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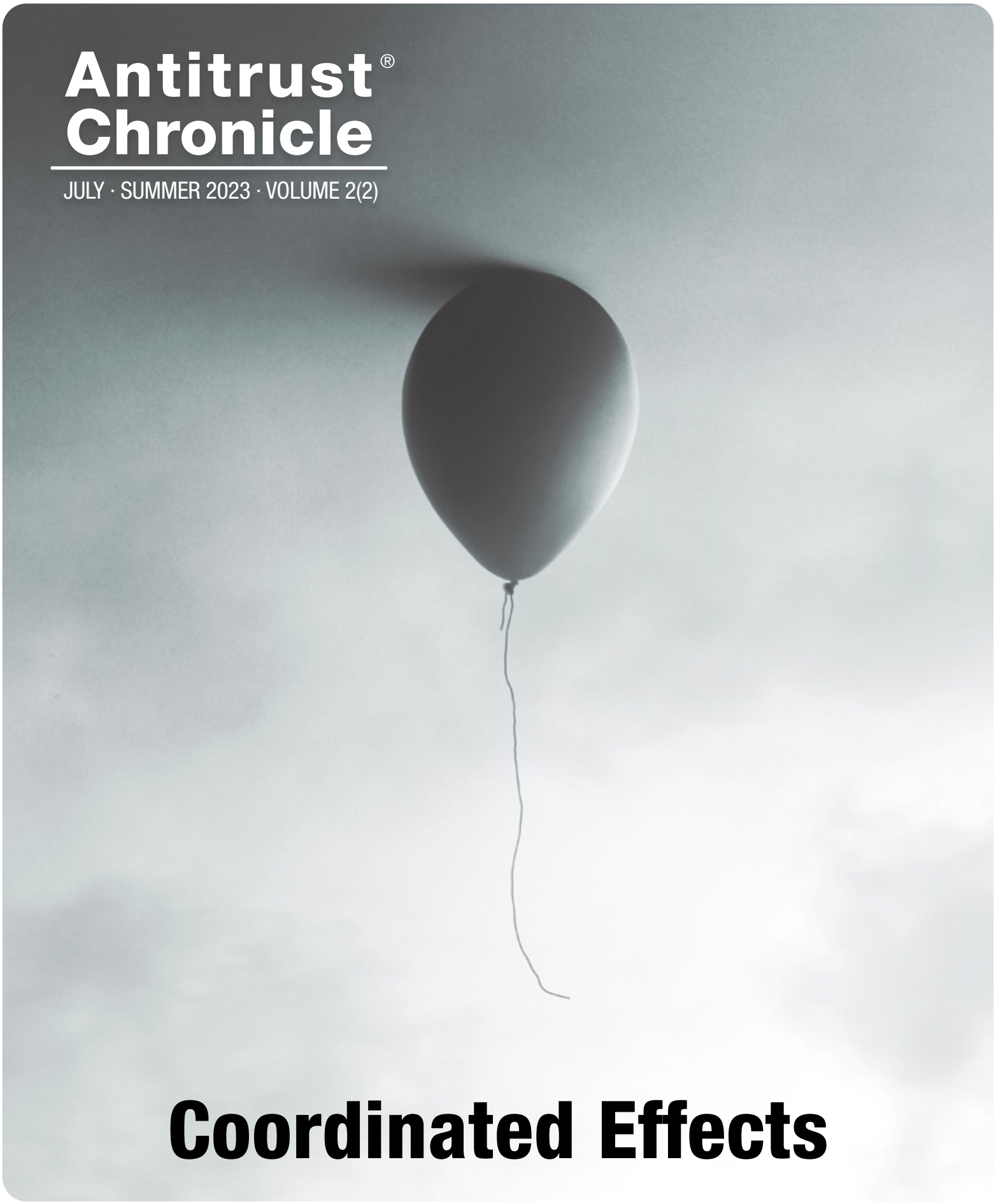

Coordinated Effects

CPI COMPETITION POLICY® INTERNATIONAL

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LETTER FROM THE EDITOR

Dear Readers,

This edition of the Chronicle deals with the theme of coordinated effects and related issues in tacit collusion. In simple terms, coordinated effects arise when a merger enables at least an important subset of rivals to exercise joint market power through coordinated pricing, production decisions, and other strategic actions. Concerns about anticompetitive coordination are as old as competition law itself, but vigilance in the merger context has ebbed and flowed with changes in economic philosophy and enforcement priorities. Today, contributors to this edition of the Chronicle sound varying degrees of alarm about potential underenforcement in this area.

It is not hard to see how underenforcement could arise. Since coordinated effects analysis often relies on a set of contingent factors in the already predictive context of *ex ante* merger review, reviewing agencies might choose to concentrate on the comparatively straightforward task of unilateral effects analysis, inquiring whether merged firms could raise prices through individual acts alone. Rigorous proof requirements, like those set out in judgments such as the EU *Airtours* case, do not improve the comparative appeal of coordinated effects analysis. Deserved or not, coordinated effects analysis has developed a reputation for difficulty and imprecision relative to other theories of harm in merger review.

Several of the articles in this Chronicle examine the role that coordinated effects theories play in merger control on either side of the Atlantic — and discuss ways that this role might be increased. Other articles look to how coordination works outside the merger context, and in particular how price announcements by competing firms (falling short of an explicit agreement to fix prices) can play an important role in market-wide price elevation.

D. Daniel Sokol & Sean P. Sullivan open with an exploration of the debate between antitrust critics who claim that merger enforcement has been lax since the 1980s and those who reject this critique. In the authors' view, available data reject the broad assertion that overall merger enforcement has declined in recent decades but support the narrower assertion that coordinated effects enforcement has declined. The article considers what this half-truth of the lax enforcement narrative means for the efficacy of current merger enforcement and for opportunities for durable policy reform.

In what is perhaps a glimmer of hope for the reinvigoration of coordinated effects in merger enforcement, **Jamie Daubenspeck, Kate Maxwell Koegel, Nathan Miller & Joseph Podwol** acknowledge that coordinated effects have come to play a smaller role, but note methodological developments that might change this trajectory. The decline in the use of coordinated effects theories could be due to the popularization of merger simulation and other methodologies to estimate unilateral effects and, until recently, the lack of similar quantitative tools for coordinated effects. First, economic theory does not always justify the bundling of coordinated and unilateral effects allegations. Second, by leveraging new methodologies for simulating mergers with possible coordinated effects, agencies can now evaluate coordinated effects with greater rigor. The article sets out these new methodologies, where they are expected to work well, and the types of evidence needed to support them.

Similarly, **Joseph Farrell** builds on past work on "non-purposive coordination" and what the U.S. 2010 Horizontal Merger Guidelines call "parallel accommodating conduct." Such conduct is deemed to arise when oligopolists respond to one another's competitive initiatives in ways that undermine competitive incentives but that are not driven by a goal of converging on a mutually understood outcome or penalizing departures from one. Interestingly, the article clarifies the role of so-called "trigger strategies" in repeated-game "folk theorems," and observes that purposive trigger strategies do require careful coordination (from oligopolists' point of view) but non-purposive strategies need not. Finally, the article underlines the importance of the use of language in this context, particularly "coordination" and its cognates, and how loose usage of such terms risks being unhelpful in the antitrust analysis of "non-purposive" responses.

From an EU standpoint, **Joanna Piechucka** assesses the European Commission's recent approach to coordinated effects in horizontal merger review. She provides an overview of the framework for their assessment in the EU Commission's Horizontal Merger Guidelines, and reviews the recent decisional practice in applying them. The article concludes with a non-exhaustive reflection on what can be done to improve the assessment of coordinated effects in merger control.

Broadening the scope of analysis to encompass the UK, **Kirsten Edwards-Warren** analyses both UK and EU merger cases in the past ten years to assess the extent to which coordinated effects have played a role. She finds that coordinated effects theories of harm are articulated in decisions infrequently; when they are investigated, they result in an adverse finding less often than other non-coordinated concerns; and even when there has been an adverse finding on coordinated effects it has almost never been pivotal to the remedies. The author notes that in only one UK case (*Breedon/Cemex*) and one EU case (*Spirit/Asco*) a remedy was designed solely to address a coordinated effects concern.

Broadening the canvas yet further, **Richard May** looks to the potential for antitrust enforcement against concrete coordination, i.e. beyond hypothetical coordinated effects in a prospective merger analysis. Specifically, this piece looks at the potential for unilateral price announcements to facilitate coordination, particularly as the world experiences a period of heightened inflation. Enforcement against such announcements is low. In the author's view, there appears to be no reason to believe that public announcements could not be used to facilitate coordination in times of inflation, and could even be more likely given the potential for industry level cost pressures. By monitoring examples of firms referencing each other in the context of future prices, or output levels, authorities are likely to be better placed to identify potentially problematic conduct or deter it in the first place.

Finally, **Margaret C. Levenstein & Valerie Y. Suslow** look at the strategic use of price indexes to facilitate collusion. The means by which companies might engage in such conduct vary, and include submitting false price reports, targeting a segment of the market that influences the index, or designing the price index to ease manipulation. A price index can be particularly vulnerable where long-term contracts are pegged to the index. The authors describe several antitrust cases where such tactics were used, and in light of these cases, draw some general lessons. While not condemning of price indexes *per se*, the article calls attention to the importance of the rules and institutions that are used to produce and govern them.

In sum, as the articles in this Chronicle show, although the empirical evidence is that coordinated effects theories are seldom employed in contemporary practice, this does not mean that they have no role to play in merger enforcement. This is particularly true in light of the broader push towards more vigorous merger enforcement in certain jurisdictions, widespread concern about inflation (arguably facilitated by parallel price increases that may not fall within the scope of price-fixing rules), and the potential for antitrust and economics scholarship to develop robust and workable coordinated effects models. It would only then remain for enforcers to put them into operation.

As always, many thanks to our great panel of authors.

Sincerely,

Sean Sullivan (University of Iowa) & D. Daniel Sokol (University of Southern California)

SUMMARIES

THE OLIGOPOLY PROBLEM, TRIGGER STRATEGIES, AND "COORDINATED EFFECTS"

By Joseph Farrell

In earlier work, Jonathan Baker and I explored what we called "non-purposive coordination" and the 2010 Horizontal Merger Guidelines call "parallel accommodating conduct." Such conduct arises when oligopolists respond to one another's competitive initiatives in ways that undermine competitive incentives but that are not driven by a goal of converging on a mutually understood outcome or penalizing departures from one. Here I explore and modernize an approach that was hinted at sixty years ago, elucidating the roles of concentration and diversion ratios without fully predicting conduct. While the conclusions may point in the same general direction, that analysis differs starkly from the analogous findings in the standard repeated-game framework for oligopoly responses. That framework's findings concern sticking to and enforcing, not reaching, a common understanding; and the presence of such an understanding is an assumption, not a finding, in standard game theory. I clarify the role of trigger strategies in repeated-game "folk theorems," and observe that purposive trigger strategies do require careful coordination (from oligopolists' point of view) but non-purposive strategies need not. Finally I observe that the use of language in this context, particularly "coordination" and its cognates, risks being unhelpful in the antitrust analysis of non-purposive responses.

COORDINATED EFFECTS AND THE HALF-TRUTH OF THE LAX ENFORCEMENT NARRATIVE

By D. Daniel Sokol & Sean P. Sullivan

A debate is brewing between antitrust critics who claim that merger enforcement has been weak and fading since the 1980s and establishment defenders who respond that merger enforcement has stood firm and even toughened since the Chicago revolution. Could the truth be somewhere in between? Available data reject the broad assertion that overall merger enforcement has declined in recent decades, but support the narrower assertion that coordinated effects enforcement has declined. We consider what this half-truth of the lax enforcement narrative might mean for antitrust reform opportunities.

STRATEGIC USE OF PUBLIC PRICE INDEXES AS A COLLUSIVE DEVICE

By Margaret C. Levenstein & Valerie Y. Suslow

While public price indexes are widely used for the purpose of increasing market efficiency through information transmission, they can also be used strategically with an anti-competitive purpose. The mechanisms vary, such as submitting false price reports, targeting a segment of the market that influences the index, or designing the price index to ease manipulation. A price index can be particularly vulnerable to potential anti-competitive actions when long-term contracts are pegged to the index, that is, when the index is "hardened" into the contract. Although the *Socony-Vacuum* case has long been recognized as an example of this phenomenon, there are other cases as well where this behavior has occurred. We describe several antitrust cases where a price index was used to facilitate collusion. In light of these cases, we draw some general lessons. Our findings about the use of price indexes to reduce competition is not a condemnation of price indexes, but rather calls attention to the importance of the rules and institutions that are used to produce and govern them.

RECENT ADVANCES IN ECONOMIC METHODOLOGY FOR COORDINATED EFFECTS

By Jamie Daubenspeck, Kate Maxwell Koegel, Nathan Miller & Joseph Podwol

Coordinated effects have come to play a smaller role in merger enforcement over time. Antitrust agencies now tend to focus on unilateral effects allegations with coordinated effects playing at most a supporting role. This could be due to the popularization of merger simulation and other methodologies to estimate unilateral effects and, until recently, the lack of similar quantitative tools for coordinated effects. This article argues two main points. First, economic theory does not always justify the bundling of coordinated and unilateral effects allegations; in some cases, market or merger characteristics may cut against one theory of harm while supporting the other. Second, by leveraging new methodologies for simulating mergers with coordinated effects, agencies and antitrust practitioners can now evaluate certain classes of mergers where coordinated effects are present using the same quantitative rigor that is commonplace for unilateral effects analyses. We discuss the conceptual framework behind these new methodologies, the settings where these coordinated effects merger simulations are expected to work well, and the types of evidence needed to support them.

SUMMARIES

WHAT'S NEXT?

For August 2023, we will feature an Antitrust Chronicle focused on issues related to (1) **State AGs**; and (2) **EAB Antipasto**.

ANNOUNCEMENTS

CPI wants to hear from our subscribers. In 2023, we will be reaching out to members of our community for your feedback and ideas. Let us know what you want (or don't want) to see, at: antitrustchronicle@competitionpolicyinternational.com.

CPI ANTITRUST CHRONICLES September 2023

For September 2023, we will feature an Antitrust Chronicle focused on issues related to (1) **Defining Innovation**; and (2) **Compliance**.

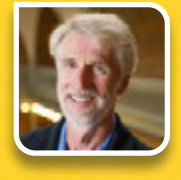
Contributions to the Antitrust Chronicle are about 2,500 – 4,000 words long. They should be lightly cited and not be written as long law-review articles with many in-depth footnotes. As with all CPI publications, articles for the CPI Antitrust Chronicle should be written clearly and with the reader always in mind.

Interested authors should send their contributions to Sam Sadden (ssadden@competitionpolicyinternational.com) with the subject line "Antitrust Chronicle," a short bio and picture(s) of the author(s).

The CPI Editorial Team will evaluate all submissions and will publish the best papers. Authors can submit papers on any topic related to competition and regulation, however, priority will be given to articles addressing the abovementioned topics. Co-authors are always welcome.

THE OLIGOPOLY PROBLEM, TRIGGER STRATEGIES, AND "COORDINATED EFFECTS"

BY JOSEPH FARRELL[1]



1 Professor of the Graduate School in the Department of Economics, University of California, Berkeley.

A price-setting oligopolist's competitive incentive to cut its price is undermined if it expects its rivals to respond by cutting theirs; similarly, its incentive to raise its price is buttressed if it believes rivals will respond by raising theirs. The resulting "oligopoly problem" weakens competition among the oligopolists and raises prices; analogous mechanisms can similarly harm customers in non-price dimensions.

> More than 60 years ago Donald Turner described a robust and intuitive source of such oligopoly responses:[2]
>
> The rational oligopolist [takes into account] the reactions of his competitors to any price change that he makes. He must take them into account because his competitors will inevitably react. They will inevitably react, for example, to a price cut on his part because otherwise the price cut will make a substantial inroad on their sales…

Turner continues by claiming a close link between this and concentration:

> …if, for example, there are only three producers of equal size and a price cut by one doubles his sales, the sales of each of his two competitors will be cut in half. The rational seller in an industry with a very large number of competitors does not calculate their reactions to a price cut by him, because they are not likely to be sufficiently affected by the price cut to react; if, for example, there are one hundred producers of equal size, a doubling of sales by one, evenly drawn from his competitors, would cut their sales by only one ninety-ninth. …

Turner's discussion of the role of concentration is not entirely satisfactory: it is analytically risky to "round down" small quantities to zero. As differential calculus teaches us, one often needs to keep track of the relative smallness of quantities all of which are small. But I believe Turner's instincts served him well in this case.

To see this, take Turner's example and suppose that initially each of the 100 equal producers sells 990 units.[3] Firm 1 cuts its price by an amount that, absent responses by the other firms, would double its output, to 2 x 990 = 1980 units. Assuming (with Turner) symmetry and an aggregate diversion ratio of 100 percent (all of firm 1's additional sales are at the expense of the other firms in the market), each of the other 99 firms would lose 10 units of its sales and sell 990 – 10 = 980 units, absent responses. But each of them in fact responds. How does (say) firm 2 respond to a price cut by firm 1 that, absent any response, would cut firm 2's sales by (as Turner notes) one ninety ninth, or from 990 units down to 980?

We do not have a unique rigorous answer to that question. But that shouldn't mean defaulting to an implied answer that firm 2 won't respond at all (as in the one-shot models of oligopoly). Nor is it particularly helpful to observe that in some dynamic frameworks it seems that almost anything can happen (as, more loosely, in repeated-game models). This is related to the issue of "conjectural variation," which has run into similar problems and seems to have prompted similar less-than-helpful reactions. We need some guidance about what is relatively apt to happen, and in our current state of knowledge this appears to mean dialing down any expectations of perfection and being pragmatically satisfied with sensible and intelligent.

While Turner does not say this, I read him as envisioning, along those lines, that firm 2's response would be apt to be proportionate: its responsive price cut would regain (or protect) some of the 10 units that it would otherwise lose, or maybe all of them, but probably not more. I think this is quite sensible and intuitive as a description of natural or non-collusive oligopoly behavior.[4] Let us label the sales volume that firm 2 regains with its response, divided by the 10 units that it would lose if it did not respond, as its regain ratio, or R. So firm 2 regains 10R units and on net loses 10(1 – R) units of sales. It is not guaranteed that R is between 0 and 1, but that seems an intuitively sensible benchmark and is consistent with Stackelberg responses (the rational prediction if players do not look further ahead than that response) in many simple demand systems.

In regaining 10R units, firm 2 takes (or takes back) from each of its rivals, and hence in particular from firm 1, one ninety-ninth of that 10R, or 10R/99 of a unit. In aggregate the effect on firm 1's sales of such responses by firms 2 to 100 is thus 99 x (10R/99) or 10R units. Summing up, firm 1's price cut, which absent responses would have gained it 990 new sales, actually gains it "only" 990 – 10R new sales, which even if R=1 is only slightly different (980 versus 990) from the initial estimate ignoring responses. Indeed, even if say R=2 one might say the

2 Donald Turner, "The Definition of Agreement Under the Sherman Act," *Harvard Law Review* (1962).

3 This makes some of the arithmetic simpler and of course has no separate substantive force.

4 This thinking views firm 2 as responding to the decline in its sales, or more precisely to the downward or (ten unit) leftward shift in its residual demand curve, without regard to the source of the shift; and Turner is clearly also envisioning that firm 1's initiating price cut remains in force long enough for the other firms' responses to apply in the market. In modern words, he is considering a Markov response, and assuming, like Charlie Brown, that the football is not yanked away moments before he kicks it. See the discussion in Eric Maskin & Jean Tirole "A Theory of Dynamic Oligopoly, III: Cournot Competition," *European Economic Review* (1987).

same thing. One can see Turner's point when he argues that firm 1 need hardly take such responses into account in evaluating such a price cut, although a more modern discussion would instead point out that taking those responses into account would not much change firm 1's incentive for the initiating price cut.

By contrast, consider the highly concentrated or three-firm version of Turner's example. Again, consider a price cut that would, absent responses, double firm 1's sales. Continuing (with Turner) to assume a 100 percent aggregate diversion ratio, that would take half of 990, or 495, units from each of firms 2 and 3 if they did not respond. If instead each responds with a price cut that would in isolation (re)gain it a fraction R of that 495 units, then half of that regained volume is taken from firm 1, so the responses cost firm 1 a fraction $R/2$ of the initially gained 990 units. Although the unknown parameter R appears in both cases (and it is not guaranteed that the same value of R would apply in both), here values of R well below 1 are consistent with a substantial dilution effect, in contrast to the many-firm case where even with R=1 (or somewhat higher) the responses still don't much matter to firm 1.

Some readers will recognize that the impact of firm 1's initial price cut on each of its rivals depends on the diversion ratio from firm 1 to that rival, and the impact in turn on firm 1 of that rival's response is proportional to the strength of that response and to the diversion ratio from that rival to firm 1.[5] Thus with *n* symmetric competitors the dilution of firm 1's sales gain is a sum of (n – 1) terms of the form $\boldsymbol{Rd_{1j}d_{j1}}$, or in total $(n-1)R\frac{1}{n-1}\frac{1}{n-1}$. Thus as Turner claimed, firm 1's incentives become more competitive as n increases (concentration falls).

This sketch of a model is obviously incomplete in various ways. For instance, the analysis terminates after one round of responses to firm 1's initiating price change. That might seem to suggest (though it doesn't require) that those responses be privately optimal, as in Stackelberg (but with multiple followers) equilibrium: Jonathan Baker and I have argued that Stackelberg seems a reasonable starting point for analyzing "natural" oligopoly dynamics,[6] but there are plenty of unresolved questions, such as whether the followers foresee one another's responses.

More generally, what determines the parameter R? One might try to derive a response ratio R in a truly dynamic model. Maskin & Tirole (1987) do this or a closely related exercise for a quantity-setting game in which two firms alternate in setting quantities and each such decision is binding for two periods.[7] But they (even they!) limit themselves to the symmetric duopoly case, and find even there that calculating a rigorously derived response rate requires a good deal of analysis followed by solving a quartic equation. And I have not seen subsequent work that offers us a workhorse model, or empirics, that would give us a good sense of how R varies with market conditions such as transparency, demand elasticity, pass-through rates, and concentration—or indeed whether those are even the key conditions to look at.

Looking for a way to dial down ambitions of perfection and make some progress, one might follow Turner's footsteps and assume something like reasonable proportionality, for instance R between 0 and 1 and relatively stable, although recognizing that none of that is guaranteed. If R stays stable and in a reasonable range, we just saw that one can say something about the effects of concentration and diversion ratios on the extent to which oligopoly incentives depart from the unilateral (no responses) incentives that have become the primary focus of so much antitrust economics.

