcome is to be implemented, coordination may fall apart or fail to take root in the first place. Second, firms must have some mechanism for flexibly responding to changing market conditions. This may be impossible or difficult in the absence of explicit communications since "market signaling" may simply be too slow.[51] Third, firms may have to coordinate on "punishment" strategies in the event that such will have to be implemented. While reversion to "competition" seems like a simple prescription, it may mean different things to different market participants. Fourth, because punishment is costly to all market participants, firms may want to coordinate on when to trigger the punishment phase. Jumping the punishment gun may appear to others as cheating and lead to further unraveling of tacit collusion, but too much restraint in punishing can embolden cheating and thus reduce the chances of successful collusion.[52]

While the obstacles to successful coordination in real markets summarized above are substantial, successful coordination is surely not an empty box.[53] However, the obstacles facing market participants also complicate the task of establishing the likelihood of coordinated effects from a merger. This is so if only because the economic foundations on which coordinated effects rest are much less developed and

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50. For example, firms A and B may agree that market division is preferable to competition but they may have diametrically different opinions on how the market should be divided. Similarly, if firms A and B have different costs, both may agree that $0.90 per widget is better than $0.50 but may disagree about whether $0.90 is better than $1.10.

51. In fact, when markets are subject to frequent shocks, tacit collusion may simply be impossible.

52. This conflict can be especially pronounced in those realistic market situations in which firms cannot clearly determine, based on private information and public signals, whether rivals are cheating or not. *See*, *e.g.*, Joseph E. Harrington, Jr. & Andrzej Skrzypacz, *Collusion under Monitoring of Sales*, 38 RAND J. ECON. 447 (2007) (showing that when prices are private information and quantities can be observed by cartel members, only asymmetric punishments can sustain explicit collusion). The importance of this type of results, in my view, is that they point to the weakness in the notion that tacit collusion can realistically implement supracompetitive prices in realistic market scenarios. *See also* Margaret C. Levenstein & Valerie Y. Suslow, Determinants of Cartel Duration and the Role of Cartel Organization (University of Michigan, Working Paper, Nov. 2007) (showing how organizational practices contribute significantly to cartel stability).

53. *See generally* Levenstein & Suslow, *supra* note 14.

much more complex as compared to the Bertrand and Cournot workhorse models of static competition, and the assessment of the risks does not yield itself to the ready quantification associated with unilateral effects.

The new approach emphasized in recent merger matters in the United States and in the European Union faces up to the challenge by focusing the analysis on describing and empirically testing, when possible, the plausible mechanism(s) of coordination by which a particular merger would make coordination more likely, more successful, or more complete. Consistent with the 1992 *Merger Guidelines*, this approach aims to explain how a merger is likely to materially relax several of the constraints that limited, prior to the merger, the industry's ability and incentive to maintain prices above competitive levels in a dynamic market environment. This, in turn, requires showing empirically and qualitatively, in the context of a clearly enunciated model of tacit collusion, that the merger makes it easier to (1) reach and sustain tacit agreement on key dimensions of competition; (2) detect deviations from the agreement (especially if the industry is not stable), so as to dissuade firms from cheating for fear of punishment; and (3) deter such deviations from coordination by means of more effective (e.g., faster and more costly to the cheating firm) punishments. The various checklist factors are clearly relevant to this line of inquiry but other considerations matter as well.

Put another way, an analysis of merger effects must describe the main building blocks of the mechanism of coordination, including the description of the means by which coordination was or would be implemented and sustained.[54] This leg of the analysis addresses several subissues, each of which needs separate analytics. First, what is the particular form the putative collusive conduct could likely take? Will it entail output suppression/price elevation, capacity restriction, or customer allocation? And which business decisions will remain independent?

In *Arch Coal*, for example, the FTC claimed that the mechanism of coordination would entail suppression of capacity growth (hence output) ahead of anticipated growth of demand. Such suppression, if agreed upon and successfully implemented, would have the predictable effect of raising the time path of prices relative to what it would have been absent the merger. The *Arch Coal* court famously—and mistakenly—described the FTC's theory of coordinated effects as "novel."[55] While coordination on capacity is hardly a novel idea in economics, the court was most likely on a firmer footing when it questioned whether such coordination can be reached absent direct negotiations among the putative colluders. Similarly, in its assessment of the competitive effects of the Sony/Bertelsmann joint venture in the recorded music industry, the EC extensively examined a wide variety of theories of price- and nonprice-related coordination between the major record companies, including alleged coordination on promotional budgets, on the pricing of each title, on pricing policy, on chart album prices, on access to retailers, on access to airplay,

54. *See*, *e.g.*, *Arch Coal*, 329 F. Supp. 2d at 131 (in which the FTC opposed the proposed merger "under the theory that the mechanism of tacit coordination that is most strongly supported by the evidence is a form of output restriction").

55. *Id*. at 131.

on chart rules, on release date, on coordination at the level of publishing activities and alleged negative impact on cultural diversity.[56] Similarly, in *Cruise Lines*, the FTC considered a variety of coordination strategies, such as price elevation confined to "frequent cruisers," early bookers, superior cabins, or some other consumer characteristics, as well as coordination on additions to capacity.[57]

Second, as a part of the examination of the mechanism of coordination, the reviewing agency should assess, assuming that hypothetically the parties can agree to coordination on some aspect of their strategies, how the parties would be able to actually agree on the level (and time path) of the coordinated variable. It is one thing to agree that collusion will entail customer allocation, it is quite another to agree on the actual allocation absent direct communications. Can an acceptable plan of action actually be reached without direct communications or with just "cheap talk"? Plainly, the more complex the terms of coordination, the less likely it is that these can be implemented absent some direct communications or absent a price leadership being assumed by one of the market participants. These considerations put a premium on simplicity of the form of coordination, but such simplicity has its own costs.[58]

Third, assuming that there is an agreement on the terms of coordination, how would such terms of coordination be monitored? In particular, is the market sufficiently transparent to make detection possible and does the merger improve market transparency? When coordination permits a certain amount of flexibility (in response to market and idiosyncratic shocks) in firms' market behavior, cheating may be hard to distinguish from adhering to the terms of agreement. This creates a temptation to deviate that can unravel the coordination or impede it from getting off the ground. Also, how will the terms of agreement be enforced? A simple reversion to "competition" may mean different things to different firms. Finally, how would the terms of the agreement be adjusted in response to market shocks? As we shall see in the next section, both economics and merger enforcement have made some important advances in analyzing tacit collusion within the context of this analytical paradigm, which focuses on a clear specification of the mechanism of coordination.

In addition to identifying a potential mechanism for coordination, it is also important to articulate how a proposed merger would enable the mechanism to be effective, thereby allowing coordination to occur as a result of the merger. In other words, it is important to identify what conditions prevent coordination in the absence of the merger and how such conditions would be altered as a result of the merger. The Department of Justice (DOJ) appears to have adopted precisely such a framework in 2002 in its analysis of the proposed acquisition of Masonite, a manufacturer of molded door skins, by Premdor, a manufacturer of interior molded

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56. Press Release, European Commission, Mergers: Commission Confirms Approval of Recorded Music Joint Venture between Sony and Bertelsmann after Re-Assessment Subsequent to Court Decision (IP/07/1437) (Oct. 3, 2007).

57. Statement of the Federal Trade Commission Concerning Royal Caribbean Cruises, Ltd./P&O Princess Cruises plc and Carnival Corporation/P&O Princess Cruises plc, FTC File No. 021 0041 (Oct. 4, 2002), *available a*t http://www.ftc.gov/os/2002/10/cruisestatement.htm.