The bottom line that rivals' responses may raise oligopoly prices more in a more concentrated market is of course a staple of antitrust economics, but the analysis that an average 21st-century antitrust economist or economically-savvy lawyer would offer to support that bottom line would scarcely overlap at all with Turner's logic or a refinement or modernization thereof—a logic that would be radically unfamiliar to such an interlocutor. This fact is strange and somewhat perturbing, and I want to explore here how it comes about.

As most readers will be aware, modern oligopoly price theory largely bifurcates between static models on the one hand, and repeated-game models on the other. An archetypal static model involves simultaneous one-shot choices of price or quantity, and is the usual approach to modeling "unilateral effects." An archetypal repeated-game model consists of an infinite series of periods; in each period rival firms play a copy of a given "stage-game." The stage-game is usually just like its static cousin and consists of simultaneous moves by the rivals that, importantly, remain in effect only during the period.

In a one-shot model or in such a repeated-game model, it is never possible for one firm to "respond" to seeing another's price in the natural sense that both prices will apply at the same time. This is entirely clear when one looks at the model with that question in mind, but (in

5 The "from" and "to" terminology originated with discussions of merger-induced price increases, and gets turned around in analyzing a price cut, but is too well-established for me to mend it here.

6 Joseph Farrell & Jonathan Baker, "Natural Oligopoly Responses, Repeated Games, and Coordinated Effects in Merger Analysis: A Perspective and Research Agenda," *Review of Industrial Organization* (2021). Also generally see Jonathan Baker & Joseph Farrell, "Oligopoly Coordination, Economic Analysis, and the Prophylactic Role of Horizontal Merger Enforcement," *Penn Law Review* (2020).

7 Eric Maskin & Jean Tirole "A Theory of Dynamic Oligopoly, III: Cournot Competition," *European Economic Review* (1987).

my experience) seldom explicitly pointed out. By the time firm 2 sees firm 1's price in the one-shot model the game is over; less obviously, in the repeated-game model, by the time firm 2 sees firm 1's period-t price and can choose its own, potentially in response, it is period (t+1) and firm 1's period-t price has already been superseded.

It may not be clear how long firms in practice are committed to their prices versus how quickly other firms can react, but the prevailing repeated-game literature takes an extreme position on that question: it assumes that firm 2 can never respond to firm 1's price while the latter still applies.[8] In this way intuitive notions of what might well be "inevitabl[e]" responses, such as Turner's, are *ignored by definition* and the consequences of a surprise price cut and of the responses to it are evaluated in different periods. It is a startling thing for a literature on price responses to assume.

The repeated-game literature instead focuses on a different kind of price response: a response to bygone history and not only to current conditions. In game-theory language, those responses are not Markov (they depend on payoff-irrelevant history, and in many simple expositions they depend only on payoff-irrelevant history).[9] Certainly they are not "inevitabl[e]" in anything like Turner's sense. Turner-esque responses to a still-in-force price make sense for firm 2 at some level irrespective of what firm 1 might know or believe, but a punitive response intended to deter price-cutting makes sense only if firm 1 foresees it or learns to do so.[10] Such a response is "bootstrapped:" it would be completely rational for each firm to ignore the bygone history if other firms did so, and in an intuitive sense that ("bygones are bygones") would be a natural starting point. Getting instead to a point where everyone expects specific punitive responses because they expect that everyone else expects just those responses takes some work. And indeed thwarting that "work," largely by denying the firms the use of open explicit communication, is the agenda of enforcement against price-fixing.

The repeated-game framework and literature captures some important aspects of oligopoly responses and conduct, and I am not disparaging that contribution.[11] But it is also plainly missing something important, and its dominant market share in antitrust economics education risks entrenching a narrow focus on the things that it does stress. So it is worth being conscious of points that it misses.

First, a general point about game theory. Almost all game theory, including the standard repeated-game models, evaluates possible predictions of the game's outcomes to see whether they would fail because of an incentive to deviate: if not, they are called equilibria. A bit more precisely, the theory evaluates strategy profiles—full descriptions of how the game might be played (including following histories that are not supposed to arise)—to see whether at least one player has an incentive to depart from its specified strategy, assuming that others stick to theirs. Non-equilibrium outcomes are treated as not plausible predictions. Thus the existence of a "common understanding" of how everyone is expected to play is baked, or assumed, into any equilibrium and thereby into (almost) any game-theoretic prediction. This common understanding, then, is not a finding but a methodological assumption. If one thinks, as many do, of non-competitive oligopoly dynamics as involving reaching a common understanding and then ensuring incentives not to "cheat," the repeated-game literature focuses on the latter and has rather little to say on the former.

This may be part of why repeated-game theory often diagnoses the existence of a shared-monopoly equilibrium even in very unconcentrated markets.[12] Yes, the theory also points out that fully competitive equilibria also exist, but it would be helpful if it had a lower rate of false positives. One possible approach is to make stronger demands (e.g. renegotiation-proofness, or bargaining perspectives on the allocation of gains among oligopolists) on the equilibrium. But I now suspect that a wiser interpretation is that the internal incentive stability of an equilibrium (that is, being "an equilibrium") is not usually the gating factor: that is more often the "work" of getting there. Game theory unfortunately has not had very much to say about that work and how much more difficult it becomes if, as under effective anti-collusion enforcement, firms must avoid explicit direct communication.

Second, a point more specific to the repeated-game literature. Most discussions of a repeated oligopoly game focus on trigger strategies. Broadly, a firm uses a trigger strategy if it charges a high price so long as every firm in the industry has always done so, but switches to a

8 A similar timing and commitment issue arises with "limit pricing:" if an incumbent can set a high price but cut (or more generally completely re-optimize) its price as quickly as an entrant can challenged it, the threat of entry is (in simple models) toothless. See Paul Milgrom & John Roberts, "Limit Pricing and Entry under Incomplete Information," *Econometrica* (1982). This contrasts with the idea of "contestability," which assumed that an incumbent could not cut its price on entry. Aaron Edlin has suggested policy intervention to bring monopoly markets closer to the latter theory. See Aaron Edlin, "Stopping Above-Cost Predatory Pricing," *Yale Law Journal* (2001).

9 The intuitive idea is simple; Maskin & Tirole give it a rigorous formulation and discuss the relationship with other intuitive properties. Eric Maskin & Jean Tirole, "Markov Perfect Equilibrium I: Observable Actions," *Journal of Economic Theory* (2001).

10 This relates to Thomas Schelling's distinction between "warnings" and "threats." In technical game-theoretic terms, the ex post motivation for a punitive response here is that everyone else is expecting it.

11 Indeed, I have taken part in that literature: see for instance Joseph Farrell & Eric Maskin, "Renegotiation in Repeated Games," *Games and Economic Behavior* (1989).

12 Carl Shapiro, "Theories of Oligopoly Behavior," *Handbook of Industrial Organization* (1989).

much lower price if any firm has ever deviated from the high price. In this sense a trigger strategy is discontinuous or at least has a very sharp increase in R or a conjectural variation or similar response parameter at or near the anticipated price. An equilibrium featuring trigger strategies is the oligopoly analogue of thermonuclear "mutual assured destruction." Like MAD, it is in principle powerful discipline, but it is also easy to see how it can go horribly wrong. Why is it so pervasive in discussions of oligopoly dynamics?

One reason, I conjecture, is the role that trigger strategies play in the proofs of what are called the repeated-game folk theorems. While there are several folk theorems, the most familiar discussion in antitrust economics shows (simplifying slightly) that any allocation of e.g. shared-monopoly profits that gives each oligopolist some of the excess profits above the one-shot equilibrium level can be sustained as the payoffs from a trigger-strategy equilibrium of the repeated game. Moreover, although it is more complicated to state the result precisely, any allocation that can be sustained as the payoffs from *any* "subgame-perfect" equilibrium of the repeated game can also be sustained using trigger strategies. Thus students of repeated-game equilibrium learn to consider what can and cannot be achieved in theory using trigger strategies. But those strategies' central role in those *proofs* does not imply any recommendation or any particular prominence in use. Much of what can be sustained using trigger strategies may equally be sustained using price-matching or similarly non-trigger strategies. Equally, the somewhat-less-than-competitive outcome of Turner's model could also be sustained using trigger strategies—but that of course does not mean that an oligopoly behaving in Turner style is in any sense using trigger strategies behind the scenes.

This matters, I think. In particular, consider the role played by what game theorists call coordination. Literally the word means arranging things together. A "coordination game" is a game, such as technology adoption with network effects, in which the key thing is to do "the same thing" as other players.[13] Classic game-theoretic examples include pure coordination games (in which nothing else matters):

1,1	0,0
0,0	1,1

Another classic coordination game is the "battle of the sexes" (in which coordination incentives coexist with conflict over what to coordinate on):

2,1	0,0
0,0	1,2

In oligopoly, coordination in this sense — picking the same, or precisely-matched, strategies—is *sometimes but not always* important for the outcome to feature above-competitive pricing. In particular, if one focuses on trigger strategies, it does indeed become crucial to pick consistent triggers — otherwise triggering will indeed ensue. For instance, if oligopolist 1 picks a trigger of $100 and oligopolist 2 picks a trigger of $101, a price war ensues after period 1, because oligopolist 2 will interpret oligopolist 1's $100 price as "cheating."[14]

Thus the term "coordination" risks being confusing. In its game-theoretic meaning it applies sometimes but not always when oligopolists reach what antitrust might call successful coordination. And Jonathan Baker and I adopted the phrase "non-purposive coordination" to emphasize that it is the incentive-sapping effect of responses (as in Turner) that provides the economic essence of the harm, whether they are illegally "coordinated" or are "natural and non-purposive" or neither. It is late in the day to rethink the most helpful usage for terms such as coordination, agreement, collusion, and so on. But we can at least remain uncomfortably aware of the risks of confusion, and remind ourselves to think very carefully around these issues.

The theory of repeated games, and in particular the folk theorems, are a powerful piece of analysis and play a prominent role in understanding the boundaries of *possible* oligopoly and similar cooperation. But they need to be complemented by a better understanding of which of the very many possible outcomes are relatively likely. We do not yet have a rigorous workhorse model of the latter, so it is important to use what insights we have and work pragmatically to develop those, and not ignore them merely because they are incomplete and imperfect. Understanding the dynamics of firm responses under relatively simple credible, if not "inevitable," behavior seems likely to be among the better ways forward.

13 It is usually clear from context what "the same thing" means. One can also think of it as a game with multiple equilibria in which each player would like the other player(s) to know what he is doing.

14 That assumes that each oligopolist's price is equal to the threshold that it applies to another oligopolist's price; one could alternatively separate those two but the basic point would remain.

COORDINATED EFFECTS AND THE HALF-TRUTH OF THE LAX ENFORCEMENT NARRATIVE

BY DANIEL SOKOL & SEAN P. SULLIVAN[1]

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I. THE LAX ENFORCEMENT NARRATIVE AND ITS SKEPTICS

A debate is brewing between antitrust critics who claim that merger enforcement has been weak and fading since the 1980s and establishment defenders who respond that merger enforcement has stood firm and even toughened since the Chicago revolution. Neither side is easily dismissed for their position; neither position is capable of concession or compromise.

Advocates of the lax enforcement narrative occupy the highest positions in government and academia. As House Chair of the Congressional Joint Economic Committee, Representative Donald Beyer recently railed against the "explosion" of mergers and acquisitions: "Over the past 40 years, [mergers] have been allowed to proceed at an unprecedented pace . . . due in part to our failed experiment with a more lax enforcement of antitrust laws."[2] In substance, if not in the exact same words, Beyer's talking points are echoed by other antitrust critics, including those in the current administration. In an executive order, President Biden asserts that "over the last several decades, as industries have consolidated, competition has weakened in too many markets."[3] Assistant Attorney General Jonathan Kanter promises to end previous underenforcement: "I am here to declare that the era of lax enforcement is over, and the new era of vigorous and effective antitrust law enforcement has begun."[4] The Open Markets Institute urges the agencies to shake off decades of lax enforcement: "the lax merger guidelines used over the past 40 years have contributed to unprecedented concentrations of economic and political power that threaten both America's economy and its democratic institutions."[5]

Skeptics of the lax enforcement narrative (who tend not to hold leadership positions under the Biden administration) command long experience and substantial data in raising objections to the narrative. A few months ago, John Mayo and Mark Whitener offered an exemplar of the skeptical response in a short article in the Antitrust Magazine. Synthesizing their own research and the work of others writing about merger enforcement, Mayo and Whitener argue that available evidence categorically refutes the lax enforcement narrative. Among other things, they argue the evidence shows (1) that "merger enforcement activity has increased, not declined," (2) that the agencies "have won litigated merger cases more often over time, not less," and (3) that agency policy initiatives have driven "pro-enforcement changes in judicial doctrine" during the decades of supposed backslide.[6] Others have reached similarly negative conclusions when attempting to verify claims of underenforcement[7] and rising concentration.[8]

Holding lax enforcement claims in one hand, and the skeptical response in the other, one finds an ugly, zero-sum debate. If the skeptical position is right, then proponents of the lax enforcement narrative are stunningly mistaken. Do they not realize that data refute their position? Or do they suspect their story is false but invoke it anyway to justify desired actions? In the other direction, if the lax enforcement narrative is right, then much of the antitrust bar might be written off as silly or worse. The lax enforcement narrative presupposes that entire generations of antitrust attorneys have toiled in blissful ignorance of the crumbling state of antitrust enforcement — or have even contributed to its decline.

II. SOMETHING BETWEEN THE EXTREMES

Unlike most ideological debates, disagreements tinged with empirical assertions are sometimes vulnerable to resolution, and we wonder if the present debate could be improved by a more specific interrogation of the underlying claim in the lax enforcement narrative. In short, we note that merger enforcement could be vigorously and effectively enforced in some regards but not in others. If so, then overall trends in enforcement could

2 *A Second Gilded Age: How Concentrated Corporate Power Undermines Shared Prosperity: Virtual Hearing Before the J. Econ. Comm.*, 117th Cong. 2 (2021) (Opening Statement of Hon. Donald Beyer Jr., Chairman).

3 Exec. Order No. 14,036, 86 Fed. Reg. 36,987 (July 14, 2021).

4 Jonathan Kanter, Antitrust Enforcement: The Road to Recovery, Remarks as Prepared for Delivery Keynote at the University of Chicago Stigler Center (Apr. 21, 2022), https://www.justice.gov/opa/speech/assistant-attorney-general-jonathan-kanter-delivers-keynote-university-chicago-stigler.

5 Open Markets Institute, Comment Letter on Request for Information on Merger Enforcement (Apr. 21, 2022), https://www.regulations.gov/comment/FTC-2022-0003-1123.

6 John W. Mayo & Mark Whitener, *Has Merger Enforcement Really Gone Soft? Probing the Foundations of the Antitrust Reform Narrative*, Antitrust, Fall 2022, at 4, 4–5.

7 *E.g.* C.-Philipp Heller, Robert Lauer & James Mellsop, *Is Lax Enforcement of Antitrust Policy To Blame for an Increase in Market Power?*, Concurrences: Comp. L. Rev., May 2023, at 37; Dennis W. Carlton, *Some Observations on Claims That Rising Market Power Is Responsible for U.S. Economy Ills and That Lax Antitrust Is the Villain*, CPI Antitrust Chron., Aug. 2020, at 1.

8 *E.g.* Gregory J. Werden, *Concentration and Rising Market Power: Fears and Facts, in* Research Handbook on Abuse of Dominance and Monopolization (Pinar Akman, Or Brook & Konstantinos Stylianou eds., 2022); Robert Kulick & Andrew Card, Industrial Concentration in the United States: 2002-2017(2022) , https://www.uschamber.com/assets/documents/Final-Industrial-Concentration-Paper.pdf; Robert D. Atkinson & Filipe Lage de Sousa, No, Monopoly Has Not Grown (2021), https://www2.itif.org/2021-no-monopoly-has-not-grown.pdf.

remain basically the same, while specific areas of enforcement could slide into decay. Concentration and market power could grow as claimed in some respects, but not as claimed in other respects.

That is what we argue is happening. Available evidence supports the skeptical position — rejects the lax enforcement narrative — in all but one respect. But that one respect is a doozie. Coordinated effects enforcement has declined *severely* over recent decades — to a state of underenforcement not far off from the claims of the lax enforcement narrative. This, we argue, is the half-truth of the lax enforcement narrative. An intermediate position that partly reconciles otherwise irreconcilable empirical claims and that identifies a deficiency in current merger enforcement upon which all sides might agree that change is needed to empower effective antitrust enforcement. All that one needs to entertain this intermediate position is an openness to the possibility that merger enforcement could be adequate in some respects and inadequate in others.

III. OVERALL MERGER ENFORCEMENT HAS NOT DECLINED

To be clear, we agree with Mayo and Whitener, and other skeptics, that merger enforcement has not declined in the overall sense that the most strident advocates of the lax enforcement narrative claim it has.

A. Merger Enforcement from 1960 to 2000

This is not to say that enforcement has not varied since the 1960s. Senator Amy Klobuchar points to the 1980s as a period of ostensibly weak merger enforcement, and there is at least some evidence consistent with this claim. For example, compared to the 92 horizontal merger challenges brought by the DOJ in the 1960s, and the 85 challenges in the 1970s, only 37 horizontal merger challenges were brought by the DOJ in the 1980s.[9] Also consistent with the lax enforcement claim is the qualitative impression that government merger challenges were received more credulously in the 1960s than in subsequent decades. Gone are the days when Justice Stewart was driven to exclaim, "The sole consistency that I can find is that in litigation under [section] 7, the Government always wins."[10]

But the scant data supporting the broad form of the lax enforcement narrative shrink beneath the mountain of counterevidence. Take the above-noted DOJ enforcement statistics. The drop off in horizontal merger challenges during the 1980s reversed in the 1990s, with the DOJ bringing 69 challenges over this decade, only a few less than it had brought in the supposedly stronger enforcement era of the 1970s.[11] Merger enforcement data from the FTC also conflict with the apparent trend. As Joe Sims and Deborah Majoras have observed, together the agencies challenged an average of about 20.5 mergers per year from 1968 to 1978, compared with an average of about 17.9 per year from 1979 to 1997,[12] hardly a sea change.

Even this modest reduction in challenge rates must be interpreted with care. Between 1978 and 1979 the Hart-Scott-Rodino Antitrust Improvements Act took effect, bringing with it premerger notice requirements, discovery opportunities, and compulsory waiting periods. In the decades prior to HSR, companies had no obligation to notify the government about their intent to merge and the agencies consequently failed to learn of many, perhaps most, mergers in time to seek preventative remedies.[13] Preliminary injunctions were infrequent during this period.[14] Efforts to unwind consummated mergers could be slow and costly.[15] To state the obvious, high challenge rates, in the decades before HSR, did not necessarily equate to impactful merger enforcement.

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9 Joseph C. Gallo et al., *Department of Justice Antitrust Enforcement, 1955–1997: An Empirical Study*, 17 Rev. Indus. Org. 75, 94–96 (2000). Changes in enforcement frequency may owe to changes in enforcement priority and resource allocation.

10 *United States v. Von's Grocery Co.*, 384 U.S. 270, 301–02 (1966) (Stewart, J., dissenting).

11 Gallo, et al., *supra* note 9, at 94–96.

12 Joe Sims & Deborah P. Herman, *The Effect of Twenty Years of Hart-Scott-Rodino on Merger Practice: A Case Study in the Law of Unintended Consequences Applied to Antitrust Legislation*, 65 Antitrust L.J. 865, 866 n.7 (1997).

13 *See* William J. Baer, *Reflections on Twenty Years of Merger Enforcement Under the Hart-Scott-Rodino Act*, 65 Antitrust L.J. 825, 829 (1997) ("The data suggest that close to 70 percent of the problematic mergers were not detected in time to seek preliminary relief [in the decades before the HSR Act's passage].").

14 *See* Grant S. Lewis, *Preliminary Injunctions in Government Section 7 Litigation*, 17 Antitrust Bull. 1, 3–4 (1972) ("Between 1914 and 1955, the government filed twenty-one Section 7 suits and moved preliminarily to enjoin the acquisition in two of them. During the last sixteen years, 167 government Section 7 suits have been filed and the government has so moved in fifty of them. The government was successful on fifteen of these post-1955 motions, unsuccessful on twenty-five and ten were settled before decisions on the merits were rendered." (footnotes omitted)).

15 *See* Baer, *supra* note 13, at 827 (citing one instance in which the government spent 17 years trying to unwind an anticompetitive merger).

Nor would lower challenge rates in the decades following HSR necessarily equate to weak enforcement. HSR's notice and waiting period obligations probably deter some anticompetitive mergers from being attempted at all,[16] mooting the need for challenges. The HSR framework provides both opportunities and incentives for merging parties to abandon deals that seem likely to be challenged,[17] or to work with the agencies to proactively adjust mergers in ways that eliminate concerns as effectively as litigation might, again divorcing the effectiveness of merger enforcement from the rate of merger challenges. Looked at from this perspective, the slight decrease in merger challenge rates from the 1960s to the 1990s could reflect a substantial *increase* in the vigor and effectiveness of merger enforcement — an interpretation consistent with Mayo and Whitener's skeptical position.

B. Merger Enforcement from 2000 to Present

If evidence does not support the lax enforcement narrative before the turn of the century, might it reveal the claimed slump in enforcement in the years since then? In short, "No." Within the mostly apples-to-apples context of post-HSR merger enforcement,[18] we still cannot locate evidence of a broad and persistent decline in merger enforcement.

We are not alone in this assessment. In a recent survey of antitrust enforcement practices — which critiques declining challenge rates in most other areas of antitrust law — Fiona Scott Morton reports no similar trend in merger enforcement. "As to mergers," Scott Morton notes, "we do not see a trend in overall enforcement at the two antitrust enforcement agencies, despite a significant increase in economic activity over this time period."[19] The qualification about changes in economic activity could be important for interpreting these data, since stable challenge rates mean something different in comparison to stable merger activity levels than they do in comparison to sharply rising merger activity.

But adjusting for overall merger activity does not appear to resuscitate the lax enforcement narrative. Instead, in an analysis of challenge rates over the period of 1979 to 2017, Jeffrey Macher and John Mayo conclude that, after factoring in merger activity levels, the relative challenge rate appears to have increased over time.[20] To some extent, this might reflect mean reversion. Since the 1980s produced a smaller number of merger challenges than either previous or subsequent decades, a return to more average challenge frequency in subsequent decades could present as an increasing rate of enforcement.