58. *See infra* Section 5.

doors. In its complaint, the DOJ alleged that premerger the risk of price coordination in the downstream molded door market was reduced by the independent presence of Masonite.[59] The DOJ argued that Masonite, which was present only in the upstream door skin market, had an incentive to supply smaller, nonintegrated downstream firms if major downstream firms attempted to elevate molded door prices. That is, Masonite had an incentive to supply potential downstream mavericks that could disrupt any attempt at downstream coordination. This incentive would disappear once Masonite was purchased by Premdor, since Masonite would also benefit from the elevation of molded door prices. Conversely, Premdor's (albeit small) presence in the upstream market gave it the ability and incentive to disrupt any attempt by Masonite and other major upstream firms to elevate upstream prices, but this incentive would also be eliminated by the merger.[60] Thus, the DOJ articulated how potential maverick behavior prevents coordination in the absence of the merger and how the merger would likely eliminate this constraint on coordination.[61]

5. Recent developments in coordinated effects economics

There have been several interesting new analytical breakthroughs in the economic analysis of coordinated effects. This theoretical literature explains how the complexity and volatility of profit-maximizing business strategies can impede pre- and postmerger coordination.[62] If the profit-maximizing monopolist acting alone in the marketplace would have to deploy complex business strategies—such as advertising, investment, pricing, and research and development strategies—and the marketplace is subject to significant volatility, then such a monopolist must have the ability to adjust its behavior frequently, possibly even on a day-to-day basis. The problem this creates for incentives for collusion and for its sustainability is obvious: if profit maximization requires behavioral flexibility, then, when a given firm makes those adjustments to its behavior, its rivals may have a difficult time distinguishing "innocent" strategic adjustments from cheating (that is, deviations from collusion). If rivals cannot predict or effectively "read" each others' profit-maximizing strategies, they may be compelled to forego flexibility and adopt simpler behavioral strategies in order to secure some, perhaps only limited, coordination. Yet simple, stable, and predictable strategies are likely to be far from profit maximizing. Hence, if these strategies were to be adopted, gains from cooperation would be limited at stabilized prices relative to the benefits of strategic flexibility.[63] At the same time,

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59. Complaint ¶ 35, United States v. Premdor, Inc., No. 1:01CV01696, 2002 WL 1816981 (D.D.C. 2002).
60. *Id.* ¶ 36.
61. *See generally* Dick, *supra* note 25.
62. *See*, *e.g.*, Harrington & Skrzypacz, *supra* note 52; Susan Athey, Kyle Bagwell & Chris Sanchirico, *Collusion and Price Rigidity*, 71 REV. ECON. STUD. 317 (2004); Susan Athey & Kyle Bagwell, *Collusion with Private Information*, 32 RAND J. ECON. 428 (2001). For older but insightful analysis, see LOUIS PHLIPS, COMPETITION POLICY: A GAME-THEORETIC PERSPECTIVE (1995).
63. Under the conditions described, firms may tacitly agree to cooperate before all of the pertinent information is revealed, but some may decide to cheat once certain types of information are revealed ex post.

deviation profits may increase. There is, thus, a complex trade-off for the putative colluders between the costs of simplifying their behavioral rules to achieve coordination that can be readily monitored and the gains from coordination. Indeed, the more the profit-maximizing behavioral rules have to be bent to the objectives of facilitating tacit coordination, the less likely it is that a simple coordination mechanism can be designed that would enable the potential colluders to agree on such strategies and maintain them in the face of changing market conditions.

Several recent merger analyses have put new analytical focus on the importance of pricing heterogeneity for the likelihood of coordinated effects. Three cases in which I was involved exhibit the perils of complexity: Sony-BMG, Carnival Cruise Lines, and MGM-Mandalay Bay. This section closes with a brief discussion of the *Arch Coal* case, which put the issue of coordination mechanisms at center stage.

The Sony-BMG transaction received very intensive scrutiny in the EU.[64] Sony and Bertelsmann AG, two international media companies, intended merging their global recorded music activities (with the exclusion of Sony's activities in Japan) into three new companies operated together under the name Sony BMG. The EU investigation of the proposed transaction entailed numerous meetings with the legal staff and economists from the Office of the Chief Economist as well as a two-day hearing. The case required an enormous data production, including development of new data sets and data cross-verification, combined with "technical" papers on the economics of tacit collusion and its detection. The intense scrutiny in Europe was due in part to the case team's notion, stated in the statement of objections (as reported in the press), that the industry was already tacitly colluding, and therefore, the transaction would somehow make things worse.[65] Yet, from my perspective, there was little evidence that tacit coordination was already taking place. Indeed, it appears that the argument that tacit coordination in the recorded music industry was unlikely because of the hit-driven and unpredictable nature of the business, which necessitates flexible, complex, and adaptive business strategies that are tailored to individual releases and buyers over time, found some receptivity at the Commission, given that the transaction was ultimately cleared. In the music business, the ratio of hits to misses is very low, just a few out of every 100. As a result, when a release is a hit, the firm has a strong incentive to support it fully with advertising and promotion resources and possibly even with price cuts when the release begins to slow its sales pace. Coordination thus becomes very difficult. The biggest bone of contention between the parties and the Commission was whether evolution of pricing for the releases demonstrated a sufficient degree of price parallelism to suggest that

64. *See* Sony/BMG, Case No COMP/M.3333, Commission Decision of 19 July 2004, *annulled*, Case T-464/04, Independent Music Publishers and Labels Association (Impala) v. Comm'n, 2006 E.C.R. II-02289, *on reinvestigation*, Case COMP/M.3333, Sony/BMG, Commission Decision of 3 October 2007.

65. *See* Emmanuel Legrand, *Update: Bertelsmann, Sony Reply to Statement of Objections* (June 9, 2004), *available at* http://www.allbusiness.com/retail-trade/miscellaneous-retail-retail-stores-not/4367991-1.html (quoting the statement of objections as stating: "The Commission is of the opinion that the pricing policies adopted and particularly the decisions to stabilize prices during the years examined were the result of co-ordinated action.").

some coordination was taking place and could continue to take place. The evidence on average prices of CD albums in individual member states suggested little premerger price parallelism in the industry. Rather, there was evidence of volatile pricing behavior that was consistent with competition rather than with coordination. Based in part on such evidence, despite the issuance of the statement of objections, the EC found the Sony/BMG joint venture to be compatible with the common market and allowed the transaction to proceed without any changes.[66] Still, the case left open empirical and theoretical questions regarding the probative value of price parallelism as an element of proof of tacit (or even explicit) collusion.[67]

Another matter that received intense scrutiny, this time much more so in the United States than in Europe, was *Cruise Ships*. At the end of 2001, two competing proposed transactions emerged in the cruise ship industry: the friendly creation of a "dual-listed company" combining Royal Caribbean Cruises, Ltd. and P&O Princess Cruises plc, and a competing hostile tender offer by Carnival Corporation for Princess. The three firms were the largest in the North American cruise market and either merger would have resulted in a single firm with a share of about 50 percent of the market. The FTC's investigation involved extremely complex and detailed empirical analyses, drawing on more than 100 gigabytes of price transaction data. The FTC quickly recognized that neither a unilateral increase in price nor a tacitly coordinated price increase to all passengers was possible. Given that a theoretical monopolist would not find it profitable to raise prices across the board, the critical analytical issue was whether the merger would facilitate anticompetitive price discrimination, that is, whether the merger created a reasonable probability of a focused price increase at some subset of customers. Under U.S. merger antitrust law, the merger would raise competitive concerns not only if it harmed all consumers in the relevant market but also if it harmed a well-defined (i.e., identifiable) and sizeable subset of consumers. Consequently, the analytical challenge was to determine whether the industry could find a group of consumers that could be susceptible to a coordinated postmerger increase in prices.

An important feature of the cruise line industry in this analysis is that the industry has a fixed and highly perishable product: the berths on any given sailing of a ship. As a result, pricing in the industry is enormously complex. Determining whether price discrimination was possible was, thus, not an easy task. Cruise lines are concerned first and foremost with filling as many berths as possible because most of the costs of the berth are sunk, so there is little extra cost to filling an open berth but

66. *See* Sony/BMG, Case No COMP/M.3333, Commission Decision of 19 July 2004. The original decision was annulled by the Court of First Instance, which found among other things that the Commission had failed adequately to support its conclusions. Case T-464/04, Independent Music Publishers and Labels Association (Impala) v. Comm'n, 2006 E.C.R. II-02289. Thereafter, the Commission reopened the antitrust review of the merger and again found the transaction to be compatible with the common market. Case COMP/M.3333, Sony/BMG, Commission Decision of 3 October 2007.