Evidence of comparatively rising enforcement intensity is, however, echoed in at least one other empirical study. Looking at FTC investigation data, Malcolm Coate reports declines in the number of Second Requests and merger challenges since the turn of the century: the respective frequencies fall from an average of about 67 Second Requests and 26 challenges every two years before 2001, to 40 Second Requests and 20 challenges over the 16 subsequent years.[21] But the ratio of these trends, as Coate notes, reflects an increasing rate of merger challenges.[22] Within closely investigated mergers, the challenge rate rises from about 38 percent before 2001 to 49 percent thereafter.[23] Whether or not a nearly 50 percent challenge rate feels appropriate in this context, it is hard to square with the narrative of weak and declining vigor in merger enforcement.

IV. COORDINATED EFFECTS ENFORCEMENT HAS DECLINED

The claims of advocates of the lax enforcement narrative — that overall merger enforcement has declined in intensity or efficacy over a span of decades — are not supported by the evidence. But that does not mean that merger enforcement has remained constant. Consistency of merger enforcement does automatically imply consistency *within* merger enforcement.

16 *See* Carl Shapiro, *Protecting Competition in the American Economy: Merger Control, Tech Titans, Labor Markets*, 33 J. Econ. Persps. 69, 72 (2019) ("Merger control policy greatly affects the set of deals that are proposed . . . .").

17 *Cf.* Sims & Herman, *supra* note 12, at 866 (noting the sharp decline in litigation following enactment of the HSR framework, with less than one fifth of challenged mergers continuing to litigation after HSR, as opposed to nearly half before HSR).

18 An important revision to the HSR reporting thresholds took place in February of 2001. As Thomas Wollmann notes, this revision appears to have resulted in potentially anticompetitive mergers going entirely uninvestigated by the agencies. Thomas G. Wollmann, *Stealth Consolidation: Evidence from an Amendment to the Hart-Scott-Rodino Act*, 1 Am. Econ. Rev.: Insights 77, 82 (2019).

19 Fiona Scott Morton, Wash. Ctr. for Equitable Growth, Modern U.S. Antitrust Theory and Evidence Amid Rising Concerns of Market Power and Its Effects: An Overview of Recent Academic Literature 13 (2019), https://equitablegrowth.org/wp-content/uploads/2019/05/052819-antitrust-lit-rev.pdf. Like us, Scott Morton notes changes in the types of mergers that the agencies are challenging. *Id.* at 14.

20 Jeffrey T. Macher & John W. Mayo, *The Evolution of Merger Enforcement Intensity: What Do The Data Show?*, 17 J. Comp. L. & Econ. 708, 709 (2021).

21 Malcolm B. Coate, The Merger Review Process at the Federal Trade Commission from 1989 to 2016, at 33 tbl.2 (Feb. 28, 2018), https://ssrn.com/abstract=2955987.

22 *Id.* at 8–9.

23 *Id.* at 33 tbl.2.

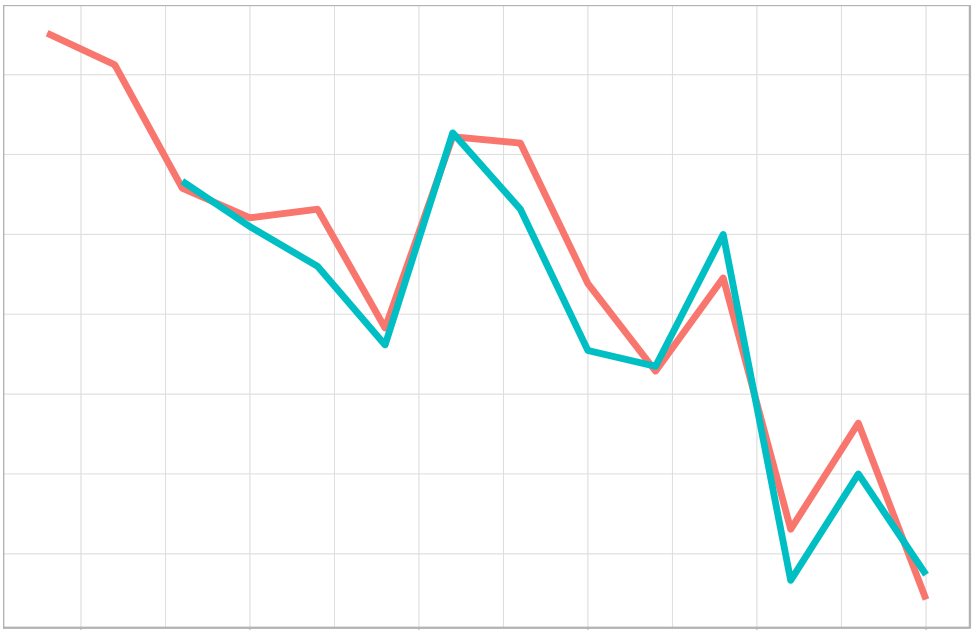
Indeed, it would be disappointing if merger enforcement had not changed over the span of decades of accumulated experience and advances in economic research. Those who would see merger enforcement forever frozen in the analysis of the 1960s, or 1980s, or any other decade, pine for a stasis that is as obnoxious to progress as it is to pragmatic decisional law. That said, changes within merger enforcement come with no manufacturer's guarantee of improvement, and our view of the evidence is that at least one development of the past decades has emerged as an error of omission. Coordinated effects enforcement has declined to a level approaching the abdication described by the lax enforcement narrative.

A. Fewer Cases, Fewer Investigations

As we develop in recent scholarship, the frequency of coordinated effects enforcement has declined — since the early 1990s — by every metric we have used to track it. This decline is evident in the paltry number of coordinated effects cases in recent decades of reported opinions.[24] It is evident in a review of recent survey data on practitioner experiences with merger investigations.[25] And, most impressively, it is evident in what limited transparency data are available on internal agency enforcement practices.

For a number of years, the FTC compiled and publicized information on its merger investigations as part of the Merger Policy Transparency Project.[26] Summarizing transparency project data on completed FTC investigations from 1989 to 2016, Malcolm Coate has previously called attention to a persistent trend of FTC investigations favoring unilateral effects analysis over coordinated effects analysis.[27] To give a sense of the pattern that Coate is observing, the following figure plots the portion of merger investigations that focused primarily on coordinated effects theories during the window for which transparency data were collected. (The two lines reflect separate but overlapping datasets in Coate's study.[28])

Figure 1. Portion of FTC Second Requests Primarily Focused on Coordinated Effects[29]



Did the FTC have it right when more than 80 percent of its serious investigations concerned coordinated effects theories at the start of the 1990s? Probably not. Mergers present more than just coordinated effects issues, and forcing most investigations through the analysis of this single theory of harm may have led Commission staff to miss problematic mergers that they would not miss today. But relegating coordinated

24 D. Daniel Sokol & Sean P. Sullivan, *The Decline of Coordinated Effects Enforcement and How to Reverse It*, 76 Fla. L. Rev. (forthcoming 2024).

25 D. Daniel Sokol, Marissa Ginn, Robert Calzaretta & Marcello Santana, *Antitrust Mergers and Regulatory Uncertainty*, Bus. Law. (forthcoming 2023).

26 *See* Malcolm B. Coate, Annotated Bibliography for the Transparency Papers: Version 3.4 (Feb. 25, 2021), https://ssrn.com/abstract=1984680; Malcolm B. Coate & Shawn W. Ulrick, *Transparency at the Federal Trade Commission: The Horizontal Merger Review Process 1996-2003*, 73 Antitrust L.J. 531 (2006).

27 Coate, *supra* note 21, at 2.

28 *See id.* at 14–16.

29 Figures illustrate data tabulated by Coate. *Id.* at 35 tbl.4. Mergers to monopoly have been excluded when computing relative frequencies.

effects theories the focus of less than 20 percent of investigations is no better. Just as overemphasis of coordinated effects theories may have caused the agencies to miss problematic mergers in the past, underemphasis of coordinated effects theories is likely leading the agencies to miss problematic mergers today.

B. Less Concern with Market Concentration

Perhaps this explains the dissonance one perceives in recent commentary about mergers and market concentration. Several years ago, Representative Jerry Nadler asserted a version of the lax enforcement narrative specific to changes in market concentration due to mergers:

> Over the past several decades, [waves] of anticompetitive consolidation in industry after industry [—] which has largely been the result of lax merger enforcement [—] have threatened the economic wellbeing and financial security of American families, whether through job losses and artificially low wages or higher prices and lower quality for essential goods and services. This massive concentration of economic power has arguably even frayed our nation's social fabric. [30]

Nadler's claims sound strange when compared with the intentionally reduced emphasis on market concentration in the 2010 revision of the Horizontal Merger Guidelines. That reduced emphasis, while explicitly intended to reflect a change in approach,[31] was not presented or — to our knowledge — received as a relaxion of merger enforcement. Wisely or not, it reflected an emergent consensus among economists and antitrust practitioners that reliance on market concentration evidence was often inferior to other ways of attempting to predict whether mergers would have anticompetitive effects.[32]

As we argue in recent research, that consensus is both cause and effect of the decades-long decline in coordinated effects enforcement.[33] While the number and relative size of firms in a market defined by the Hypothetical Monopolist Test is, by construction, relevant evidence when assessing the threat of coordinated effects arising from a merger within that market, this same evidence may hold little to no probative value for evaluating the threat of unilateral effects from mergers.[34] Thus, as investigations have shifted toward almost exclusive focus on unilateral effects theories, it is little wonder that market concentration evidence has decline in analytical prominence. But that is an explanation, not an excuse, and it does not justify an uncritical retreat from relying on market concentration evidence in merger view. Advocates of the lax enforcement narrative might argue that the agencies went too far in disregarding concentration considerations. We are sympathetic to that critique, at least to the extent that deemphasis of market concentration evidence has resulted in the agencies devoting less attention to coordination concerns.

V. FINDING BALANCE IN MERGER ANALYSIS

For those who are persuaded — as we are — that anticompetitive coordinated effects are being overlooked and underpoliced in merger review, the question is what can be done to rebalance enforcement priorities. It is trite to say that recognizing the problem is the first step in solving it. Here, however, there may be a special nexus between recognition and solution. Coordinated effects enforcement declined during a period of neglect in scholarship and expert commentary. No less than we need renewed focus on coordinated effects theories within the agencies, we need renewed focus on coordinated effects theories in research and commentary. Industrial organization economists need to devote more time to coordinated effects theories and to related forms and implications of interdependent exercises of market power. Legal scholarship is needed, too. The world has changed enormously since coordinated effects theories last commanded widespread academic and research interest. It would be a shock if there were not new things to say.

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30 *House Judiciary Committee, Regulatory Reform, Commercial and Antitrust Law Subcommittee Hearing of Oversight of the Antitrust Enforcement Agencies*, 115th Cong. (2018) (statement of Ranking Member of the Judiciary Committee, Jerry Nadler), unpublished transcript accessed at ProQuest Congressional.

31 *See e.g.,* Alison Oldale, Joel Schrag & Christopher Taylor, *The 2010 Horizontal Merger Guidelines at Ten: A View from the FTC's Bureau of Economics,* 58 Rev. Indus. Org. 33, 38 (2021) ("[O]ne of the most significant changes in the 2010 Guidelines is the reduced emphasis on the analysis of market definition and concentration as a central focus of horizontal merger review."); Carl Shapiro, *The 2010 Horizontal Merger Guidelines: From Hedgehog to Fox in Forty Years*, 77 Antitrust L.J. 701, 707 (2010) ("Many observers have noted specifically that the 2010 Guidelines place less weight on market shares and market concentration than did predecessors.").

32 *E.g.* Dennis W. Carlton & Mark A. Israel, *Effects of the 2010 Horizontal Merger Guidelines on Merger Review: Based on Ten Years of Practical Experience*, 58 Rev. Indus. Org. 213, 217 (2021) (observing that "the recent industrial organization literature has shied away from — or even rejected — the notion that measures of market concentration can tell one anything about market power"); *see also* Daniel Hosken, Louis Silvia & Christopher Taylor, *Does Concentration Matter? Measurement of Petroleum Merger Price Effects*, 101 Am. Econ. Rev.: Papers & Proc. 45 (2011).

33 Sokol & Sullivan, *supra* note 24.

34 *See* Sean P. Sullivan, *Modular Market Definition,* 55 UC Davis L. Rev. 1091, 1107–17 (2021).

The hopeful note, here, is that fresh thinking and impactful research could do great work in helping to reinvigorate this area of antitrust enforcement. We believe that a greater emphasis on coordinated effects is one of the few ways that those at opposite ends of the antitrust-policy spectrum could come together to identify and address competition concerns. We also hope that, with time and assistance from the economics literature, the agencies will craft more effective legal and policy responses to coordinated effects issues.

STRATEGIC USE OF PUBLIC PRICE INDEXES AS A COLLUSIVE DEVICE

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I. INTRODUCTION

In a number of antitrust cases, in different industries – such as oil, beef, and financial markets – as well as across geographic regions and time periods, public price indexes have been implicated as key mechanisms for achieving coordinated effects. The use of an index may increase the profitability of collusion by allowing firms that coordinate their behavior in one market to have a much larger impact (and thus accrue much larger profits) through the index's effect on prices in closely related markets. An index is particularly vulnerable to anti-competitive manipulation when there is greater concentration in the transactions that generate the information in the index than in the transactions that use the index. Using an index may also reduce the likelihood that a collusive equilibrium is disrupted by an external shock; when long-term contracts specify a price based on a public price index, the collusive price can automatically adjust, without requiring communication or renegotiation among the colluding firms.

Note that firms may use public price indexes strategically to anti-competitive effect without misreporting any information that goes into the index.[2] While fraud and misrepresentation can cause serious harm to competition and to consumers, this is not necessary for an index to facilitate collusion. In some cases, indexes are designed for ease of manipulation, for example when they use prices from thin or very concentrated markets to produce a public price index that is used in a broader market. In other cases, indexes amount to a way to share information about pricing through an industry organization. In yet other cases, the index is produced by a neutral party, such as a statistical agency, with no anti-competitive purpose. The use of a price index in long-term contracts ("hardening" the contract with respect to the index, as we will refer to it in this article) itself can change the incentives for collusive behavior.

II. CASE VIGNETTES: COORDINATION INVOLVING PRICE INDEXES

Strategic behavior toward public price indexes can create collusive profits in one (or both) of two ways: industry participants may engage in strategic action to raise a public price index and then (1) *coordinate* their individual behavior by making price offers/bids based on that index, or (2) receive higher prices because they have *hardened* that index into long-term contracts. Where the price index reflects a *segment* of the market, players may behave strategically in that market in order to influence the index. Where the price index is not verified, players may give *false reports*. Finally, where the price index is privately produced, players may *design* the index to disproportionately reflect the behavior of collusive participants. The cases discussed below reflect combinations of these different possibilities.

A. Socony-Vacuum

The classic *Socony-Vacuum* case, in which the Supreme Court ruled that market manipulation is a mechanism of restraining trade, pertained to spot market manipulation and coordination: oil refiners increased the prices they received through strategic purchases that affected a public price index.[3] The large, vertically integrated oil producers sold their oil to wholesalers and independent refiners at a price that was "indexed to the spot market price."[4] The spot market price was determined by "averaging the high and low spot market quotations reported in the Chicago *Journal of Commerce* and Platt's *Oilgram* or by averaging the high and low quotations reported in the Journal alone."[5]

This spot market price was hardened into oil contract prices. The proportion of transactions that were conducted on the spot market had declined, making this pricing mechanism more vulnerable to manipulation. According to the *Socony-Vacuum* decision: "About 80% or more of defendant companies' jobber contracts provided that the price of gasoline sold thereunder should be the Mid-Continent spot market price on the

2 Writing about attempts to corner or short a market, Verstein makes a similar point: "[I]f the threat of litigation is to constrain manipulators, we must reverse many decades of conflating manipulation with fraud. Many manipulations do not involve fraud, as such, and this is true of benchmark manipulation. Instead, we must recognize benchmark manipulation as a distinctive form of market abuse." Andrew Verstein, *Benchmark Manipulation,* 56 Boston College Law Review. 215, 219 (2015).

3 *See e.g.,* Alan Schacter, *The Availability of Antitrust Treble Damages for Commodities Market Manipulation*, 54 Fordham Law Review. 853, 854 (1986).

4 Daniel Crane, *The Story of U.S. v. Socony-Vacuum: Hot Oil and Antitrust in the Two New Deals in Antitrust Stories*, Benjamin N. Cardozo School of Law, Jacob Burns Institute for Advanced Legal Studies, Working Paper No. 173 at p. 4 (2006).

5 *United States v. Socony-Vacuum Oil Co., Inc.*, 310 U.S. 150 (1940), para. 45 [hereinafter *U.S. v. Socony*]. The decision describes in detail the process for determining the spot price: "In the case of the *Oilgram* these prices are obtained by a market checker who daily calls refiners in the various refinery areas (major companies as well as independents) and ascertains the quantity and price of gasoline which they have sold to jobbers in spot sales. After checking the prices so obtained against other sources of information (such as brokers' sales) and after considering the volume of sales reported at each price, he determines the lowest and highest prices at which gasoline is being sold to jobbers in substantial quantities on the spot market. Thus, if he finds that substantial sales are reported at 5 1/8¢, 5 1/4¢ and 5 3/8¢, the *Oilgram* reports a price range of 5 1/8-5 3/8¢. The result is published in the *Oilgram* that same day." (para. 46, footnotes omitted).

date of shipment."[6] As the spot market price affected a broad range of transactions, the large integrated producers ("the majors") could affect prices by targeting a relatively small number of transactions. They did this with the "dancing partner program" which "match[ed] the majors with small independent refiners. Whenever the small refiner had hot oil that it was prepared to dump on the market, its dancing partner would buy up the oil and squirrel it away" effectively preventing the published spot market price from falling.[7] Note that there was not, in this case, a claim that the reported spot prices were false. Rather, the colluding firms acted to keep the accurate, but manipulated, price index high.

B. Cattle

Cattle provides a more recent example of how a price index, even when there are honest reports to a trustworthy third party, can increase the probability of collusion. As in *Socony-Vacuum*, collusion appears to have been implemented by manipulating a relatively thin cash market that is hardened into contracts and therefore determines the prices in many additional transactions. The cash price for cattle was, allegedly, strategically depressed by large meat packers reducing their purchases in the spot market. It was alleged that this reduced the price index, and thereby reduced the price packers paid cattle farmers for contract purchases.

The U.S. Department of Agriculture produces a number of indexes based on mandatory reporting of the sale of cattle.[8] There are no allegations that the reports are strategic or that the formula for calculating the reported prices is strategic. But the "cash price" of cattle has been hardened into contract and futures prices so that "the reward for fixing the price of about 25 percent of cattle purchased is control of the price for over 95 percent of the market."[9]

C. Salmon

The *Salmon Industry* case points to the vulnerability of industry-designed price indexes to manipulation (or at least the appearance of thereof). In 2019, the European Commission ("EC") and the U.S. Department of Justice ("DOJ") Antitrust Division initiated investigations of several Norwegian salmon producers for potential collusive activities. In that same year a class action suit was filed by U.S. seafood purchasers. The EC and DOJ subsequently closed their investigations without further action, while the defendants in the civil suit ultimately settled for USD 85 million.[10] One of the interesting allegations in this case, which we have written about previously, is whether the major Norwegian salmon farmers redesigned the industry-produced public price index during the alleged collusive period to facilitate coordination:

By early 2012, major Norwegian farmers and the Oslo exchange for fish products were discussing a new methodology for reporting the spot price of salmon products. This method—formalized in April 2013 when an existing, industry-produced price index was abandoned in favor of the new (Nasdaq) index—provided vertically integrated salmon farmers the opportunity to report purchase prices directly to the index for the first time. While we are not able, based on the publicly available evidence, to comment on the existence of explicit collusion or the intent of these actions, the economics suggests that the vertical and horizontal combinations observed in this industry made it vulnerable to the anticompetitive use of industry-produced price indices.[11]

The spot market for Norwegian salmon is thin: one estimate from the class action complaint is that about 1 percent to 2.5 percent of production is sold on the spot market, while the majority of transactions are arranged through long-term contracts.[12] Prior to 2013, the Oslo Fish Pool spot price index was compiled from reports by independent salmon farmers. This changed in 2013 when the Oslo Fish Pool worked with the salmon industry to design a new Nasdaq index compiled from reports of distributors, which allowed the newly vertically integrated major producers to participate by submitting prices at which they transferred salmon to value-added processors or retailers.[13]

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6 *U.S. v. Socony*, para. 45.

7 Crane (2006), p. 7.

8 A summary of these price indexes is provided by the U.S. Department of Agriculture, Agricultural Marketing Service, *User's Guide to USDA LMR Cattle Price Reports*, https://www.ams.usda.gov/sites/default/files/media/LMRCattleUserGuide.pdf.

9 Brianna Alderman, *Meatpackers Feed on Fed Cattle*, 68 Antitrust Bulletin. 88, 94 (2023).

10 Danial Asmat, Margaret Levenstein, Valerie Suslow, & Helen (Zhihan) Wang, *Swimming in Pools: Collusion in the Salmon Market*, 68 Antitrust Bulletin. 137, 137-38 and footnote 32 (2023), documenting the withdrawal of cases by EC and DOJ.

11 Asmat et al. (2023), p. 138.

12 Asmat et al. (2023), p. 143.

13 Asmat et al. (2023), p. 144. This index was also composed, in small part, by a separate Norwegian salmon index produced by the SSB, the Norwegian Statistical Bureau (Statistisk Sentralbyra).