67. *See* Brief of Economists as Amici Curiae Supporting Petitioners, Bell Atl. Corp. v. Twombly, 127 S. Ct. 1955 (2007) (No. 06-480).

significant lost revenue from letting a berth sail empty. The industry is therefore driven by "yield management," which is implemented using highly complex models of the evolution of demand over time: sell an empty berth too soon and forego a chance of selling it later to a customer willing to pay more; wait with an empty berth too long and it may never be sold. This yield management model results in large variation in day-to-day pricing of product. A key focus of the merger analysis in that case, therefore, was on the role of yield management as a tool for potential price discrimination. Specifically, the question was whether there were patterns to the pricing for specific subgroups of customers that reduced the complexity of industry pricing in such a way as to allow for coordinated interaction. In particular, if cruise line operators could identify a specific group of potential customers with relatively inelastic demand for cruising then a tacit increase in price could be confined to that group or, better yet, to the product that this group was (on average) favoring. An analysis of pricing to various groups of customers—those who booked early, those who booked in more attractive cabins, those who were "frequent cruisers," and many others—revealed no such discernible pattern. The failure to find any such ways of reducing pricing complexity was a key factor in the FTC's decision not to challenge the proposed mergers.[68]

Yield management also played an important role in our analysis of the MGM-Mandalay Bay merger in Las Vegas. In 2004, MGM Mirage and Mandalay Resort Group announced that MGM Mirage would buy the Mandalay Resort Group for $7.9 billion. Both companies have a major presence in Las Vegas. MGM Mirage owns Bellagio, MGM Grand, The Mirage, Treasure Island, New York-New York and the Boardwalk Hotel, while Mandalay operates Mandalay Bay Resort, The Hotel, Luxor, Excalibur, Circus-Circus, Monte Carlo, and the Four Seasons at Mandalay Bay. The combined company, which would operate more than half of the approximately 72,000 hotel rooms on the Strip, would be the largest gaming company in the world, with combined revenues of nearly $7 billion a year. However, the evidence showed that there is extreme variation in the price of a standard room in Las Vegas over a period of several months prior to the day of arrival. Indeed, there was extreme variation even on any given day for a standard room for a booking for a specific day. As a result, we argued that it would not be possible for the hotels to coordinate because there was no focal price point off of which hotels could coordinate their pricing behavior. Moreover, in both cases, the need for pricing flexibility would make it difficult to detect legitimate pricing adjustments from cheating even if one

68. *See* Statement of the Federal Trade Commission Concerning Royal Caribbean Cruises, Ltd./P&O Princess Cruises plc and Carnival Corporation/P&O Princess Cruises plc, FTC File No. 021 0041 (Oct. 4, 2002), *available at* http://www.ftc.gov/os/2002/10/cruisestatement.htm. Two commissioners dissented. *See* Dissenting Statement of Commissioners Sheila F. Anthony and Mozelle W. Thompson (Oct 4, 2002), *available at* http://www.ftc.gov/os/2002/10/cruisedissent.htm. For more on the investigation, see, e.g., Mary T. Coleman, David W. Meyer & David T. Scheffman, *Economic Analyses of Mergers at the FTC: The Cruise Ships Mergers Investigation*, 23 REV. INDUS. ORG. 121 (2003); *Cruise Investigation: Empirical Economic and Financial Analyses* (Nov. 2002), *available at* http://www.ftc.gov/be/hilites/ftcbeababrownbag.pdf.

could assume that rivals would be able to monitor actual prices paid by hotel guests.[69] The FTC closed its investigation of the transaction without action.[70]

As these cases demonstrate, pricing complexity can make it difficult for firms to coordinate tacitly on price. Yet collusion may take other forms aside from price coordination. For example, incumbents may agree on allocation of customers or territories, as in *Cruise Line*, where the investigation considered various collusive mechanisms, including a reduction in capacity by taking ships out of service, not constructing some of the planned ships, or moving them to different destinations. Basic economic theory of supply and demand teaches that if firms remove enough capacity from the marketplace, the price may drift up as a result of the decrease in supply. Thus, it is not unusual for economists to find that the object of collusion is controlling quantity or capacity rather than price.

This theory of collusion by capacity restrictions underpinned the theory of collusion in the FTC's challenge in 2004 to Arch Coal's then-pending acquisition of Triton Coal Company.[71] In seeking a preliminary injunction to block the deal, the FTC relied on a theory of coordinated interaction through output restriction, by which the major coal producers would limit extraction to drive up price by having supply lag behind rising demand. Although the court found the FTC's theory "novel," tacit collusion based on a Cournot model explicitly contemplates the possibility of coordination based on capacity and output. Such coordination can be difficult to achieve, however, especially when the demand is uncertain or growing. There is no such thing as homogeneous "capacity," and capacity decisions must be coordinated on many dimensions. Thus, collusion on output or capacity is not necessarily easier to implement than collusion on prices.[72] Further, in *Arch Coal*, the FTC postulated that the merger would not reduce supply below premerger levels but rather would merely slow the growth of supply relative to some unspecified benchmark. The court correctly found that the merger would have been unlikely to result in that kind of tacit collusion on capacity because it would have been difficult to implement such an agreement, ensure its stability, and detect deviations, especially in the absence of consensus on the likely future evolution of demand and demand volatility.[73]

The few cases briefly discussed in this section illustrate several points. First, tacit collusion, if any, has to take place and be sustained in markets that are much more complex than those that are considered in even the most sophisticated theoretical models of collusion. Second, these models nevertheless provide some guidance as to the type of empirical evidence that may be helpful in proving or disproving the risks

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69. In the cruise line business and in the hotel business, rack prices bear little resemblance to the actual prices paid by customers.

70. Letters from Donald S. Clark, FTC Secretary, to Jan McDavid and Charles S. Rule, counsel for MGM Mirage and Mandalay Resort Group (Feb. 16, 2005), *available at* http://www.ftc.gov/os/closings/staff/050216mgmmandalay.pdf.

71. *See* FTC v. Arch Coal, Inc., 329 F. Supp. 2d 109 (D.D.C. 2004).

72. *See* Case M.1524, AirTours/First Choice, Commission Decision of 22 September 1999, *annulled*, Case T-342/99, Airtours v Comm'n, 2002 E.C.R. II-2585.

73. *Arch Coal*, 329 F. Supp. 2d at 140-46.

of collusion after the mergers. In particular, empirical evidence that demonstrates the complexity of business decisions (e.g., pricing) in response to customer heterogeneity and market instability can go a long way to assuage concerns about the risks of collusion postmerger. Third, unlike in the realm of unilateral effects, while the analytical tools are improving, the high-powered econometrics of merger simulation is not yet the standard.

6. Conclusions

As this chapter describes, economics is deepening its understanding of coordinated effects and is developing new analytical approaches to gauging the risks of such effects. The traditional "policy shortcuts" used for this purpose—as reflected in the checklists in the U.S. and in the EU merger guidelines—are still useful but have to be used with care and with attention to the details of the industry or industries involved. The key economic lesson is that a reduction in the number of firms does not mean that a merger substantially increases the likelihood that competition will be lessened. The reasons for this include the presence of effective maverick firms; creating new mavericks through merger; potential entry into the market and expansion by noncollusive firms; overall market conditions such as complexity of pricing, volatility of demand and cost conditions; lack of transparency; and a lack of obvious focal points.

Although mergers over the past decade or so were more likely to be reviewed on the basis of unilateral effects concerns, the renewed interest in coordinated effects merger analysis is an important development that will stimulate new research (as did the ascendancy of unilateral effects theories) and present new enforcement challenges. This means that, from the enforcement standpoint, the analyses of coordinated effects should deploy rigorous analytical tools, such as critical loss analysis and the like. Although the critical loss analysis has come in for some harsh criticism, it remains useful when properly applied.