D. LIBOR

LIBOR is one of the best-known examples of benchmark manipulation, but it is not unique. Similar activity occurred in other financial market benchmarks, including the Euribor market and the yen interest rate derivatives market.[14] There have also been cases involving illegal manipulation of foreign exchange markets by traders at several banks, with large fines imposed.[15]

LIBOR captures virtually all of the characteristics of benchmarks that facilitate collusion that we have found. The index was designed by industry participants in a way that made it vulnerable to both collusion and false reports. Abrantes-Metz et al. (2012) describes the design process and its vulnerability:

> In [1986] the [British Banker's Association] introduced Libor as a reference rate for a number of securities, notably syndicated loans, futures contracts, and forward rate agreements. … The BBA selects 16 banks to provide daily rate quotes for the calculation of Libor. …The quoted Libor rate on any given day is the simple average of the rates submitted by the middle eight banks, that is, the average after dropping the highest and the lowest four rates. … Because the "middle eight" quotes are converted into Libor through a simple arithmetic mean calculation, as few as five (of 16) banks, acting in concert, could conceivably influence the published Libor rate.[16]

LIBOR was hardened into contracts well beyond the market whose prices it allegedly reflected. The "London Interbank Overnight Rate" is intended to measure very short-term interest rates charged by banks to other banks.[17] By 2014, it was used to determine transaction prices (usually interest rates) in over $200 trillion contracts from interest rate and international currency swaps to credit cards and auto loans.[18] It appears that industry participants took advantage of the vulnerability of LIBOR to collude, report falsely, and profit from both the direct manipulation of these interest rates and the positions they held in the broad expanse of markets that used LIBOR as a signal: "...some derivatives traders asked bank officials that were charged with providing rate submissions to the LIBOR poll to bias their reports…. In some instances, more significant distortions were achieved through collusion that coordinated the misreporting among several banks."[19]

E. Poultry

The poultry industry provides an illustration of how firms may both influence how a public price index is calculated and manipulate that index with false reports. There is also a suggestion that the co-conspirators shifted to using contracts that were explicitly contingent on the manipulated price index. Li & Weisman (2023) examine these allegations of price-fixing in the market for U.S. broiler chickens.[20]

In addition to the common practices firms often implement to sustain collusive prices, such as reducing supply and monitoring adherence to their agreement, poultry producers allegedly took actions to "facilitate, monitor and police their coordinated output restriction scheme by, among other things, communicating through third parties…."[21] In particular, the poultry producers were alleged to have used the Georgia Dock Price Index ("GDI") to raise prices. The allegations suggest that the producers in the industry influenced the design of the GDI to permit its

14 *See e.g.,* cases involving manipulation of Euro and Yen-based benchmarks. "It [EC] said traders at seven banks were in regular contact and exchanged information on their trading positions and pricing strategies via chatrooms or messaging services." (*HSBC fails to shake off Euribor cartel charge*. Biztech News, Jan. 12, 2023; https://www.eurone-ws.com/next/2023/01/12/eu-hsbc-antitrust) and "disseminating misleading information to some of the banks of the panel that set yen rates and serving as a communications channel between traders involved in anticompetitive activities." (*ICAP Fined For Participating in Bid to Manipulate Key Benchmark Rates*, Wall Street Journal, Feb. 4, 2015; https://www.wsj.com/articles/icap-fined-for-participating-in-bid-to-manipulate-key-benchmark-rates-1423049102).

15 *See e.g.*, Michael Corkery and Ben Protess, *Rigging of Foreign Exchange Market Makes Felons of Top Banks*, N.Y. Times, May 20, 2015; https://www.nytimes.com/2015/05/21/business/dealbook/5-big-banks-to-pay-billions-and-plead-guilty-in-currency-and-interest-rate-cases.html.

16 Rosa Abrantes-Metz, Michael Kraten, Albert D. Metz & Gim S. Seow, *Libor Manipulation?,* 36 Journal of Banking and Finance. 136, 137 (2012).

17 Gavin Finch & Liam Vaughan, *The Man Who Invented the World's Most Important Number*, Markets Magazine, Bloomberg News, 2016; https://www.bloomberg.com/news/features/2016-11-29/the-man-who-invented-libor-iw3fpmed?leadSource=uverify.

18 Darrell Duffie, & Jeremy C. Stein, *Reforming LIBOR and Other Financial Market Benchmarks*, 29 Journal of Economic Perspectives, 191, 198 Table 1 (2015).

19 Duffie & Stein (2015), p. 196.

20 Li & Weisman (2023) provide background on the series of cases and decisions, including the initial civil suit alleging price-fixing, filed in 2016 (with over 150 additional suits filed since). Price-fixing efforts in the industry are alleged to have begun "as early as 2008 through at least early 2019" (p. 57). One poultry company defendant paid a criminal fine of over $100 million in 2021 following a guilty plea (p. 59). There was a mistrial in one case, and other cases have been won by the defendants or ultimately dropped. Dong Li & Dennis L. Weisman, *Ruffled Feathers: The Chicken Cartel in the United States,* 68 Antitrust Bulletin. 47, 57-60 (2023).

21 Li & Weisman (2023), pp. 57-58.

manipulation; that they reported false prices to the Georgia Department of Agriculture in a coordinated fashion to create the appearance of higher prices; and that contract prices were pegged to the price indexes.

While Georgia Dock was produced by the state of Georgia's agricultural department, its creation and its implementation were heavily influenced by the largest poultry producers:
Georgia Dock was created in the Poultry Market News ("PMN") Bulletin in 1965 by the Georgia Department of Agriculture ("GDA") upon a recommendation from the Georgia Poultry Federation ("GPF"). The GPF is a trade association for poultry producers in Georgia. The pricing methodology of Georgia Dock has remained largely unchanged since 1972, although it was never made public until its final days. A non-public, non-governmental PMN Advisory Committee was formed around the same time with members from the participating producers.[22]

The index appears to have influenced transaction prices both where the index was explicitly hardened into contracts, as was documented in the case, and where it was used more informally to set price, as Li & Weisman note occurred "as a base-line or crosscheck."[23] Li & Weisman suggest that the shift to contracts that relied on the price index was a strategic move by industry participants, saying, "The industry collectively moved away from long-term fixed-price contracts to short-term contracts with prices pegged to several price indices beginning in 2008…."[24] It was alleged that poultry producers were able to and did submit misleading information that influenced the reported price index:

> Nine of the largest producers by market share in Georgia submitted prices to form the Georgia Dock index with their respective market shares serving as the index weights. Unlike [other price indexes], there is no double verification…. Hence, to inflate the Georgia Dock, all or most of the companies would have to submit higher prices within two cents of each other. Georgia Dock was twenty or thirty cents higher than the comparable … price index for extended periods of time. …As a result of budget cuts and force reductions at PMN around 2008 and 2009, and other personnel changes in 2011 and 2012, Georgia Dock became an easy target for manipulation.[25]

As a result of investigations that began after pricing anomalies were reported by the Wall Street Journal in 2016, the GDI was closed down by the end of that year. No new index was created by the Georgia Department of Agriculture to take its place.[26]

F. Natural Gas and Oil

Energy markets have also been targeted for strategic interventions with intent to influence indexes that affect prices broadly. In particular, there have been charges that traders manipulated reports to Platts, a privately-owned publisher of energy price indexes, to influence its benchmarks for energy commodity prices. These benchmark indexes are relevant for "traders and companies globally which daily use Platts' benchmarks to price billions of dollars' worth of contracts."[27]

Platts produces a variety of indexes that rely on voluntary self-reports of transactions by industry participants.[28] In an article on regulation in the natural gas and electricity markets, and price formation mechanisms more broadly, Boyd (2020) traces the history of regulation in these markets. He observes that from the 1980s until the California energy crisis of 2000-2001, the Federal Energy Regulatory Commission "paid almost no attention to these price indices, assuming that they were natural features of an emerging market… [They] were viewed as reflections of the market (facts about the market) rather than as constitutive technologies that played a fundamental role in making these markets."[29]

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22 Li & Weisman (2023), p. 65.

23 Li & Weisman (2023), p. 65.

24 Li & Weisman (2023), p. 58.

25 Li & Weisman (2023), pp. 65-66 (footnotes omitted).

26 *See e.g.,* three 2016 Wall Street Journal articles: Spencer Jakab, *Are Food Companies Playing Chicken with Prices?*, WSJ, January 18, 2016; Kelsey Gee & Jacob Bunge, *Chicken Prices Under Scrutiny as New Rules Set to Kick In*, WSJ, November 22, 2016; and, Jacob Bunge, *Agricultural Officials to Suspend Controversial Chicken Pricing Benchmark*, WSJ, December 21, 2016.

27 Chris Prentice & Jody Godoy, *U.S. Justice Department probes suspected manipulation of Platts benchmarks – sources*, Reuters, October 4, 2021; https://www.reuters.com/business/energy/exclusive-us-justice-department-probes-suspected-manipulation-platts-benchmarks-2021-10-04/.

28 William Boyd, *Ways of Price Making and the Challenge of Market Governance in U.S. Energy Law*, 105 Minnesota Law Review. 739, 766 (2020).

29 Boyd (2020), p. 761.

But, as Boyd notes, the process of compiling and publishing a price index has "ample room for the exercise of discretion and judgment on the part of those constructing the indices…"[30] And in fact, two fuel oil industry firms, Glencore and Vitol, paid substantial fines for manipulating reports to Platts to influence benchmark prices.[31] A press release by the DOJ describes some of Glencore's actions, for example, that it "conspired to manipulate two benchmark price assessments published by S&P Global Platts ("Platts") for fuel oil products" relating to "price terms of the physical contracts and derivative positions were set by reference to daily benchmark price assessments published by Platts…"[32] Glencore employees submitted orders to Platts "with the intent to artificially push the price assessment up or down."[33] In particular, there was clear recognition in these actions of the broader goal:

> The bids and offers were not submitted to Platts for any legitimate economic reason by Glencore Ltd. employees, but rather for the purpose of artificially affecting the relevant Platts price assessment so that the benchmark price, and hence the price of fuel oil that Glencore Ltd. bought from, and sold to, another party, did not reflect legitimate forces of supply and demand.[34]

III. LESSONS LEARNED

As we argue through the case vignettes presented here, price indexes are or can be used to facilitate collusion. Of course, public price indexes can increase the efficiency of markets by providing participants with information. For example, they may reduce contracting costs and risk exposure by creating public signals relevant for a wide variety of state-contingent contracts (e.g., forward and futures contracts). Our findings relating to the anti-competitive use of price indexes is not a condemnation of price indexes, but rather calls attention to the importance of the rules and institutions that are used to produce and govern price indexes. Some practices promote competition; others make it easier to undermine it.

At first glance, it might not seem plausible that colluding firms could profit from strategic manipulation of a price index. In the neoclassical archetype, collusive actions to increase profits by manipulating a price index would be self-defeating: firms make purchases to drive up the spot price of some product, and that spot price is publicly reported. In turn, other prices calculated as a function of the spot price also increase. But it is costly to buy up goods on the spot market to drive up the price. And if colluding firms do, other firms may find ways to undermine the price increase, shorting the market because they know the price has to come down, thus undermining any increases in the broader market. The attempted market intervention is costly but would have no effect on equilibrium prices or profits. The cases described above help us to understand the contours of market institutions that might undermine the logic of the archetype and make it rational for colluding firms to manipulate a price index. These cases suggest that there can be strong incentives to manipulate such indexes. They are often vulnerable to strategic manipulation either because they are constructed collaboratively by industry players or there is insufficient oversight, or both.

How do public price indexes affect the stability of collusion? Following Stigler and others, we have long argued that cartels need to coordinate their behavior and be able to monitor that behavior to reduce the incentive for defection.[35] By making observable what might otherwise be private transaction prices, public price indexes can assist with both coordination around a collusive price and monitoring of adherence to a collusive agreement. The latter is predicated on the public price index *accurately* reflecting market transactions. We emphasize this because much of the focus of concern, and of legal enforcement actions, is on firms that misreport information. We discuss this further below, but for

30 Boyd (2020), p. 766. Similarly, in their analysis of a German cement cartel, Hüschelrath & Veith (2016) describe how producers complete a standardized survey to report prices and quantities, which is compiled into a public price index by the German Federal Statistical Office ("FSO"). And yet, strategic behavior is possible "with respect to the choice of the invoice handed over by the addressed firms to the FSO." Kai Hüschelrath & Tobias Veith, Cartelization, *Cartel Breakdown, and Price Behavior: Evidence from the German Cement Industry*, 16 Journal of Industry, Competition and Trade. 81, 90 n.11 (2016). Their description illustrates that public "prices" are not merely the reporting of a single price, but rather are indexes created from multiple prices according to some agreed-upon process.

31 *See e.g.,* Commodities Futures Trading Commission press releases, at https://www.cftc.gov/PressRoom/PressReleases/8326-20 and https://www.cftc.gov/PressRoom/PressReleases/8534-22. Also, see Pirrong (2017) who discusses "the submission of false information to price reporting agencies (e.g., Platts)" and notes that related to U.S. energy market cases, "the CFTC collected $445 million in settlements on attempted manipulation and false reporting cases from 2004 through 2009." Craig Pirrong, *The Economics of Commodity Market Manipulation: A Survey*, 5 Journal of Commodity Markets. 1, 12 (2017).

32 DOJ Office of Public Affairs press release, *Glencore Entered Guilty Pleas to Foreign Bribery and Market Manipulation Schemes*, (May 24, 2022); https://www.justice.gov/opa/pr/glencore-entered-guilty-pleas-foreign-bribery-and-market-manipulation-schemes.

33 DOJ press release (May 24, 2022).

34 DOJ press release (May 24, 2022).

35 *See e.g.*, Margaret C. Levenstein & Valerie Y. Suslow, *What Determines Cartel Success?,* 44 Journal of Economic Literature, 43, 44 (2006). For a discussion of Stigler's insights into the conditions necessary for coordination as they apply to the timely topic of algorithms, see Michal Gal & Daniel Rubinfeld, *Algorithms, AI, and Mergers,* forthcoming in Antitrust Law Journal, pp. 11-12 (2023); https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4469586.

collusion, there can be manipulation of benchmark indexes – strategic action to influence those indexes – that creates collusive profits but does not involve misrepresentation of transaction prices.

A benchmark can act as a coordination device because it transfers information about the state of the market between industry participants without direct communication. This allows firms to adjust the collusive price in response to external shocks (e.g., changes in demand) without direct communication or renegotiation of the agreement. In an environment where direct communication between competitors gives rise to legal risk, price indexes provide a way to reduce that risk. The use of a public price index could be thought of as an alternative to the kind of complicated price book agreements used in the famous *GE-Westinghouse turbine generator* case.[36] These kinds of agreements allow the collusive price to respond to external shocks, rather than have those shocks disrupt collusion.

Alternatively, public price indexes can support collusion by increasing the profitability of successful collusion and thus reducing the incentive to defect. Benchmark price indexes can increase the profitability of collusion when they influence prices in related markets. This can happen both when the index is used for general information about the state of the market or when they are explicitly named as the determinant of the price in a state-contingent contract. The latter case occurs when the price index is hardened into contracts.[37] The broader the scope of markets that use the price index, the larger the potential gain from manipulation of the index and the greater the incentive to collude. By expanding the reach of a collusive arrangement, the benchmark increases the profitability of collusion, making it more likely and more stable.

As Boyd (2020) noted in his discussion of energy markets or as many noted in the discussion of LIBOR, the impact of changes in price indexes is often felt widely.[38] Kovacic et al. (2023) argue that, "by manipulating a benchmark price which comes from a small number of transactions, or even a survey, the colluding firms can favourably impact to their advantage a very large number of other transactions in the market."[39] Where a small number of transactions or price reports determine a benchmark used in a wider market, costly transactions that might not otherwise seem profitable if they only had a direct impact, can be worthwhile.

When a price index is hardened into long term contracts, it automates the process of coordinating changes in the collusive price. Hardening also makes it less profitable to defect, because the change in one firm's behavior will have a smaller effect on the index (which reflects the behavior of multiple parties) and will affect the transaction prices of all contracts that are hardened in the same way. Thus there is a built-in price matching process; any price cutting that one firm undertakes will likely reduce the public price index and therefore the price received by all parties that use contracts in which the price index has been hardened.

Is such "hardening" necessary for public price indexes to support collusion? While it is helpful, simply having a common knowledge signal also helps the cartel participants adjust their behavior in response to external shocks without constant renegotiation. An example of this in another context is the lack of impact of international exchange rate fluctuations on cartel stability. Levenstein & Suslow (2011) looks for evidence that exchange rates disrupted collusive agreements and finds that although "responding to such [exchange rate] fluctuations may take the time and attention of cartel members, they do not appear to break up otherwise stable cartels."[40]

Where the proportion of trades covered by the price index has fallen or the concentration of sellers participating in the market covered by the price index has increased, a price index seems to be particularly vulnerable for anti-competitive manipulation. In a thin market, the number of players is small relative to the market that is influenced by the benchmark, so coordination, agreement, etc. are easier than in a thick market with many participants.

Firms may also engage strategically in misreporting prices used in calculating an index. If the benchmark is susceptible to manipulation through misrepresentation, it may not even be necessary to convince co-conspirators to charge a price that is not individually rational.

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36 See e.g. Pankaj Ghemawat & Anita M. McGahan, *Order Backlogs and Strategic Pricing: The Case of the U.S. Large Turbine Generator Industry*, 19 Strategic Management Journal. 255, 265 (1998), describing the role of the price book in facilitating coordination without requiring repeated communication: "In 1963, General Electric changed its pricing policy to adhere strictly to the levels published in a simplified price book adjusted by a prespecified multiplier. After a period of learning that lasted about 1 year, the book prices and multipliers for both General Electric and Westinghouse (Allis-Chalmers had exited) came to coincide, and remained the same until the early 1970s, when the two were challenged with another antitrust suit."

37 Duffie & Stein (2015): "The second basic motive for manipulating benchmarks is a desire to profit on positions in derivative financial instruments that are contractually linked to the benchmark." (p. 196)

38 Boyd (2020), p. 767.

39 William E. Kovacic, Robert C. Marshall & Michael J. Meurer, *Cartel Issues in Plain Sight*, 00 Journal of Antitrust Enforcement. 1, 2 (2023). They also argue that this expansive effect implies that collusive damages may be underestimated, as they do not take account of potential follow-on effects on other prices (pp. 4-5).

40 Margaret C. Levenstein & Valerie Y. Suslow, *Breaking Up is Hard to Do: Determinants of Cartel Duration*, 54 Journal of Law and Economics. 455, 483 (2011).

Firms simply report such prices, and by having them reported into a benchmark, others' incentives are changed so that the higher collusive price is rational.

One important implication of the evidence presented here is that price indexes can serve an anti-competitive purpose even if they are not fraudulent.[41] Firms might design a benchmark to facilitate increased profitability of transactions even when the price is not hardened into contracts because it allows them to communicate or signal that some firms are charging a higher price. In turn, this allows the players to observe and punish deviations from that higher price. Of course, in any particular industry, a combination of these activities may be occurring.

The use of public price indices requires a mechanism to aggregate reports or transactions into a public signal. In some cases, there is an explicit algorithm for translating reports or transactions into this signal. In some cases this algorithm is public; in other cases, it is known to industry participants, but is not public. In some cases, it appears that the algorithm is only known to the entity that produces the public signal. Indexes that are designed by industry participants are more vulnerable to collusive manipulation. Indexes whose algorithm is public are more useful for punishing cartel participants. Indexes whose algorithm is secret are more susceptible to fraudulent reports.

IV. CONCLUDING REMARKS

These antitrust vignettes illustrate how price indexes have been used to facilitate collusion. Different mechanisms have been employed to manipulate price indexes, particularly when they are hardened into contracts. While neither price indexes themselves nor the use of price indexes to write state-contingent contracts is inherently anti-competitive, these cases do suggest that it is possible for collusive firms to use them in this way. The anti-competitive impact does not require that firms falsely report information, and in fact in many cases the accuracy of a manipulable index is what facilitates collusion.

In addition to focusing on the role that public price indexes can play in facilitating collusive behavior, examining the role of benchmark prices in collusion highlights a more general point about our understanding of markets. Economic, legal, and policy discussions often refer to "the price" or the "cash price" or the "spot price." But "the price" is a concept, not a unique observable number. Frequently, transaction prices are not public. Even when they are, there are often multiple transactions that give rise to variation in price. In many instances, "the price" – as referred to in a casual way – is actually an index calculated through a formula based on select information and then shared with industry participants or publicly published. Where the information comes from and what formula is used to produce the measure of price are subject to governmental or industry rules and practices, and they may change over time. The design of an index reflects the varied interests of the parties that contribute to the production of these measures. As Boyd (2020) notes, the design and production of price indexes, "are merely technical exercises … the people in charge of constructing these indices hold enormous power in their hands. They can literally move markets."[42] More precision in how we talk about prices would enhance our understanding of how markets function and allow us to develop more effective policies and interventions in those cases where an index is being used to undermine competition.

41 In a different context, Verstein (2015) makes the important distinction between fraud and manipulation. Benchmark price indexes can be manipulated by colluding firms, either explicitly or tacitly, even if there is no fraud or misreporting of prices in the calculation of the index.

42 Boyd (2020), pp. 766-767 (footnotes omitted).

RECENT ADVANCES IN ECONOMIC METHODOLOGY FOR COORDINATED EFFECTS

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I. INTRODUCTION

Firms seeking to collude, whether tacitly or explicitly, face two main economic challenges.[2] The first is determining prices or other strategic variables, such as quantities (the "coordination problem"). The second is that each firm can earn more profit, at least in the short-term, by undercutting collusive prices or otherwise deviating from a collusive scheme (the "incentive problem").[3] These challenges tend to be more difficult to overcome, all else equal, when there are more independent firms in a market competing against one another. Therefore, merger enforcement has long been recognized as one mechanism through which antitrust authorities can prevent or limit collusion in the economy.[4]

Despite this, merger enforcement has trended away from cases that allege a risk of "coordinated effects."[5] The last merger enforcement action litigated to decision based entirely on coordinated effects was the FTC's unsuccessful challenge of the Arch Coal/Triton Coal merger in 2004.[6] Since then, in merger investigations litigated to decision, all coordinated effects allegations have been bundled with unilateral effects allegations.[7]

To our knowledge, there is no basis to think the decline in coordinated effects merger enforcement is due to changes in the economy that make coordinated effects less relevant.[8] Rather, we think the decline is largely due to contributions to the economics literature that have clarified how unilateral effects theories connect to empirical objects, such as markups or diversion.[9] With unilateral effects, useful information can be gleaned from internal documents or head-to-head competition between merging parties. Further, advancements in merger simulation techniques that provide quantitative estimates of consumer harm have largely focused on unilateral effects.[10] In contrast, the study of mergers with coordinated effects has not historically lent itself to a standard quantitative framework.[11] As Steven Salop & Fiona Scott Morton explain:

> [P]art of the reason that coordinated effects concerns have been given less emphasis in recent cases may be that economists have not developed an econometrically intensive measure to predict their prevalence. But if agencies or courts imagine that the lack of an econometric technique is the same thing as the lack of an answer — or a lack of importance — then entire classes of harm will go unenforced.[12]

By deemphasizing coordinated effects, antitrust agencies may be missing an important piece of the puzzle when it comes to merger enforcement. Economic theory shows that the types of markets and mergers that present serious competitive problems due to coordinated effects can differ from those that create concerns about unilateral effects. Furthermore, certain remedies or merger characteristics that may mitigate unilateral effects concerns — such as efficiencies and divestiture — can in some cases be counterproductive when there is a risk of coordinated effects.

In this article, we revisit the economics of coordinated effects, with a particular focus on the recent empirical literature. We explain that advances in econometric analysis allow quantitative merger simulations comparable to those used in unilateral effects investigations in markets

2 The distinction between tacit and explicit collusion is a legal one, and we do not distinguish between the two in this article. See Louis Kaplow, COMPETITION POLICY AND PRICE-FIXING (2013).

3 Michael D. Whinston, LECTURES ON ANTITRUST ECONOMICS 20–21 (2006) ("Modern economic theory tells us that oligopolists who seek to come to an agreement to sustain high prices but who cannot sign binding agreements […] face two principal problems: an incentive problem and a coordination problem.").