Critical loss analysis is often used in the unilateral effects cases to determine whether a SSNIP would be profitable postmerger for the two merged firms or a subset of industry participants. Yet it can also be applied in the coordinated effects setting to determine whether a SSNIP would be profitable postmerger for the putative tacit colluders, who need not comprise all the firms in the relevant market. If the market is properly defined, a SSNIP would be profitable for all firms in the market acting as a monopolist. However, this does not mean that a SSNIP (or business strategies that result in a SSNIP) can be successfully implemented by the putative collusive group postmerger. It is worth noting in passing that the procedure outlined in the 1992 *Merger Guidelines* to define the relevant market suggests that in a well-defined antitrust market there is at least some prima facie incentive for firms to engage in tacit collusion with the effect of increasing prices above the "current" level. Recall that the 1992 *Merger Guidelines* define the relevant product market using the SSNIP methodology: "Absent price discrimination, the investigating agency will delineate the product market to be a product or group of products such that a hypothetical profit-maximizing firm that was the only present and future seller

of those products ('monopolist') likely would impose at least a 'small but significant and non-transitory' increase in price [SSNIP]."[74] If the relevant market is defined using the SSNIP methodology, it follows that a monopolist over the products in such market would profitably raise prices in the relevant market by roughly 5 to 10 percent. Put another way, the incumbent market participants in the relevant market, defined using the SSNIP methodology are, by definition, leaving money on the table (for consumers). This raises the question of whether and how the transaction creates an incentive and ability for some or all incumbent firms to raise the price above the premerger level and closer to the monopoly level. In other words, the question is the extent to which a particular merger mitigates the existing impediments to acting on the incentive to raise prices.

First, the industry participants must be able to select a plausible tacitly collusive plan of action. This may be difficult or impossible absent direct communications. Hence, as the integral part of the procedure, the agency has to explain how the industry members may be able to arrive at such a putative course of action. Merely invoking "focal points" should not be enough. Second, for each putative tacit colluder, coordination must be individually rational (so that each firm's expected net present value of profits under the hypothetical collusive strategy is higher than without it) and incentive compatible (that is, the firm has no incentive to cheat once the coordinated plan of action is implemented). However, there may not exist a tacitly collusive plan for the industry that meets those requirements—that is, being individually rational and incentive compatible—for each firm. Thus, the use of critical loss analysis must recognize that what a hypothetical monopolist would do regarding potential price increases may not be feasible for the firm postmerger. Still, the use of a 5 to 10 percent SSNIP may anchor the empirical analyses that would shed light on whether such a SSNIP can be implemented and sustained. If, for example, many firms would have an incentive and ability to cheat on a putative SSNIP, then, even if a monopolist would be able to profitably implement it, the industry participants may not be able to do so absent explicit collusion that entails some side payments. Third, whereas a hypothetical (and actual) monopolist can adjust its behavior in response to external shocks, the collusive group may not be able to do so effectively or for a broad range of shock. Hence, the sustainability or durability of a profitable SSNIP ought to be considered as well.

In view of this discussion, one plausible standard for gauging the risks of enhanced tacit coordination might be that a merger raises coordinated effects concerns if a 5 to 10 percent tacitly coordinated price increase (or any other suppression in competition leading to equivalent harm) can be implemented postmerger with substantial likelihood, which requires quick and effective detection of deviations from the collusive course of action, and that can be sustained using credible punishments (possibly including reversion to premerger pricing or other strategies). As a part of this analysis, a firm's incentives to join a tacitly collusive group or to cheat on the arrangement ought to be assessed under plausible

74. 1992 MERGER GUIDELINES, *supra* note 1, § 1.11.

assumptions regarding firms' likely degree of impatience (discount rate) for current versus future profits.[75]

In sum, there has been significant progress made in the area of coordinated effects analysis. It is no longer the case that such analyses are guided by guesswork and intuition. The focus is now on the coherent description of the mechanism by which posited coordination can plausibly be implemented and sustained over time as well as on a development of empirical tests that can be used to gauge incentives and ability to deviate from the coordinated outcome.

75. As noted earlier, firms' impatience (or discount rate) is an important factor that determines incentives to cheat. Thus, the higher the discount rate, the more impatient firms are and the more inclined they are, ceteris paribus, to cheat. For a more complete and accessible exposition, see IVALDI ET AL., *supra* note 19.