4 Andrew R. Dick, *Merger Policy Twenty-Five Years Later: Unilateral Effects Move to the Forefront*, 27 ANTITRUST 1, 25 (2012).

5 Dick, *supra* note 4; D. Daniel Sokol & Sean P. Sullivan, *The Decline of Coordinated Effects Enforcement and How to Reverse It*, FLA. L. REV., (Forthcoming).

6 *Fed. Trade Comm'n v. Arch Coal, Inc.*, 329 F. Supp. 2d 109 (D.D.C 2004). Although the FTC's challenges to the Evonik/PeroxyChem and Tronox/Cristal mergers occurred after Arch Coal, the FTC alleged unilateral effects in both cases. See Complaint, *In the Matter of RAG-Stiftung, et al.*, Docket No. 9384 (Federal Trade Commission) and Complaint, *In the Matter of Tronox Limited, et al.*, Docket No. 9377, (Federal Trade Commission).

7 Sokol & Sullivan, *supra* note 5.

8 See John Asker & Volker Nocke, *Collusion, Mergers, and Related Antitrust Issues* in HANDBOOK OF INDUSTRIAL ORGANIZATION 5 (Kate Ho et al. eds., 2021).

9 Gregory J. Werden, *A Robust Test for Consumer Welfare Enhancing Mergers Among Sellers of Differentiated Products*, 44 J. INDUS. ORG. 4, 409 (1996); Joseph Farrell & Carl Shapiro, *Antitrust Evaluation of Horizontal Mergers: An Economic Alternative to Market Definition*, 10 B.E. J. THEOR. ECON. 1 (2010).

10 Nathan H. Miller & Gloria Sheu, *Quantitative Methods for Evaluating the Unilateral Effects of Mergers*, REV. INDUS. ORG. 58, 143 (2021).

11 U.S. Dept. of Justice & Fed. Trade Comm'n, *Horizontal Merger Guidelines*, Section 7.1 (2010). See also Robert H. Porter, *Mergers and Coordinated Effects,* 73 INT'L J. INDUS. ORG., 2 (2020).

12 Steven C. Salop & Fiona Scott Morton, *The 2010 HMGs Ten Years Later: Where Do We Go From Here?*, 58 REV. INDUS. ORG. 81, 93 (2021).

with a history of collusion and a known coordination mechanism. These new coordinated effects tools use data that are similar to — and often identical with — the data that would also be used in unilateral effects analyses. These methodological advances may help restore coordinated effects to a central place in merger enforcement, to the benefit of competition and consumers.

II. MERGERS AND COORDINATED EFFECTS

Viewing mergers through the lens of the coordination and incentive problems shows that coordinated effects can have a distinctly separate set of risk criteria from unilateral effects with respect to post-merger harms. With unilateral effects, the magnitude of adverse price effects tends to be larger, all else equal, when the change in concentration caused by the merger is larger. Indeed, the economics literature confirms that the change in the Herfindahl Hirschman Index ("HHI") correlates with harm in an important class of unilateral effects models.[13] But with coordinated effects, the greatest adverse price effects can arise from mergers that involve firms with more moderate market shares.[14] The reason can be understood through the incentive problem. Economic theory indicates that, again holding all else equal, firms with more moderate shares often are the ones that limit collusive prices, either because they participate in the collusive scheme but would not do so if prices were even higher, or because they undercut the collusive scheme and thereby limit how high the cartel's prices can be while preserving the profitability of the collusion.

In a similar vein, divestitures and cognizable post-merger efficiencies often reduce harms from unilateral effects, but they potentially can increase the harm from coordinated effects. For example, certain divestitures, such as those that create symmetry across firms or otherwise alter the incentive compatibility constraints of participating firms can increase the risk of coordinated effects.[15] Similarly, cost efficiencies resulting from the merger may make coordination easier if they equalize firm cost profiles or make firms more symmetric in other ways. Consequently, when both unilateral and coordinated effects are at risk, enforcement agencies should carefully consider whether efficiencies or proposed divestitures will likely help or hinder the resolution of the coordination and incentive problems in a potential collusive scheme.

Recent merger challenges that have alleged coordinated effects as a primary mechanism for post-merger harm have been successful only when they directly engaged with the question of how the merger would likely impact the coordination and incentive problems. The FTC prevailed in blocking the Tronox/Cristal merger on coordinated effects grounds by showing *inter alia* that the merger would help market participants overcome the coordination problem, for example by making the market more transparent.[16] In contrast, the FTC was denied its preliminary injunction of the Evonik/PeroxyChem merger because the FTC did not provide an "independent basis" to conclude that the merger would alter the ability of firms to coordinate or incentivize participation in a collusive scheme, beyond showing that the merger would increase market concentration.[17]

III. METHODOLOGICAL FRAMEWORK FOR EVALUATING COORDINATED EFFECTS

Recent methodological advances in economics have identified a class of mergers for which modeling can be used as a basis for merger simulations: those mergers that occur in markets where tacit or explicit collusion is already present. By focusing on markets where firms have already resolved the coordination problem, the literature combines data with economic theory to model the incentive problems that limit collusive pricing. The key insight of these new approaches is that modeling can inform the profitability of coordination, defection, and punishment, both pre-merger and post-merger. These objects determine each firm's "incentive compatibility constraint," the short-term versus long-term profit tradeoff that must be satisfied for firms to participate in a given collusive scheme in equilibrium. These models can then show how a merger would affect each firm's incentive compatibility constraint, and use that understanding to quantitatively predict harms post-merger.

This methodology builds on an older, established theoretical literature that rigorously models coordination between firms, including Rotemberg & Saloner (1986) and Green & Porter (1984).[18] Fundamentally, it yields a similar toolkit to that used in unilateral effects merger sim-

13 Volker Nocke & Michael D. Whinston, *Concentration Thresholds for Horizontal Mergers*, 112 AMER. ECON. REV. 6, 1915 (2022).

14 Iwan Bos & Joseph E. Harrington Jr., *Endogenous Cartel Formation with Heterogeneous Firms*, 41 RAND J. ECON. 92 (2010); Ryan Mansley, Nathan H. Miller, Gloria Sheu & Matthew C. Weinberg, *A Price Leadership Model for Merger Analysis*, INT'L J. INDUS. ORG (forthcoming).

15 See Helder Vasconcelos, *Tacit Collusion, Cost Asymmetries, and Mergers*, 36 RAND J. ECON. 1, 39–62 (2005).

16 *Fed. Trade Comm'n v. Tronox Ltd.*, 332 F. Supp. 3d 187 (D.D.C. 2018).

17 *Fed. Trade Comm'n v. RAG-Stiftung*, 436 F. Supp. 3d 278 (D.D.C. 2020).

18 Julio J. Rotemberg & Garth Saloner, *A Supergame-Theoretic Model of Price Wars during Booms*, 76 AMER. ECON. REV. 3, 390 (1986); Edward J. Green & Robert H. Porter, *Noncooperative Collusion under Imperfect Price Information*, 52 ECONOMETRICA 1, 87 (1984).

ulation. An economist first models the dynamics of competition in the market pre-merger, considering consumer demand, firm production costs, and other relevant economic characteristics. The model then generates predictions of post-merger behavior. As with unilateral effects simulation models, the better the model reflects the salient market and firm characteristics, the more useful the results.

Two sets of recent papers show how practitioners can exploit knowledge of the collusive mechanism to quantify harms from coordinated effects. Miller, Sheu & Weinberg (2021) and Miller & Weinberg (2017) (collectively, "Miller et al.") simulate the impact of mergers in the domestic beer industry.[19] These papers provide a framework for estimating the impact of mergers involving industries with a history of oligopolistic price leadership involving firms with differentiated products. Similarly, Igami & Sugaya (2021) simulate mergers in the international vitamin industry, which has historically been vulnerable to coordination on quotas.

The domestic beer industry saw increasing concentration during the period studied in Miller et al. Between 2001 and 2011, three companies Anheuser-Busch-InBev ("ABI"), SABMiller, and Molson-Coors accounted for 61-69 percent of all U.S. revenue, and the major importers Grupo Modelo and Heineken accounted for another 12-16 percent of revenue. In June 2008, SABMiller and Molson Coors merged their U.S. operations. A subsequent merger investigation by the DOJ into a proposed ABI-Modelo merger found a history of price leadership behavior in the beer industry between domestic firms. Specifically, the DOJ found that ABI announced annual price increases each summer to be implemented in early fall. Following their merger, MillerCoors "typically joined ABI price increases."[20]

Miller et al. begin their investigation of the impact of the MillerCoors and proposed ABI-Modelo merger by estimating consumer demand for beer using a typical workhorse econometric model for differentiated products price competition, known as a "nested logit random coefficients" model. This type of demand model is commonly used in the literature, and variants of the model will be familiar to many antitrust practitioners from their use in unilateral effects investigations.[21]

Miller et al. develop an empirical model of oligopolistic price leadership for the supply side based on documentary evidence on coordination mechanisms used in the domestic beer industry uncovered in a DOJ investigation. In the model, a price leader first makes a non-binding price announcement, and then firms set prices simultaneously. The price announcement serves as a "focal point" that firms in the market can use to align their beliefs and resolve the coordination problem. Colluding firms decide whether to set their prices in line with the leader's announcement or undercut the announced prices. The tradeoff is that firms recognize that deviating from the price announcement will lead to retaliation and a return to a non-collusive equilibrium with lower prices. Thus, for the price leadership collusive scheme to be sustainable, the colluding firms must view maintaining the collusive scheme over the long term to be more profitable than undercutting and reaping short term profits.

Miller et al. estimate key parameters governing the firms' marginal costs (which are often not directly observed by econometricians in merger investigations) and the incentive compatibility constraints using scanner data on prices and quantities.[22] These estimates allow Miller et al. to then simulate the competitive effects of mergers, taking into account coordinated effects. Miller et al. consider both the Miller/Coors merger and a hypothetical merger of ABI and Grupo Modelo. The results are consistent with these mergers relaxing incentive compatibility constraints and allowing firms to set higher collusive prices. Furthermore, incorporating cost efficiencies for MillerCoors *amplifies* this coordinated effect because it strengthens the firm that most constrains collusion in the model.[23]

Another recent paper by Igami & Sugaya uses a similar framework to Miller et al., but apply it to very different setting: one where firms that produce commodity goods compete on quantity rather than price.[24] During the 1990s, Roche, a major Swiss drug company, colluded with vitamin makers around the world to cartelize the production of vitamins. Although some of these vitamin cartels collapsed on their own, several survived until the cartel was prosecuted by the DOJ in 1999. Evidence uncovered through the investigations of antitrust authorities found that the vitamin cartels operated by setting production quotas for each member during quarterly meetings. The colluding firms then monitored each other's compliance with the scheme by monitoring publicly available trade statistics. Documentary evidence also shows that the colluding firms threatened retaliation against one another for real or perceived defections from the quota agreements.

19 Nathan H. Miller & Matthew C. Weinberg, *Understanding the Price Effects of the MillerCoors Joint Venture*, 85 ECONOMETRICA 6, 1763 (2017); Nathan H. Miller, Gloria Sheu & Matthew C. Weinberg, *Oligopolistic Price Leadership and Mergers: The United States Beer Industry*, 111 AMER. ECON. REV. 10, 3123 (2021).

20 See Dept. of Justice, "Justice Department Files Antitrust Lawsuit Challenging Anheuser-Busch Inbev's Proposed Acquisition of Grupo Modelo," January 31, 2013, https://www.justice.gov/opa/pr/justice-department-files-antitrust-lawsuit-challenging-anheuser-busch-inbev-s-proposed.

21 See e.g. Oliver Budzinski & Isabel Ruhmer, *Merger Simulation in Competition Policy: A Survey*, 6 J. COMP. L. & ECON. 2, 227 (2010).

22 Antitrust agencies often rely on accounting data from the merging firms, which do not reveal the marginal costs of the merging firms without additional assumptions.

23 Mansley et al., *supra* note 14, expands on this result and shows that some divestitures can amplify coordination.

24 Mitsuru Igami & Takuo Sugaya, *Measuring the Incentive to Collude: The Vitamin Cartels, 1990–99*, 89 REV. ECON. STUD. 3, 1460 (2022).

Igami & Sugaya model the demand side of the vitamin market using a linear demand equation. They model the supply side of the market as consisting of a set of firms setting quantities cooperatively while competing against a fringe. Firm incentives to maintain the collusive scheme post-merger are modeled using incentive compatibility constraints, as in Miller et al. An important distinction is that Igami & Sugaya assume that firms either engage in near-perfect collusion or otherwise deviate to competitive prices, whereas Miller et al incorporate that collusion can be partial, coordinating on prices below monopoly levels in order to reduce the incentives of firms to deviate. With the model estimated, Igami & Sugaya use simulations to examine the coordinated effects of mergers. They find that the mergers that create concerns for coordinated effects are those that yield more symmetric cost profiles. These effects are potentially significant: a hypothetical merger between two parties to the vitamin C cartel that would have eliminated the highest-cost vitamin C manufacturer, BASF, would have increased the profit gain from coordination for the highest-cost of the remaining manufacturers, E. Merck, by 47 percent.[25]

IV. LITIGATING COORDINATED EFFECTS MOVING FORWARD

The advances discussed above suggest a set of steps plaintiffs could use to quantify harms from coordinated effects: 1) identify the collusive mechanism used within the industry using industry knowledge and observed patterns of competition, 2) estimate pre-merger demand and a supply-side model that incorporates the collusive mechanism, and 3) use the estimated model to simulate the effects of the merger on prices and quantities, possibly taking merger-specific efficiencies and other aspects of the merger into account.

Although the methods to quantify harms from coordinated effects are new, they do not place a significantly larger investigatory burden on plaintiffs beyond what is normally required in litigating a merger on unilateral effects. Much of the data required to conduct the types of analyses in Miller et al. and Igami & Sugaya are often already produced in the course of a merger investigation or litigation. Data used in Miller et al. include retail scanner data providing weekly revenue and unit sales for beers from a sample of supermarkets in the pre-merger period, household demographic information from the Census Bureau, and information on transportation costs (an important component of beer production costs) using Google Maps.[26] Similarly, Igami & Sugaya use information on prices, aggregate output and market shares, plant capacity, and unit production costs using documents produced in the course of subsequent antitrust investigations.

In supporting the model, it can be helpful to lay the evidentiary-groundwork to demonstrate that the merger simulation reflects the salient economic realities of the alleged markets. This can go beyond the "checklist" of factors suggested by the Horizontal Merger Guidelines by establishing not only a history of coordinated conduct, but by identifying the likely mechanism of collusion for the industry. For example, Miller et al. rely on evidence uncovered from the DOJ's investigation of the proposed ABI-Modelo merger to identify the beer industry's historical pattern of oligopolistic price leadership, while Igami & Sugaya use evidence uncovered from investigations of the vitamin cartels to identify that industry's production quota scheme. This sort of evidence shows first, that market participants may have solved the coordinated problem; and second, that a mechanism exists for the merger to exacerbate harm from coordination.

While the merger simulation itself quantifies the extent to which the merger changes the incentive problem within the model, qualitative evidence remains helpful and can serve as a useful complement to the model. Economic theory shows that a cartel's ability to charge supra-competitive prices is constrained by the member of the cartel with the greatest incentive to defect. In practice, this could be a follower within the price leadership context (e.g. Miller or Coors prior to their merger) or a firm that has historically been the first to defect in response to changing macroeconomic conditions. Evidence showing that this constraint is provided pre-merger by one of the merging parties can be consistent with harm from coordinated effects in much the same way that evidence of head-to-head competition between merging parties is suggestive of harm via unilateral effects. Alternatively, the merger might involve a competitively significant firm that has resisted coordination or undercut an existing coordination by other firms (a "maverick" in the parlance of the Horizontal Merger Guidelines), thereby tightening the incentive compatibility constraints that limit collusion. Again, evidence consistent with that possibility can complement the model.

It should be noted that not all mergers involving markets where collusion is present pose a risk of coordinated effects. For example, a merger that does not involve the cartel member with the greatest incentive to defect or a maverick firm may not increase prices further, absent efficiencies or divestitures. Efficiencies that reduce symmetry among cartel members may reduce the incentive for some members to continue to collude as Igami & Sugaya show in the case of their hypothetical vitamin C merger.[27] Merging parties who believe their merger to be procompetitive could present evidence along these lines in defending their merger to antitrust authorities or courts.

25 Igami & Sugaya 1488–1499, *supra* note 24.

26 Mansley et al., *supra* note 14, show how the model can be calibrated with data on market shares and margins.

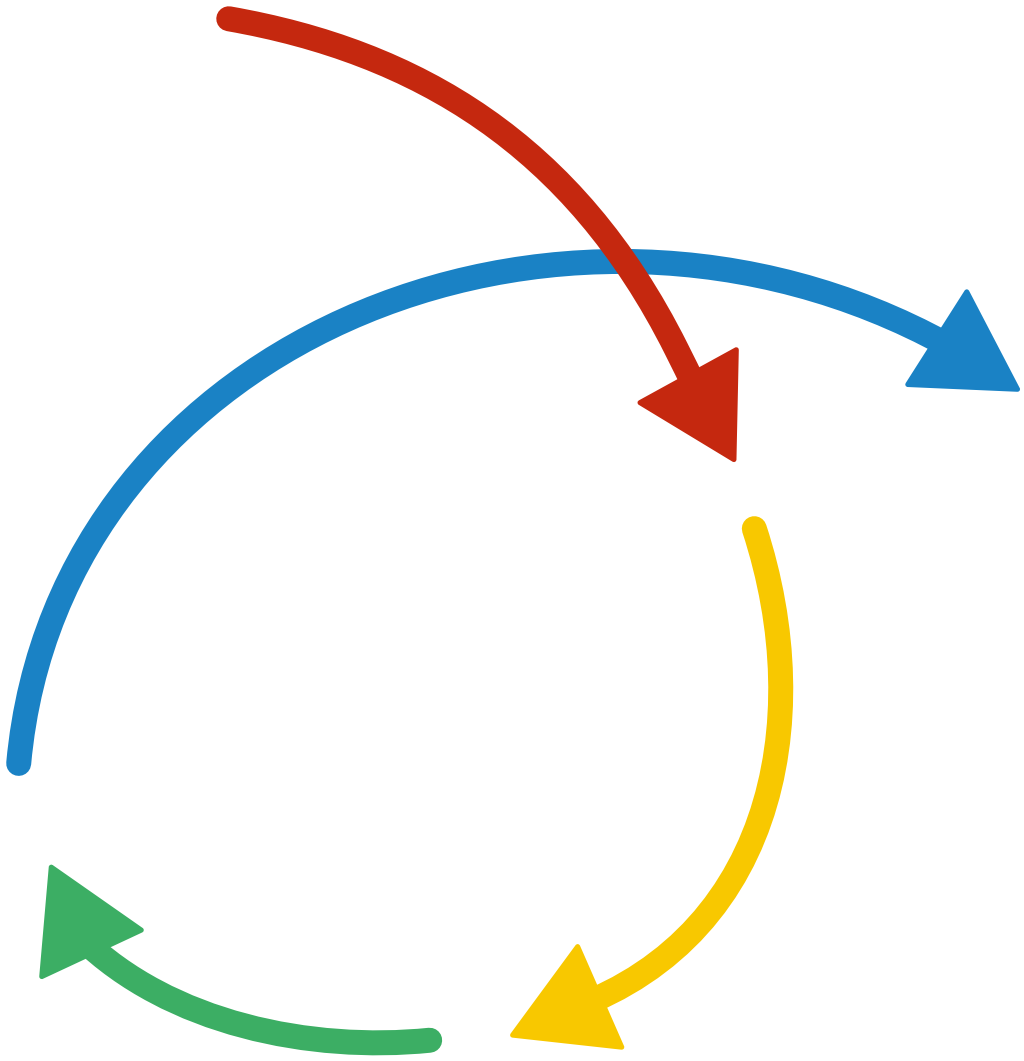
27 Efficiencies may also exacerbate coordinated effects as Miller et al. show for the MillerCoors merger.

V. CONCLUSION

Economic theory indicates that unilateral and coordinated effects present conceptually distinct threats to competition from mergers. However, litigation around coordinated effects, when not paired with unilateral effects, has been relatively rare in recent history. Advances in the economics literature have worn away at the gap between the ability to quantitatively assess unilateral and coordinated effects. Coordinated effects have a real and vital role to play in antitrust, and to ignore them in favor of unilateral effects ignores an important part of the competition landscape.

Given that data are likely available to conduct rigorous coordinated effects analysis in a relevant class of mergers, a natural next step would be for the antitrust agencies and private plaintiffs to challenge a merger with this sort of analysis at the forefront. While the previous lack of quantitative methods to address coordinated effects may have hampered the antitrust community from coalescing around a standardized approach to the problem of coordinated effects, this is no longer the obstacle it once was. Practitioners now have an updated toolkit with which to consider coordinated effects and the real, and distinct, effects they may have on competition.

COORDINATED EFFECTS OF MERGERS: THE EC PERSPECTIVE



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I. COORDINATED EFFECTS IN THE EC MERGER GUIDELINES

Horizontal mergers may significantly impede effective competition via two main effects: unilateral effects and coordinated effects. While the assessment of unilateral pricing incentives created by the merger are at the core of any horizontal merger investigation, mergers may also facilitate or enhance collusion and thereby generate "coordinated effects" on market outcomes. Coordination can take a variety of possible forms, e.g., keeping prices above the competitive level, limiting production or new capacity to the market, dividing the market by geographic area, or allocating contracts in bidding markets.

This is acknowledged in the 2004 European Commission's Horizontal Merger Guidelines ("EC Guidelines")[2] by specifying, in particular, that mergers may significantly impede effective competition by *"changing the nature of competition in such a way that firms that previously were not coordinating their behaviour, are now significantly more likely to coordinate and raise prices or otherwise harm effective competition. A merger may also make coordination easier, more stable or more effective for firms which were coordinating prior to the merger (coordinated effects)."*[3]

The EC Guidelines also set out the general approach that the European Commission ("the Commission") follows when analyzing possible coordinated effects of mergers that helps in identifying characteristics of an industry that make it more or less susceptible to collusion. Specifically, the Commission first assesses whether it would be possible for firms to reach terms of coordination.[4]

Reaching terms of coordination. Coordination is considered more likely to emerge in markets where it is relatively simple to reach a common understanding on the terms of coordination, i.e., what actions are considered in accordance with the aligned behavior and which are not. The EC Guidelines emphasize that reaching a common understanding on the terms of coordination is more likely the less complex and more stable the environment is, e.g., few players, homogenous product, relatively stable demand and supply conditions. Other relevant factors include symmetry of firms (in terms of cost structures, market shares, capacity levels or levels of vertical integration) or structural links (cross shareholdings or joint venture participation).

The Commission then assesses whether coordination is likely to be sustainable by looking at three main groups of criteria in a cumulative nature.[5]

- *Monitoring deviations*. Sustaining coordination relies on the ability of firms to monitor to a sufficient degree whether other firms are deviating from the terms of coordination, as threat of timely and sufficient retaliation keeps firms from deviating. The EC Guidelines point to market characteristics that make transparency likely higher, e.g. lower number of active participants, market transactions taking place on a public exchange or an open outcry auction, markets where firms are able to interpret with some certainty whether unexpected behavior is the result of deviation from the terms of coordination. The EC Guidelines further acknowledge that firms may engage in practices aimed at increasing transparency even when general conditions may suggest monitoring deviations difficult, e.g., meeting-competition or most-favored-customer clauses, voluntary publication of information, announcements, exchange of information through trade associations, or more generally participation in arrangements that may make monitoring easier.
- *Deterrent mechanisms.* The stability of coordination relies on a threat of future retaliation, i.e. that there is some form of credible deterrence mechanisms that can be activated in a timely manner if deviation from coordination by one of the firms is detected. Retaliation occurring with delay or that is not certain to be activated may be less likely to offset the benefits from deviating. The credibility of the deterrence mechanisms also depends on whether firms have an incentive to retaliate, i.e., whether the short-term cost of punishing the deviator is lower than the long-term benefit of retaliating. The EC Guidelines also specify that retaliation may take place on other markets than the deviation itself if coordinating firms have commercial interactions in other markets.
- *Reactions of outsiders*. In order for coordination to be sustainable, outsiders (non-coordinating firms, potential competitors or customers) should not be able or do not have the incentive to jeopardize the results expected from the coordination.

Other elements pointed out in the EC Guidelines include the assessment of whether the merger involves a `maverick' firm practicing more aggressive pricing or different strategic choices as compared to its competitors. Past behavior may also give an indication of whether coordination is likely to occur in the industry under study.

2 Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings (OJ C 31, 5.2.2004, p. 5–18).

3 EC Guidelines, par. 22(b).

4 EC Guidelines, par. 44-48.

5 EC Guidelines, par. 49-57.

The approach described in the EC Guidelines follows the approach set out in the 2002 judgment of the Court of First Instance in Case *Airtours v Commission* ("Airtours judgement").[6] This landmark judgement launched a shift from a "check-list" approach simply listing factors facilitating collusion towards an approach grounded in economic theory (see discussion in Fabra & Motta (2016)).[7] At the same time, the Airtours judgement set a high-bar for the assessment of coordinated effects by emphasizing that all factors making coordination to be likely sustainable are of a cumulative nature and, hence, have to be all met.

When assessing these indicators, the Commission considers specifically the changes that the merger brings about to determine whether coordinated effects are likely to materialize. In other words, it is not enough to determine that an industry is prone to collusion but rather that the change brought about by the merger makes collusion more likely. At the same time, this approach may yield ambiguity: a merger may affect several factors determining the extent to which coordinated effects would be sustainable, but these factors may off-set each other. Ivaldi et al. (2003)[8] explain how the reduction of the number of competitors which tends to facilitate collusion, may also make the market more asymmetric and thus hindering collusion. They emphasize that while ideally the impact of the merger on collusion would be done by building a "meta-model" encompassing all the relevant characteristics, this approach would probably not be tractable. They argue that it is necessary to identify the characteristics that are most relevant in each particular industry, and also to prioritize these factors.

Following the definition of coordinated effects set out in the EC Guidelines, one could distinguish two types of cases of coordinated effects in merger: (1) a case where there was previously no collusion, but the merger significantly increases its likelihood, and (2) a case where collusion is already happening to some extent, but the merger makes it easier, more stable of more effective. While the first may potentially be more harmful in terms of its actual effects, the latter may be seen as providing more legal certainty to the case if documentary evidence of attempted collusion are provided. Such evidence may include examples of attempted but failed coordination pre-merger or indications that firms find that the merger would make coordination possible.

II. COORDINATED EFFECTS IN RECENT EC MERGER DECISIONS

A. High-Level Overview

How often are coordinated effects actually assessed in recent merger decisions? To answer this question, we reviewed all merger decisions scrutinized by the European Commission ("Commission") under Council Regulation 139/2004. Merger cases and their decisions are publicly accessible and published by DG Comp on the Commission's website. We have downloaded all decisions and focused on all non-simplified Phase I decisions, as well as all Phase II decisions written in English.[9][10] The data set analyzed covers 1,768, Commission's merger decisions notified over the period 2004-2023, including 1,649 non-simplified Phase I decisions and 119 Phase II decisions.

Textual analysis techniques were then used to establish decisions that explicitly assessed coordinated effects.[11] Coordinated effects appear to be explicitly assessed in only 13 percent of Phase I decisions. This assessment is also often limited to the statement of coordinated effects being unlikely. The assessment is more prominent in Phase II merger investigations, where they are assessed in nearly half of all decisions and typically accompanied by an in-depth analysis.[12]

6 EU Court of First Instance Decision on Case T-342/99, *Airtours v Commission*, ECR II-2585 (2002).

7 For an explanation of economic theory behind coordinated effects, see e.g.: Natalia Fabra & Massimo Motta (2017), *Assessing Coordinated Effects in Merger Cases* in HANDBOOK OF GAME THEORY AND INDUSTRIAL ORGANIZATION, (Corchon & Marini Eds., Edward Elgar, 2017) and Marc Ivaldi, Bruno Jullien, Patrick Rey., Paul Seabright, Jean Tirole, *The Economics of Tacit Collusion*, European Commission Final Report for DG Competition (2003).

8 Marc Ivaldi, Bruno Jullien, Patrick Rey & Paul Seabright, Jean Tirole, *The Economics of Tacit Collusion* (Final Report for DG Competition, European Commission, March 2003).

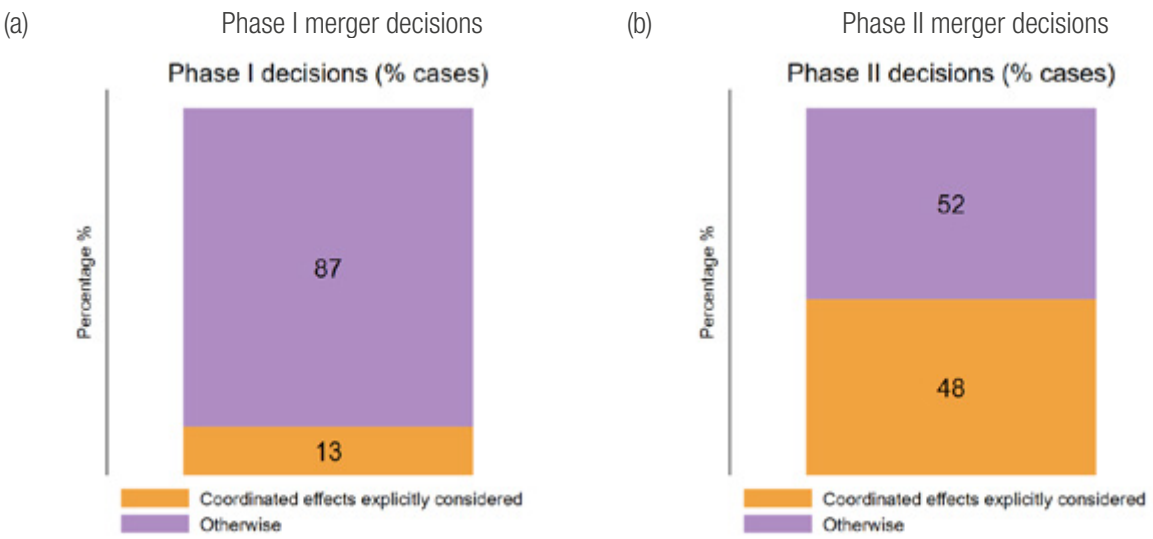
9 For this project, we have downloaded all mergers available on the website on May 8, 2023.

10 This data collection is part of a bigger project collecting information on Commission's merger decision. For an early version of the for a data documentation for this project, covering the period 1990–2014, see: Pauline Affeldt, Tomaso Duso, & Florian Szücs, *EU Merger Control Database: 1990-2014*, DIW Data Documentation, (2018). For this study, we updated the data to more recent years and exploited, in addition, textual analysis methods to augment the information provided in the final dataset to be analyzed.

11 After a standard cleaning of the text for textual analysis, the terms used to screen decisions for coordinate effects included "coordinated effect" (not preceded by terms "non" or "un", to avoid reference to unilateral effects), "collective dominance", "collective dominant position", "joint dominance", as well as "facilitate collusion". The identified cases with occurrences of terms associated to the assessment of coordinated effects were then carefully read to ensure that they are not simply a reference to/citation of EC Guidelines or used in a different context than our focus.

12 Phase II is an in-depth analysis of the merger's effects on competition and is opened when the case cannot be resolved in Phase I (see https://competition-policy.ec.europa.eu/mergers/procedures_en). In our sample of decisions, Phase I decisions had, on average, 25 pages in contrast to Phase II decisions with, overage, 233 pages.

Figure 1. Percentage of merger decisions with explicit mention of coordinated effects, by type of decision



Source: *Our elaboration on EU merger data.*

B. Two Examples of In-depth Assessment

To get a better understanding of the approach taken by the Commission to coordinated effects of mergers, I looked at two recent merger decisions providing an in-depth assessment of such effects. In one, coordinated effects were explored in-depth in a Phase I decision, leading to a finding of no coordinated effects due to lack of evidence that the merger would significantly increase the possibility and sustainability of tacit collusion in the market. In another example, following a Phase II investigation, the Commission found that the merger could significantly increase the possibility and sustainability of tacit collusion in the market. However, it judged it was not necessary to conclude on this matter as the commitments were considered to solve any such concerns.

1. Coordinated Effects Investigation in Phase I Decision in The Salmon Industry

A recent merger in the salmon industry Case M.10699 *SalMar/NTS*[13] provides an example of an in-depth assessment of coordinated effects, done in a Phase I decision. Here, the Commission investigated a merger combining two leading farmers of salmon, with SalMar (one of the world's largest producers of farmed salmon, with operations in Norway, Iceland and Scotland) acquiring NTS (a leading salmon farmer active in Norway and Iceland).

As regards horizontal overlaps, two markets were examined in detail, in particular, farming and primary processing of salmon in respectively Iceland and Norway. While the main focus in the market for Icelandic salmon was the assessment of unilateral effects,[14] coordinated effects were assessed in detail with regard to the market for Norwegian salmon.[15]

a. *In its investigation, the Commission has found that the market for the farming and primary processing of Norwegian salmon appears to be prone to coordination…*

In its investigation, the Commission has found that the market for farming and primary processing of Norwegian salmon has shown to be prone to coordination in the past. First, certain indications of past coordination were shown in the market, including the 1992 decision where the Commission found that the associations of Norwegian and Scottish salmon farmers set a minimum price for Norwegian salmon and agreed on a price premium for Scottish salmon.[16] Second, the Commission pointed to a number of further investigations and private litigation procedures based on

13 M.10699 – *Salmar/NTS* - Commission Decision of 31 October 2022.

14 In the in the market for Icelandic salmon, the parties to the concentration would have had combined production-based market share of more than 60 percent.

15 No serious doubts were raised as regards unilateral effect in the market for farming and primary processing of Norwegian salmon where the parties to the concentration would have had combined production-based market share of more than 10-20 percent]

16 Commission decision of July 30, 1992, 92/444/EC, OJ L 246/37.

allegations of collusion between Norwegian salmon farmers.[17]

As the recent investigations or allegations have not so far led to a finding of collusion, the Commission took a careful approach without drawing any conclusions based on these suspicions and conducted an independent investigation supporting the finding that coordinated effects appear to be likely in the industry, including the elements described below.

- *First, the market was found to be generally transparent*, supported by a number of findings, including that: (1) detailed price and volume indices are published every week, giving a clear picture of historic trends on a weekly basis; (2) suppliers of primary processed Norwegian salmon were found to trade to a significant extent amongst each other, allowing suppliers to draw certain conclusions as to the prices and available volumes of primary processed Norwegian salmon at a given point in time; (3) many farmers of Norwegian salmon are related by joint operations or shareholdings, allowing participating competitors to receive information on each other's production volume.
- *Second, smaller farmers, accounting for approximately 40-50 percent of the market, were considered not to have significant pricing power or exert strong competitive constraints*. First, smaller farmers primarily sell their salmon through independent exporters or larger farmers. Customers, including retail chains and secondary processors, often cannot rely on smaller farmers to meet their demands and logistical requirements, leading them to rely more on larger farmers. Moreover, smaller farmers tend to follow the pricing set by larger farmers, indicating limited pricing power for themselves and exporters.
- Finally, the customers replying to the market investigation did not perceive the market to be very competitive and expressed concerns that the Transaction could contribute to a risk of coordination.

b. *…but the Commission considered there is not sufficient evidence to suggest that the merger would significantly increase the possibility and sustainability of tacit collusion in the market*

While the Commission's market investigation has revealed that this market is prone to coordination, the Commission considered there is not sufficient evidence to suggest that the merger would significantly increase the possibility and sustainability of tacit collusion in the market. A number of findings were put forward in support of this claim.

- First, the Commission established that it is difficult for suppliers to coordinate tacitly on prices and to monitor adherence to the coordination terms due to limited information availability and significant price fluctuations in the market. Indeed, public price information, although published on a weekly basis, was historic and aggregated, with large weekly fluctuations.
- Second, the Commission pointed to the existence of numerous other suppliers, including larger ones and smaller farmers with substantial market shares, making it difficult to establish and maintain a common policy on prices.
- Finally, the Commission found it unlikely that the removal of the relatively small player NTS from the market would alter the market structure or disrupt potential coordination. In particular, the Commission found no evidence that NTS played the role of a `maverick' prior to the Transaction with regard to pricing or other commercial conditions.

Overall, the Commission raised no serious doubts due to coordinated effects on the market for the farming and primary processing of Norwegian salmon as it concluded that the merger would not make coordination easier, more stable, or more effective.

2. Coordinated Effects Investigation in Phase II Decision in the Steel Industry

The merger in the steel industry *M.8444 ArcelorMittal/Ilva*[18] shows an example of a Phase II decision, leading to a finding of likely coordinated effects. The example concerns the merger of ArcelorMittal, the largest producer of flat carbon steel in Europe and worldwide, with the main assets of Ilva, notably its steel plant in Taranto, Italy, which is Europe's largest single-site integrated flat carbon steel plant. Both companies are significant producers in Europe of hot rolled ("HR"), cold rolled ("CR") and galvanized flat ("GS") carbon steel. Initially ArcelorMittal, submitted a binding offer to acquire the Ilva in consortium with Marcegaglia, an Italian steel company which is both a competitor of and one of the largest customers of Ilva.

a. *In its investigation, the Commission found that the European Economic Area ("EEA") markets for flat carbon steel are prone to coordination…*

In its investigation, the Commission established that the EEA markets for flat carbon steel have been prone to coordination in the past. First, The Commission's investigation of the Transaction revealed evidence of past or recent tacit coordination between EEA suppliers of flat carbon steel

17 In 2019, the Commission carried out unannounced inspections at the premises of several companies active in the sector of farmed Atlantic salmon based on concerns over a potential infringement of Art. 101 TFEU. See Press release of February 19, 2019: https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT 19 1310.

18 M.8444 – *ArcelorMittal/Ilva* - Commission Decision of May 7, 2018.

in particular for HR and GS, but also other flat carbon steel products in a number of EEA markets. Coordination concerned general price levels as expressed in base, or effective prices to customers. Second, the Commission noticed that the European steel industry more generally has seen a number of cartels which were subject to a Commission decision finding an infringement of Article 101 TFEU in the past.[19] Finally, internal evidence pointed to ongoing investigations by national competition authorities on a suspicion that certain producers, including ArcelorMittal, may have colluded to fix prices of flat carbon steel in the EEA.

The Commission further established that coordinated effects appear to be likely in the industry, based on a number of observations.

· *First, major EEA suppliers likely coordinate prices following the price leader-price follower model as facilitated by market division*. Coordination would likely take place pursuant to a price leader-price follower coordination model as, e.g.: (1) base prices or the effective prices for the respective product could provide a relevant focal point for coordination; (2) ArcelorMittal is a price leader where most other large EEA suppliers participate as price followers; (3) ArcelorMittal would be able to actively signal its forward looking pricing policy in order to facilitate alignment by rivals; (4) ArcelorMittal would be able to continuously monitor rivals' reaction to inform its decisions on future pricing signals to the market; and (5) EEA suppliers have coordinated prices pre-Transaction at least in Northern Europe and possibly, to a more limited extent, also in Southern Europe.
· *Second, the markets for flat carbon steel in the EEA are sufficiently transparent to enable coordinating firms to monitor any deviations from the possibly coordinated price level*. A number of finding pointed to this finding, including: (1) the markets for flat carbon steel are concentrated with few sizeable suppliers; (2) there are several price indices for commodity steel, which provide timely updates on the evolution of steel base prices in the EEA, which also appear to be used as reference price in supply agreements with steel customers; (3) market transparency is further increased by public announcements by steel producers, either concerning their capacity or their future pricing policy, as well as through individual commercial negotiations with customers.
· *Third, there exist mechanisms to deter deviations from a coordinated outcome*. The Commission's market investigation confirmed the existence of effective and deterrent mechanisms against firms deviating from coordinated price levels to capture market share, or against expansion threatening to disrupt the competitive landscape prone to coordination. These examples indicate that retaliation is mostly practiced by targeting the rivals strategic customers engaged in spot sales as customers mostly multisource and can easily increase the share of one supplier at the detriment of another one. This allows for an expedient reaction capable of signaling that a deviation was detected and retaliated against, thus removing the incentives to deviate.
· *Fourth, neither the remaining suppliers not participating in the coordination, nor the customers would have the ability or incentive to disrupt price coordination in the EEA*, as e.g.: (1) Ilva has in the past often failed to follow the pricing as signaled by ArcelorMittal, and the merger would remove Ilva and Marcegaglia as challengers to a possible coordination with ArcelorMittal as the price leader; (2) domestic EEA producers, with the notable exception of Ilva, have generally not been perceived as competing aggressively with ArcelorMittal; (3) imports do not appear to effectively constrain the EEA producers despite a consistent series of price increases leading to a strong recovery of profitability of ArcelorMittal; (4) coordinating firms can take actions to deter disruptive entry or expansion, including indications that ArcelorMittal may have engaged in activities to deter entry or expansion by non-EEA producers to reserve the EEA markets or certain sub-segments to incumbent EEA producers.

b. *… and the merger could significantly increase the possibility and sustainability of tacit collusion in the market*

The evidence gathered by the Commission suggested that prior to the merger, ArcelorMittal and its large EEA rivals were, at least during certain periods, able to reach and sustain price coordination leading to a series of prices increases in particular in Northern Europe, and possibly also in Southern Europe, supported by an implicit market division in each others' home market areas. However, this coordination was found to be occasionally destabilized or rendered ineffective due to market shocks, e.g. Ilva's aggressive price policy. In this regard, the Commission found that the merger would significantly increase the possibility and sustainability of tacit collusion in the market.

· First, the merger would facilitate the coordinating firms in reaching a common understanding as to coordinated price levels by removing a major EEA producer and considerably strengthen ArcelorMittal's market position in the EEA.
· Second, the merger would further enhance market transparency by the removal of Ilva as, e.g. ArcelorMittal could further expand its sales network as its source of market intelligence and draw further market insight from an extended distribution network.
· Third, the merger would enhance mechanisms to deter deviations as EEA suppliers would be facing the threat that ArcelorMittal's significantly increased available capacities are used to discipline any deviations from coordination.
· Finally, the merger would likely to appreciably reduce the scope for coordination to be disrupted by outsiders and increase stability of coordination in the EEA due to the removal of Ilva, strategic links to Marcegaglia and an enlarged network of ArcelorMittal's plants, as (1) by removing Ilva as an independent competitor, the Transaction would eliminate a potential disruptor to a possible price coordination; (2)

19 Commission decision in Case IV/35.814 – *Extras for steel alloys*, dated January 21, 1998. Commission decision in Case IV/E-1/35.860-B *Seamless steel tubes*, dated December 8, 1999. Commission decision in Case COMP/38.344 – *Prestressing steel*, dated June 30, 2010.

the merger could, by strengthening economic links between the merged entity and Marcegaglia, further reduce Marcegaglia's ability and incentives to compete independently of the merged entity.

Overall, this case presents an interesting assessment of coordinated effects in a price-leadership setting. In light of its investigation, the Commission found that the merger could lead to a significant impediment of effective competition in the internal market due to horizontal coordinated effects in the markets for flat carbon steel (HR, CR and GS) in the EEA. However, it did not find it necessary to conclude on coordinated effects as the final commitments proposed in the merger were considered to address such potential horizontal coordinated effects. In particular, as part of its commitments, ArcelorMittal offered to divest an extensive package of production assets in Europe, as well as divest a number of distribution assets in France and Italy. In addition, ArcelorMittal proposed to remove Marcegaglia from the consortium purchasing Ilva and committed not to acquire shares in Marcegaglia as part of the transaction.

Finally, as a teaser, a press release issued on the Commission website suggests that coordinated effects were assessed in detail in the recent Commission decision conditionally approving the acquisition of OMV Slovenija by MOL.[20] Not being published yet, we cannot discuss the decision in this article.

III. CONCLUDING (NON-EXHAUSTIVE) REMARKS: CAN MORE BE DONE?

A. New Simulation Methods for Coordinated Effects

The Commission's assessment of coordinated effects consists in identifying characteristics of an industry that make it more or less susceptible to collusion. While this approach is grounded in economic theory, it does not quantify the likelihood or extent of coordinated effects. Model-based simulations commonly used by competition authorities to quantify competitive effects of a merger focus solely on unilateral pricing incentives that are created by the merger.[21] Simulation methods for coordinated effects are much less developed, limiting their application by competition authorities. At the same time, coordinated effects may explain increases in prices following realized mergers (see, for instance, review of retrospective studies in Porter (2020)[22] and more anecdotal evidence in Harrington (2022)[23]). While coordinated effects may be at the source of post-merger price increases, we typically look at mergers uniquely through the lens of non-coordinated effects.

A promising development in this regard is a paper by Masley et al. (forthcoming)[24]. In industries characterized by price leadership, the authors simplify the model of oligopolistic price leadership developed in Miller et al. (2021)[25] to a setting with a single market and logit or nested logit demand. To recover the structural parameters of the model, they introduce model calibration, where the exact data requirements depend on the model of demand. Assuming logit demand for instance, data requirements are limited to information on market shares, prices, two margins (one of the coordinating firms and one of the fringe firm), and a diversion ratio. Overall, their methodology allows for simulating coordinated effects of a merger using data commonly available to antitrust authorities. The authors also demonstrate that price leadership can affect how well efficiencies and remedies mitigate the effects of mergers. Importantly, as regards remedies they show that there are instances in which a divestiture amplifies, diminishes, and has little effect on coordination in the market. Standard expectations we have based on models of unilateral effects of mergers may therefore not necessarily extend to models of pricing coordination.

B. Monitoring Post-Merger Tacit Collusion and Insights from Public Announcements

As shown above, the bar to establish coordinated effects in mergers is set at a high level and quantifying coordinated effects still remains a challenge. Related to this, Joseph Harrington[26] suggests that if a merger with possible coordinated effects is approved, it is important to monitor

20 See Press release of May 17, 2023: https://ec.europa.eu/commission/presscorner/detail/en/IP_23_2781.

21 For an overview, see e.g.: Peter Davis & Eliana Garces, Quantitative Techniques for Competition and Antitrust Analysis, (New Jersey: Princeton University Press, 2009).

22 Robert H. Porter, *Mergers and coordinated effects*, International Journal of Industrial Organization, 73 (2020).

23 Joseph Harrington, *Collusion in Plain Sight: Firms' Use of Public Announcements to Restrain Competition*, Antitrust Law Journal, 84, 521-563 (2022).

24 Ryan Mansley Nathan Miller, Gloria Sheu & Matthew Weinberg, *A Price Leadership Model for Merger Analysis*, International Journal of Industrial Organization (forthcoming).

25 See model of oligopolistic price leadership developed in: Nathan Miller et al., *Oligopolistic Price Leadership and Mergers: The United States Beer Industry*, American Economic Review, 111, 3123–3159 (2021).

26 Joseph Harrington: Tacit Collusion and Competition Policy, 2nd CRESSE-JUFE Series of Lectures on Competition Policy (May 2021), https://joeharrington5201922.github.io/pdf/Harrington_CRESSE-JUFE_05.21_Slides.pdf.

the post-merger market for tacit collusion and shows how public announcements can be used to identify such behavior. In particular, Harrington (2022)[27] shows how firms may use public announcements[28] for the purpose of coordinating to restrict competition, while making prosecution more challenging as compared to private announcements due to the absence of a direct offer to collude. He provides examples of how the consolidation in the steel and airline markets in the US have led to coordinated effects and how this could have been detected through their public announcements. In the steel market example, several steel producers publicly announced and effectively introduced a plan to limit output and capacity for the purpose of raising prices. In the airline industry example, public announcements focused on the reduction in industry capacity by reducing the number of available seats, which would allow airlines to implement and sustain higher fares. In addition, he argues that public announcements could provide evidence in ongoing merger investigations, e.g. public announcements where firms suggest that the merger would make coordination easier. This could then be used as an integral part of evidence in a merger case.

C. Insights From Retrospective Evaluation Studies

Finally, as can never be emphasized enough, more ex post evaluation studies of mergers are needed, focusing also on their coordinated effects. One potential area of focus could be markets where the Commission has already conducted thorough investigations into the likelihood of these effects occurring. Retrospective analysis of mergers could feed our understanding of actual coordinated effects and inform the merger review policy.

27 Joseph Harrington, *Collusion in Plain Sight: Firms' Use of Public Announcements to Restrain Competition*, Antitrust Law Journal, 84, 521-563 (2022).

28 The author defines "public announcement" to refer to the conveyance of information by a firm or one of its employees using a medium that is widely accessible to individuals outside the firm, e.g. annual reports, earning calls, speeches and panel discussions at semi-public industry meetings, press releases, interviews.

THE PREVALENCE OF COORDINATED EFFECTS THEORIES IN UK AND EC MERGER CASES

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I. INTRODUCTION

The UK CMA, in its revised merger guidelines in 2021, stated that "Coordinated effects have been considered by the CMA relatively infrequently in the past. Some commentators have argued that enforcement in this area should be strengthened, based partly on evidence which, they suggest, demonstrates that coordination in concentrated markets is common and has the effect of restricting competition and raising prices, even when imperfect. As it has in recent cases, the CMA will consider seriously the impact of mergers in concentrated markets on the potential for firms to coordinate, including tacitly through the recognition of their interdependence and avoidance of competition."[2]

This article examines both UK and EC merger cases in the past ten years in which coordinated effects have played a material role in the investigation. I find that:

- theories of harm regarding coordinated effects have been rare – both in cases assessed by the CMA (consistent with its view quoted above) and by the EC;
- even when there are coordinated effects theories of harm articulated, they result in an adverse finding and remedy far less often than other theories of harm; and
- when there has been an adverse finding on coordinated effects, it has almost never been pivotal to the remedies that either authority has required.

II. UK MERGER DECISIONS INVOLVING COORDINATED EFFECTS

To identify relevant decisions, I ran an algorithmic search for the terms "coordinated effects" and "collusion" in all UK merger decisions on cases opened between January 2013 and December 2022. I discarded those that had fewer than five references to coordinated effects, and then I manually reviewed the remaining decisions to identify ones that articulated coordinated effects theories of harm.

I identified 18 UK mergers in the past ten years in which coordinated effects was one of the primary theories of harm. The CMA[3] cleared 10 of those unconditionally at Phase 1. The other eight cases are shown in the table below, along with the year they were notified, the outcome, and – if there was a finding of a substantial lessening of competition ("SLC") – whether the SLC resulted from expected coordinated effects (as opposed to a unilateral, vertical, or conglomerate mechanism for harm). The CMA cleared two of those cases with Phase 1 remedies ("UILs")[4] and of the six it referred to Phase 2: three were cleared, two were prohibited, and one was cancelled following an SLC finding at the provisional findings stage of the investigation.

CMA cases with coordinated effects theories	Year	Outcome	SLC in coordinated effects
Breedon Group / Cemex	2020	Phase 1 - UILs	Y
YPO / Findel	2020	Phase 2 Cancellation	N
JD Sports Fashion / Footasylum	2019	Phase 2 Prohibition	N
J Sainsbury / Asda	2018	Phase 2 Prohibition	Y
Muller / Dairy Crest	2015	Phase 1 - UILs	N
BT / EE	2015	Phase 2 Clearance	N
Tradebe-Sita	2013	Phase 2 Clearance	N
AG Barr / Britvic	2013	Phase 2 Clearance	N

Although five of these cases led to SLC findings, only two of them were in relation to the coordinated effects theories: *Breedon Group/Cemex* and *J Sainsbury/Asda.*

In *Breedon Group/Cemex,* the CMA found an SLC in relation to a coordinated effects concern in the supply of bulk cement in the East of Scotland. Its findings were predicated on a lack of customer switching and lack of attempts by suppliers to win customers from their rivals,

2 CMA 129, Merger Assessment Guidelines ("MAGs"), March 18, 2021.

3 And its predecessor organizations.

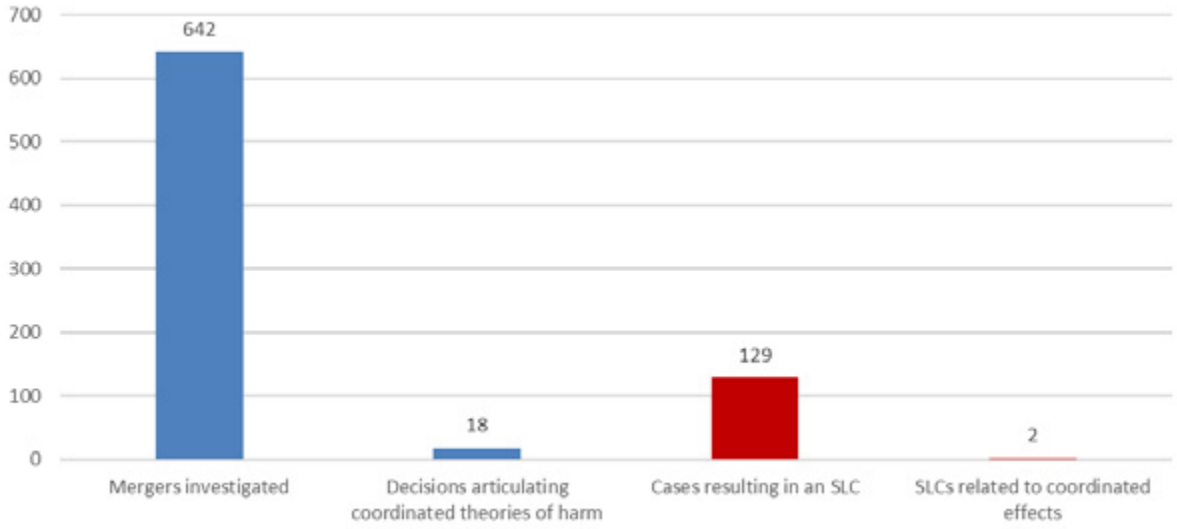
4 Undertakings in lieu of reference (to phase 2).

in a market which had the typical characteristics conducive to tacit collusion: a small number of suppliers (three), a homogenous product, and high barriers to entry. There had also been a market investigation by the CMA in 2013 that found that the industry was structurally susceptible to coordination and that producers took steps to exploit this susceptibility, using shares of sales as a focal point. While the Parties argued that the market had changed, the CMA found that many of those structural features still existed in the East of Scotland. The CMA's findings were based on customer evidence, analysis of prices, capacity utilization and sales shares. The Parties offered a remedy which included a divestment covering the East of Scotland to address the coordinated effects concern.[5] This is the only UK case that I am aware of in the past ten years in which there was a remedy designed solely to address a coordinated effects concern.

Sainsbury/Asda was prohibited on the basis of eight horizontal unilateral theories of harm and one coordinated effects theory of harm. The coordinated effects concern was in relation to the retail supply of online delivered groceries in areas of the UK where Ocado is entirely absent. Asda, Sainsbury, and Tesco accounted for 70-80 percent of online groceries at the national level. The CMA found that pre-merger there was no coordination, because these three players did not have the ability to reach and monitor coordination. However, the CMA found that pre-merger the other conditions for coordination were present, for it to be both internally and externally sustainable, and that the merger would increase the ability of the coordinating group to reach and monitor coordination.[6] However, given the extent of the eight horizontal unilateral SLC findings in this case, I expect that the merger would have been prohibited even if there had been no coordinated effects concern, thus it was probably not pivotal to the overall outcome of the case.

Coordinated effects concerns thus arise in a very small proportion of all CMA cases. According to the CMA's published merger outcomes, there were 642 mergers investigated between April 1, 2012 and March 21, 2022; 129 of them were remedied at Phase 1 or Phase 2, prohibited, or abandoned.[7] The chart below compares these figures to the number of cases I have managed to identify that articulate coordinated effects theories.

Figure 1: CMA Mergers Investigated in the Past Ten Years, in total, and with Coordinated Effects Theories



As shown in the Figure, coordinated effects theories of harm are rare (2.8 percent of cases and 1.6 percent of SLCs). Of the 18 cases with a well-articulated coordinated effects theory, 11 percent resulted in an SLC finding. This compares with 20 percent of cases overall. This difference should be interpreted with caution (as I have only identified a small sample of cases involving coordinated effects theories). However, it is more likely that my search methodology would understate the number of cases with coordinated theories of harm more than it would understate the number of cases where those theories of harm lead to SLC decisions; so the proportion could be even lower.[8]

5 There were three horizontal unilateral effects concerns which were also remedied, but they related to different markets.

6 The CMA describes internal sustainability as the requirement for the additional profit from coordination to be sufficiently high for all participants, and the need for an effective mechanism to respond to deviation. External sustainability is the requirement that the outside constraints that could destabilize the coordinating group are limited.

7 I have analyzed full calendar years in my decision search (from January 1, 2013 to December 31, 2022), so the periods are the same length, but misaligned by nine months; in the period I analyzed, 139 cases were remedied at Phase 1 or Phase 2, prohibited, or abandoned. All of the decisions with coordinated effects concerns that I found sit within the same period as the CMA's published merger outcomes.

8 I audited the algorithmic search to prevent "false positives": cases that appear to refer to coordinated effects in passing but do not actually have concerns or theories of harm articulated in the decision. There remains a risk that some cases with theories of harm that relate to coordinated effects have not been identified in the search. Any unidentified cases are more likely to be Phase 1 unconditional clearances because the decisions are shorter and there are fewer instances of the terms that I searched for.

The CMA's updated merger guidelines imply that the CMA has considered coordinated effects analysis more seriously in recent years, and that it plans to continue that scrutiny going forward. Although it is true that the only case with pivotal coordinated effects SLC that I am aware of in the last ten years was opened in 2020, my review also shows that it remains uncommon. In practice, any significant change in the CMA's approach to assessing these issues is yet to substantially affect case outcomes.

III. EC MERGER DECISIONS INVOLVING COORDINATED EFFECTS

I ran the same algorithmic search on EC decisions. The first five-year period (January 2013 -December 2017) results in few decisions referring to coordinated effects so I have focused on the later five-year period in my analysis below.[9]

In the period January 2018 to December 2022, I found 32 cases which articulated coordinated effects theories of harm. Sixteen out of those 32 cases resulted in remedies.[10] However, only two of the remedied mergers had a finding of a significant impediment to effective competition ("SIEC") resulting from coordinated effects. These data are summarized in the table below.

Outcome of EC cases with coordinated effects theories	Number of cases	SIEC in coordinated effects
Phase 1 unconditional clearance	14	0
Phase 1 remedies	10	1
Phase 2 remedies	6	1
Phase 2 clearance	2	0

The two cases in which there were SIEC findings on coordinated effects were *Spirit/Asco* (2019) and *ArcelorMittal/Ilva* (2018). The coordinated effects finding was only pivotal to the EC's remedy requirements in the former case.

Spirit/Asco was a transaction between suppliers of aerostructures[11] selling to major aircraft OEMs. The transaction had vertical and horizontal overlaps. The Commission investigated input foreclosure, customer foreclosure, tying/bundling, and unilateral effects, but dismissed these concerns. In particular, the unilateral effects concerns were dismissed on the basis that the incremental share that Asco contributed in the five overlap markets was less than 5 percent, and the parties were not close competitors because of their differences in focus. However, the Commission found that the transaction would give rise to coordinated effects because it modified the structure of Belairbus, a JV in which Asco participated with Spirit's rival Sonaca, which developed, produced, and sold slat systems for Airbus. As Sonaca and Spirit were the only two global suppliers of slats, the Commission concluded that the JV would facilitate transparency between the two suppliers and increase the likelihood that they would coordinate their behavior. Spirit submitted remedies which modified the JV agreement.

ArcelorMittal/Ilva concerned the markets for hot rolled, cold rolled and galvanized flat carbon steel. The Commission found horizontal unilateral effects concerns in each of these markets, in addition to coordinated effects in the same markets. Its coordinated effects concerns were motivated by the fact that the markets had been prone to coordination in the past (with a number of cartel decisions in the wider steel industry involving the main competitors also producing flat steel products). The shares of supply of competitors did not appear to become more symmetrical as a result of the transaction, which is often a concern under coordinated theories of harm because similarity of supply shares facilitates finding a collusive outcome that suits all competitors. Instead, the Commission considered that prices would be coordinated through a "price leader-price follower coordination model" in which there would be a common understanding that the strong market leader signals its future pricing policy in anticipation that other suppliers will adapt their pricing polices accordingly. The coordinated effects in this case were addressed through the same structural remedies that were offered to mitigate the unilateral concerns. Therefore, while there was an SIEC related to the coordination theory of harm, this issue was not pivotal to the outcome of the case.

9 I identified that the proportion of cases opened between January 1, 2013 and December 31, 2017 that had at least five references to coordinated effects was about half that of the level for cases opened between January 1, 2018 and December 31, 2022. It is plausible that difference reflects a change in how the decisions describe coordinated effects, rather than a change in the substance of the decisions.

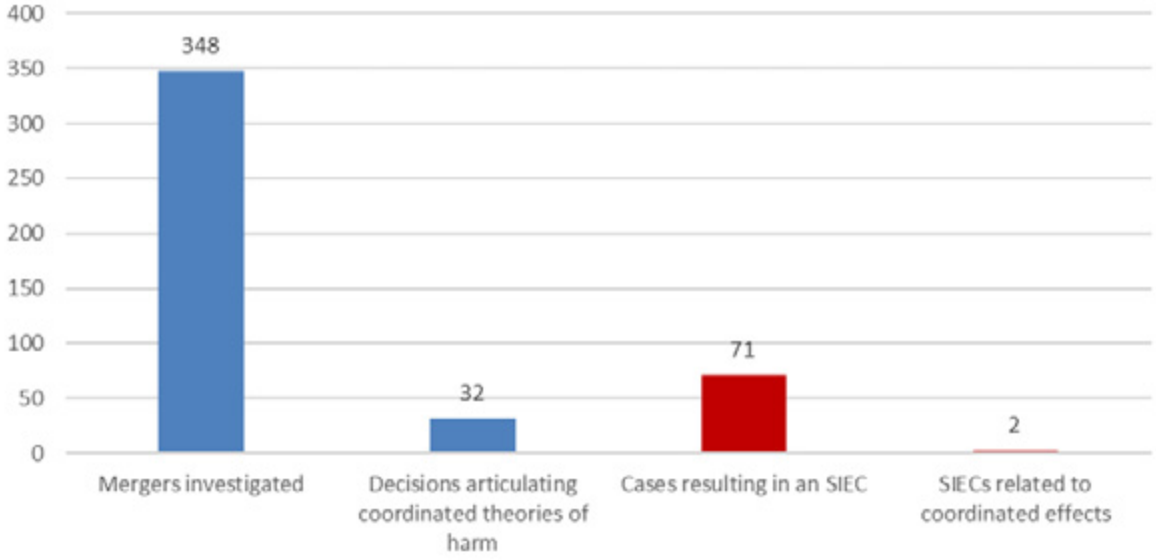
10 *KME/MKM* (2018) - coordinated effects in respect of sanitary copper tubes) and *T-Mobile NI / Tele2 NL* (2018) – coordinated effects on market for retail mobile telecommunications services in the Netherlands.

11 Components of the airframe of an aircraft including wings and tail structure.

I note that while I found no other cases in which a SIEC was found in respect of coordinated effects, in some cases commitments had been offered which the Commission alluded to in its assessment as also addressing coordinated effects theories.[12]

While a minority of EC cases articulate coordinated effects concerns (9.2 percent), they account for a larger proportion of mergers investigated than in the UK.[13] This is shown in the chart below which compares the number of decisions articulating coordinated effects theories of harm and the number of SIEC decisions related to coordinated effects, with the equivalent figures for all cases.

Figure 2: EC Mergers Investigated in The Past Ten Years, in Total, and with Coordinated Effects Theories



Coordinated effects cases accounted for 9.2 percent of EC cases and 2.8 percent of SIECs. Of the 32 coordinated effects cases, only 6.3 percent had an SIEC finding related to the coordinated effects concern; whereas overall 20.4 percent of merger cases resulted in an SIEC. Thus, as with the UK, the likelihood of a coordinated effects concern resulting in a remedy is lower than for other types of concerns.

IV. CONCLUSION

The above analysis shows that coordinated effects theories of harm are indeed rare – in fact, rarer than I had originally anticipated when designing this analysis. Even when there are concerns, these concerns may be dealt with by remedies designed to address unilateral concerns which arise in the same markets, not surprisingly given that the market structures conducive to coordinated effects are also conducive to unilateral effects. Thus, coordinated effects are very rarely pivotal to the actual remedy design. This finding holds both in the UK and EC. It is in line with the CMA's own observations, although the recently revised MAGs imply that we may see more emphasis on coordinated effects going forward.

12 For example in *Vodafone/Liberty Global Assets* (2019), the Decision stated "The Commission considers that the Transaction is unlikely to lead to the coordination of the merged entity's and Deutsche Telekom's commercial strategies as regards access to their respective telecommunications networks. In particular, the Commission notes that, as part of its Commitments, the Notifying Party already agreed to provide wholesale access to its cable network to a potential remedy taker. As a result, this possible theory of harm is moot."

13 This finding is affected by differences in the denominator, but not substantially. For the EC decisions, I look at all cases that the EC cleared at Phase 1 excluding the Simplified Procedure, and case cleared or prohibited at Phase 2 (but not cancelled). On a like-for-like basis, that reduces the total cases assessed by the CMA to 49; 3.7 percent of which had theories of harm regarding coordinated effects. The remaining difference could be affected by the fact that I do not include simplified procedure cases, as the CMA's briefing paper regime is recent and not entirely comparable. Also prior to the UK's exit from the European Union, many of the larger cross-border mergers that result in a greater number of theories of harm would have been analyzed solely by DG Comp and not by the CMA or its predecessors.

COORDINATED EFFECTS IN TIMES OF INFLATION

BY RICHARD MAY[1]

1 Competition Expert, OECD Competition Division. Views expressed are those of the author and do not necessarily reflect the views of the OECD or its members. The author is grateful to Ori Schwarz, Head of the OECD Competition Division, for comments on an earlier draft.

I. INTRODUCTION

This short article considers the role of public announcements in facilitating coordination, with a focus on the implication of high inflation. When inflation rises, competition authorities are likely to come under pressure to do all that they can to ensure the competitive process limits price increases.

The topic of competition policy and inflation is one that, until recently, did not occupy many minds, at least in most OECD countries. However, with the level of inflation rising across many jurisdictions in the past year or two, this has begun to change. For example, the OECD Competition Committee discussed the links between competition and inflation last November in a policy roundtable, and many competition authorities have stated publicly how they will react in such circumstances.[2] One factor raised during those discussions was the potential for firms to coordinate via price signaling.[3]

Compared to private communication between firms, the potential effects of public announcements on competition are less frequently discussed. Nonetheless, it is broadly accepted that public announcements, such as press releases, media interviews or earnings calls, have the potential to lessen competition by increasing the likelihood of coordination.[4] This was one of the conclusions of an OECD discussion on the topic of unilateral disclosure of information with anticompetitive effects in 2012.[5]

The article is split into two main sections. The first considers the potential for public announcements to facilitate coordination in general, including a brief discussion of the history of relevant competition enforcement. The second discusses the implications of an inflationary environment, and the particular risks regarding public announcements during these times. It finishes by briefly considering how competition authorities could react to tackle coordination through public announcements.

II. COORDINATION VIA ANNOUNCMENTS

A. Types of Coordination

Coordination can take different forms and be in different degrees. It requires a level of understanding between firms that it is not in their interest to compete fiercely, but to instead arrive at a reasonably understood mutually beneficial outcome (such as higher prices). To sustain coordination, firms must expect to be better off in than out. An inherent conflict that all successful coordination must overcome is that each firm has an incentive to deviate from coordination if it can profit from being more competitive. A crucial element of this is whether all parties know whether the others are "playing ball."

Given these conditions, there are several well-known factors that increase the likelihood of coordination, both in reaching and sustaining an understanding. For example, tacit coordination is more likely in markets with oligopolistic structures, with few firms and high barriers to entry. Beyond these factors though, markets where firms have more symmetric market shares, have similar cost bases, have prices and outputs that are more transparent and the product or service is more homogenous should, all things equal, be more likely to lead to coordination.

Coordination often conjures up the image of smoke-filled rooms and carefully drawn-out agreements. However, collusion can be tacit or explicit.[6] Both reduce competition, and preference over the two will depend on which has the largest expected net benefit.[7] To generalize, explicit collusion will have a higher expected cost to the firm as it is more likely to be perceived as falling foul of antitrust laws. This could lead to incentives for firms to engage in tacit coordination, even if it did not deliver the same level of coordinated outcome. [8]

2 See https://www.oecd.org/competition/competition-and-inflation.htm for more on the OECD policy roundtable. For an example of a competition authority publicly responding to rising inflation, see this note from the Portuguese authority: https://www.concorrencia.pt/sites/default/files/Competition%20and%20purchasing%20power%20in%20times%20of%20inflation.pdf.

3 This was also discussed in a recent CPI Column article: https://www.competitionpolicyinternational.com/competition-policy-in-times-of-inflation/.

4 The term "public announcements" is used broadly to incorporate any form of communication made in the public sphere, including on websites, by email, but also widely available speeches or in panel discussions.

5 Executive Summary of the OECD Roundtable on Unilateral Disclosure of Information with Anticompetitive Effects, https://www.oecd.org/daf/competition/Unilateraldisclosureofinformation2012.pdf.

6 This distinction is intended to be economic rather than legal, with the key difference being whether the outcome in question is derived unilaterally or multilaterally.

7 Of course it could also be preferable to compete instead.

8 As Joseph Harrington describes it, "public announcements trade off a lower chance of effectively colluding with a higher chance of escaping detection." Harrington, J. E (2022) Collusion in Plain Sight: Firms' use of Public Announcements to Restrain Competition, 84 Antitrust Law Journal No. 2 (2022), pg 521.

B. Can Announcements Facilitate Coordination?

Unilateral public announcements can contain information on a range of current and future competitive parameters, such as prices or production plans. There are many beneficial uses of this information, and it can be an important part of market functioning. For example, consumers require information to aid them in effective decision making and may appreciate advance notice of upcoming changes. Similarly, providing investors with accurate information on company performance is an important part of ensuring efficient financial markets.

However, the information is public and available to all, including competitors. The potential for announcements to be part of the exchange of information that increases the chances of coordination, or softened competition, is well established.[9] By providing information to rivals, public announcements increase transparency in markets and reduce the uncertainty amongst rivals.[10] This could be to improve the chances of finding a focal point for coordination, signal that coordination is an option and therefore more likely to succeed, as well as setting out any punishment strategy if the coordination is not successful. It is also worth reflecting that a public announcement can be a cheap way to seek to induce coordination amongst rivals, particularly when compared to actually raising prices and hoping rivals respond.[11]

The OECD Roundtable on the topic of unilateral disclosures identified four factors that can make public announcements more likely to be anticompetitive. These are when announcements:

- contain other information not intended for consumers, for example including references to specific competitors;
- disclose more information than needed;
- make it clear that behaviors are contingent on action of others; and
- include descriptions of what will happen if market players do not act as expected, such as threatening a price war[12]

It is not necessary for firms to have a specific agreement on prices or outputs for there to be some coordination that lessens competition. Two dimensions of coordination are worth considering. First, how likely there is to be a softening of competition through coordination. Second, how far is the coordinated outcome from the counterfactual of competition. Another element that is important is the extent to which announcements cover conduct that is committed or not. To the extent that firms are just announcing things they are going to do anyway, the announcement is only bringing forward information that would otherwise be known to consumers. Announcements that are less specific, non-committed or reversible, are therefore more likely to be problematic from a coordination perspective. The same is also true the further into the future the information relates to. Noting that prices will go up by 4 percent next week is less likely to be problematic than suggesting prices might go up in two months.

While coordination requires a level of reciprocity, it is not necessarily the case that announcements need to be reciprocated by rival firms to have an effect, it may be sufficient for firms to act in a certain way (e.g. by raising price, etc.). This is not to say that reciprocating announcements will not make coordination more likely. Initial announcements could be the first step in a process of information exchange that leads to, or cements, coordination. For example, a study by Aryal, Ciliberto & Leyden (2021) highlights the importance of bilateral confirmation to sustain coordination when making announcements. [13] When considering the effects of capacity reducing announcements via earnings call from legacy United States airlines, they find that capacity only reduced if all airlines noted their intention to do so, and that it did not if even one (of a few) did not mention this intention. Interestingly, the authors note that also implies that the announcements were used to signal intention to rivals rather than investors, as if the former there should be no material effect from the announcements of rivals.[14]

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9 In the previously mentioned OECD Roundtable on Unilateral Disclosure of Information with Anticompetitive Effects, all delegates recognized the potentially harmful effects of unilateral announcements.

10 The nature of the relationship between transparency and competition is also well established. On the one hand, transparency to consumers is crucial to allow them to access the information they need to assess their options, and act to select those that suit them, driving the incentives for firms to compete. On the other, this transparency can aid firms in aligning their offers such that those choices proposed to consumers are in the mutual interest of the firms.

11 Due to a lower expected probability of being found to violate antitrust law, with associated fines.

12 Similarly, in his paper referenced at footnote 8, supra, Joseph Harrington identifies three useful categories of information that firms can use which might affect competition, namely information that sets out how the firm:
- will behave given the behavior of others. For example, making clear that as long as the market prices "sensibly" they will continue to do so.
- thinks others should behave, perhaps for example by raising their prices or reducing their capacity. This could be seen as an invitation to do so.
- Predicts how others will behave, such as noting a general expectation that prices will rise. As above, this prediction could also be interpreted as a suggestion.

13 Aryal, G., Ciliberto, F & Leyden, B. T. (2022) *Coordinated Capacity Reductions and Public Communication in the Airline Industry*, The Review of Economic Studies, Volume 89, Issue 6, November 2022, Pages 3055–3084

14 This case raises another interesting point, which is that public announcements are not limited to price in order to facilitate coordination. Information could be provided on output or capacities, or even on potential entry to new geographic areas or product markets.

Finally, in relation to public announcements more generally, when markets exhibit price leadership, information is conveyed through the leader and follower pattern. Given this, to what extent could additional information from public announcements contribute to coordination? A few possibilities appear to exist. First, public announcements could signal continuance of the price setting pattern, for example if followers signaled that they would continue to do so, perhaps indicating that their pricing will "follow market dynamics."[15] Secondly, announcements could reinforce coordination by setting out how firms will react to deviations from the status quo, perhaps the leader indicating that prices need to rise but that it will "react to market dynamics as required." Lastly, perhaps the announcements could be used by followers to signal to the leader that they believe prices could rise more.

C. Different Types of Public Announcement

As explained above, there are potentially significant pro-competitive and efficiency enhancing justifications for firms providing information publicly. Whether they are anticompetitive, potentially in addition, will depend on their content. However, while there is potential for all forms of announcement to contain information that might increase the likelihood of coordination, as a starting point, it seems fair to say that the more likely it is to reach rival firms rather than more legitimate recipients, such as consumers or investors, the lower the chance of an offsetting efficiency benefit. This may be useful to understanding where to prioritize potential areas for surveillance.[16]

At one end of the scale, direct communications to customers, for example through emails to a distribution list, appear much more likely to contain information that is of benefit to customers, and less likely to be accessed by rivals. This is not to say that the information cannot end up in the hands of rivals, and the form of the communications may need to be scrutinized. At the other, announcements during speeches or via letters in trade publications seem more likely to be received by rivals. While accessible to consumers, unless there are relatively few highly interested customers or the customers also actively engage in trade related news, it appears unlikely the information is aimed at them.[17] Finally, earnings calls or other forms of transparency required as part of security regulation are aimed at investors, not consumers or competitors. As noted, while this can benefit transparency in financial markets, this does not prevent the information also being accessed by competitors.

D. Enforcement

Overall, there has not been a large amount of enforcement against public announcements by firms that facilitate coordination. There are likely to be many reasons for this, but two stand out. Firstly, as explained above, it can be difficult to discern anticompetitive from pro-competitive announcements. Second, it can be difficult to show a breach of competition law in some jurisdictions in these circumstances, as the conduct, by nature, is unilateral.

That said, the potential for public announcements to lessen competition is not lost on competition authorities. For example, the European Commission's guidance to firms on the applicability of Article 101 in relation to horizontal co-operation includes references to public announcements.[18] The guidelines highlight the importance of strategic uncertainty between rivals and note that exchanging information can constitute a concerted practice. The guidelines explain that it follows that there is a possibility of finding a concerted practice when firms make announcements, including that this could be by object:

> "… depending on the facts underlying the case at hand, the possibility of finding a concerted practice cannot be excluded, for example in a situation where such an announcement was followed by public announcements by other competitors, not least because strategic responses of competitors to each other's public announcements (which, to take one instance, might involve readjustments of their own earlier announcements to announcements made by competitors) could prove to be a strategy for reaching a common understanding about the terms of coordination."[19]

15 Hence allowing the price leader to increase prices with less fear of a significant period of lost sales due to rivals not also raising prices.

16 It must be noted however that if authorities follow too predictable a surveillance strategy, firms will have an incentive to shift communication to avenues they perceive as less likely to be monitored.

17 There will of course be industries where customers read trade publication as diligently as rivals.

18 European Commission, January 14, 2011, Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements

19 Paragraph 63 of the Guidelines. Further descriptions of the Commission's approach explains that when announcements correspond to committed, non-reversible, changes in price or quantity, they are unlikely to be found to restrict competition by object, but notes that general commitments on price are not necessarily pro-competitive and could instead make coordinated accounts more stable. Footnote 58 of the Guidelines. It is worth reflecting that the Commission's guidelines appear to place greater emphasis on the need for other firms to follow-up in response to an initial announcement, compared to the situations that appear to raise competition concerns that are highlighted in the literature.

Public announcements were the subject of a 2016 settlement case on container shipping in the EU.[20] The main practice under consideration was how the companies announced intended future price increases. The regular announcements detailed the planned increase, usually for several weeks in the future. A pattern emerged in which one company made an announcement, then others followed with similar announcements. Interestingly, the announcements were not always implemented, often when similar announcements did not arrive from other firms. From its preliminary assessment, the Commission was concerned that the announcements provided an opportunity for shipping companies to test the market to see whether they could implement a price increase, but allowed room to change course if not. The parties made commitments to change the way they announced prices, including making them specific, binding and not too far in advance.[21]

Another case from Europe involved telecommunications providers in the Netherlands, and also resulted in commitments.[22] The commitments were that the firms involved, mobile network operators, would not make oral or written announcements in the public domain on future commercial conditions, including prices, before a formal decision in writing has been taken by the organization.

There have been several other cases that have considered public announcements.[23] A number of these have been assessed under Section 5 of the FTC Act, which contains a broader provision on unfair methods of competition, including cases involving newspaper companies and those providing truck rentals.[24] There was also the interesting case of baggage fee introduction between two U.S. airlines, in which two airlines announced that they would only introduce fees if the other followed.[25]

This lack of enforcement could of course reflect a lack of harm. Given the discussion above however, it appears more likely to reflect a gap in enforcement powers, although whether there is an actual gap in powers will depend on the jurisdiction and may be debatable. One instrument to tackle this potential gap are provisions designed specifically to tackle disclosures of information, such as those recently implemented in Greece. Lionos & Wagner-Von Papp (2022) set out how such a provision may have plugged a gap in Greece.[26] The Hellenic Competition Commission has produced detailed guidelines explaining how it will assess these new provisions, and on the types of conduct most likely to fall foul of them.[27]

Finally, generally speaking, market studies do not generally offer quick enough solutions and so may not appear useful tools in times of inflation. However, market studies can be of varying lengths and scopes, and a holistic assessment of competitive conditions provides an opportunity to tackle conduct leading to coordination, including public announcements. One example of a market study being used to tackle public announcements comes from the UK market investigation into cement. In that case, there was a finding that the nature of price announcements was leading to coordination, and ultimately there was a finding of a lessening of competition.[28] This was remedied through placing restrictions on the form of those pricing announcements.

III. TIMES OF INFLATION

A. Competition and Inflation

Average annual inflation across the OECD in April 2023 was 7.4 percent.[29] While a decrease on the highs seen in 2022, this is still a substantial increase over the OECD averages in recent decades. While the initial causes of inflationary pressure are largely uncontroversial, the extent to

20 European Commission, Commission Decision AT.39850 Container Shipping, July 7, 2016.

21 It must be noted that as a commitment decision, the parties did not accept that a breach of competition law had occurred and an infringement decision was not reached.

22 ACM, case number 13.0612.53 (available at https://www.acm.nl/sites/default/files/old_publication/publicaties/14326_commitment-decision-regarding-mobile-operators.pdf)

23 See Harrington (2022) for description of cases in the U.S. context, as well as in other European markets. As noted, there have been a number of failures to prosecute cases in the United States, such as in broiler chickens and pork, as well as some settlements, for example in steel.

24 The FTC noted in November 2022 that it intended to diligently enforce under section 5, and noted that invitations to collude can fall under this, https://www.ftc.gov/system/files/ftc_gov/pdf/P221202Section5PolicyStatement.pdf.

25 See https://casetext.com/case/in-re-deltaairtran-baggage-fee-antitrust-litig-4.

26 Lionos, I & Wagner-Von Papp, F (2022) Tackling Invitations to Collude and Unilateral Disclosure: The Moving Frontiers of Competition Law?, Journal of European Competition Law & Practice, 2022, Vol. 13, No. 4

27 Hellenic Competition Commission, Guidelines on the implementation of Article 1A L. 3959/2011

28 Competition Commission Market, Aggregates, cement and ready-mix concrete market investigation, 2016-2017, https://www.gov.uk/cma-cases/aggregates-cement-and-ready-mix-concrete-market-investigation.

29 OECD data, Inflation (CPI), https://data.oecd.org/price/inflation-cpi.htm.

which the inflation has been exacerbated by competition issues has been subject to much debate.[30] One thing that is clear however, is that competition authorities will want to do all that they can to leverage competition to keep prices low where they can (and are likely to be under pressure from governments and the public to do so).

At the outset, it is worth being clear that legitimate increase in prices can occur when costs are rising. Due to the cost of changing prices, we might expect price increases to include expectations of future costs as well, such that initial increases in price might be more than the witnessed cost pressures to date.[31] The test is not therefore whether firms rise prices during times of inflation. Instead, it is whether prices are higher than in a counterfactual competitive market. Narrowing in on public announcements specifically, are prices higher than they would have been absent the announcements in question.

Further, in an inflationary environment it is likely that both businesses and consumers will expect price increases. This mutual understanding could provide an increased risk of coordinated action between firms, not least because of the potential for consumers to be less responsive to increases they expect.[32] Of course, a desire to coordinate and communicate could lead to open, and illegal, discussion and agreement on prices or other factors. As discussed above, most firms will be aware of the potential costs of being caught and, hopefully, be sufficiently deterred.

B. Public Announcements During Times of Inflation

As discussed above, the likelihood of any successful coordination will depend on the market characteristics. However, beyond these factors, several commentators have argued that there is a risk that inflationary pressures provide cover for price increases.[33] At first glance, it may seem that inflation will reduce the likelihood of tacit coordination. While the ability of firms to tacitly coordinate will depend on many factors, including the number of competitors and the complexity of the products, prices changing rapidly should make tacit coordination more difficult, all else equal. This is because it will be harder for firms to monitor each other's prices and detect whether other firms are continuing to resist the temptation to undercut coordination.

Despite, or perhaps because of this, with prices changing rapidly, it could be argued that additional information could be crucial in maintaining or supporting coordination. In this context, firms may seek to use public announcements to signal their desire to increase price and find mutual understanding with competitors. References to other firms, for example through discussions of industry trends or common cost factors, seem particularly likely during times of inflation, where prices across the economy are rising, and this is likely to further raise the risk of facilitating coordination.

Two different scenarios might explain the need for public announcements to arrive at coordinated outcomes in times of inflation. First, there may have been previous coordination in the market which is threatened due to the external factor of cost rises. In this situation, information could help maintain coordination. Second, if inflation creates a perceived need to act to maintain profitability, or perhaps there is a perceived opportunity, then rising costs could be a catalyst for coordination. As changing prices frequently can be costly, and firms may do so at additional speeds, firms may also seek ways to use information to induce coordination and reduce price competition such that they can increase prices without losing many sales.[34]

Public announcements relating to future price information carry a greater threat than past pricing information. In the context of inflationary periods, the latter is most relevant. On the other hand, pricing information may be of greater value to consumers, and it is important that authorities are able to distinguish between genuine public announcements and those made with the intention of forming a coordinated outcome. This may not always be straightforward.

These forecasts of future price do have the potential to increase the likelihood of coordination, however. As noted, a highly relevant element of inflationary periods is the general expectation of increased costs. Given this, firms may well talk publicly and give forecasts of future prices. The more firms that do so in response to each other, and with clearer references to other firms when making announcements, the higher the risk. For example, predicting that there may be increases in costs due to general inflation, which would lead to increases in prices across the industry, could increase the likelihood of that happening.

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30 See OECD, Competition and Inflation, Policy Roundtable, 2022

31 The existence of menu costs is likely to vary substantially by sector, with many sectors experiencing minimal costs in changing prices frequently.

32 The argument being that when price rises are expected, the perceived benefit of shopping around (and incurring search costs) is likely to be lower. Of course, if inflation leads to increasingly tight budgets for consumers, we would expect them to become increasingly price conscious.

33 See, for example articles such as: The Hill, Inflation is providing cover for price fixing: economists, July 19, 2022, Tobias Burns, Corporate profits have contributed disproportionately to inflation. How should policymakers respond? https://thehill.com/policy/finance/3564912-inflation-is-providing-cover-for-price-fixing-economists/.

34 Of course, this incentive exists independently of any inflationary pressure. In addition to customers switching to rivals, sales could also be lost due to reduced purchases by existing customers.

Finally, another potentially relevant feature of times of inflation to coordination is that of asymmetric pass-through, something often referred to as "rockets and feathers." This is when prices are quick to rise in response to cost increases (the "rocket") but slow to fall as costs decrease (the "feather"). Communication could play a role in reducing uncertainty about how rivals will react to changes in cost, perhaps by signaling the need for prices to rise in accordance with costs, or an expectation that prices are unlikely to fall quickly. As described above, any statements that indicate different strategies depending on the action of rivals would appear to have an even greater potential to facilitate coordination. For example, consider a statement along the lines of:

> "while there have been some decreased cost pressures in certain areas, given the highly uncertain outlook, we do not expect significant adjustments in the near term across the industry, although we will continue to monitor the necessity to act based as mandated by market conditions."

Two elements of this statement make coordination more likely. First, there is a clear focal behavior – keep prices at current levels even if costs drop. Second, if a firm is considering that it will derive a competitive advantage by lowering costs, it is now aware how others will respond and that it will be short lived.

C. Reaction From Competition Authorities

As noted earlier, there could be a question mark on the extent to which certain jurisdictions have the legal power to enforce against unilateral public announcements. Further, many public announcements discussing price, or other market conditions, will not be anti-competitive and instead be part of normal market functioning. This paper is not calling for a prohibition of public announcements on firms.

However, it is worth highlighting one factor that is on the side of authorities wishing to crackdown on the use of public announcements that facilitate coordination, and that is that they are public. Unlike explicit cartels, where the conversations will generally take place behind closed doors and be difficult to observe, public announcements are open for all to see. Therefore, at least in theory, there is a significant informational advantage for authorities in terms of monitoring and identifying potential conduct that could be worthy of further investigation, at least compared to traditional cartels. Given this, this paper argues that it is worth authorities considering how they could gather and analyze this information, notably given recent advances in technology that might help identify potential announcements of concern.[35]

In gathering and analyzing this information, authorities should be particularly wary of evidence of conduct discussed in the sections above. This includes paying attention to firms referring to future competitive parameters in the context of broader market conditions, such as setting out how they expect other firms to act. Further, if there is evidence of a regular pattern of firms following each other with pricing announcements, as well as announcements that do not contain specific information but rather general intentions to increase prices, this could indicate announcements forming the basis for coordination. This could also be the case if the announcements are made well in advance, or if there are frequent examples of planned increased later being revised. The latter could imply that the announcement was testing a proposed increase with rivals that was not successful.

As with other types of enforcement, it may also be worth authorities considering which industries appear to be at higher risk of coordination and paying closer attention to any public announcements made. This could be based on general factors that might facilitate coordination, such as the number of firms, a history of collusion, or the nature of the product. Another factor to consider could be if there is reason to believe that an industry, contrary to the economy at large, is likely to face comparatively small cost increases on its inputs. In such a case, there would appear to be less legitimacy in substantially raising prices, so it may be worth monitoring any public announcements that appear to be suggesting a need to raise prices. Relatedly, following the discussion of rockets and feathers, if an industry experiences substantial cost increases which are then known to reduce, it may be worth closely following how firms discuss the downward adjustment of price publicly.

Finally, as with all areas of enforcement, issuing clear guidance to firms so that they are aware of the risks in certain types of announcements is likely to be a good idea. It may also be beneficial to signal publicly that the authority is monitoring announcements in this way. This could also include alerting stakeholders, such as consumers or compliance minded businesses, of the types of things to monitor in public announcements, and to encourage them to bring any concerns to the attention of authorities.

35 For example, much has been written on the potential for artificial intelligence to transform the gathering and compilation of information. That is not to say that technology that has been around a little longer cannot be of use to authorities, with there appearing to be potential aids from a variety of techniques, such as web scraping and, even more old fashioned, email distribution lists.

IV. CONCLUSION

The potential for unilateral announcements to facilitate coordination is already well established. Nonetheless, enforcement against such announcements is low. With inflation at levels higher than that seen in recent decades, competition authorities will be under pressure to do all they can to keep prices low. There seems no good reason to think that public announcements could not be used to facilitate coordination in times of inflation, and could even be more likely given the potential for industry level cost factors.

If legal challenges can be overcome, given technological advances, there appears to be great potential for competition authorities to exploit the very element of these announcements that helps facilitate coordination – they are public. By monitoring examples of firms referencing each other in the context of future prices, or output levels, authorities are likely to be better placed to identify potentially problematic conduct, or deter it in the first place.

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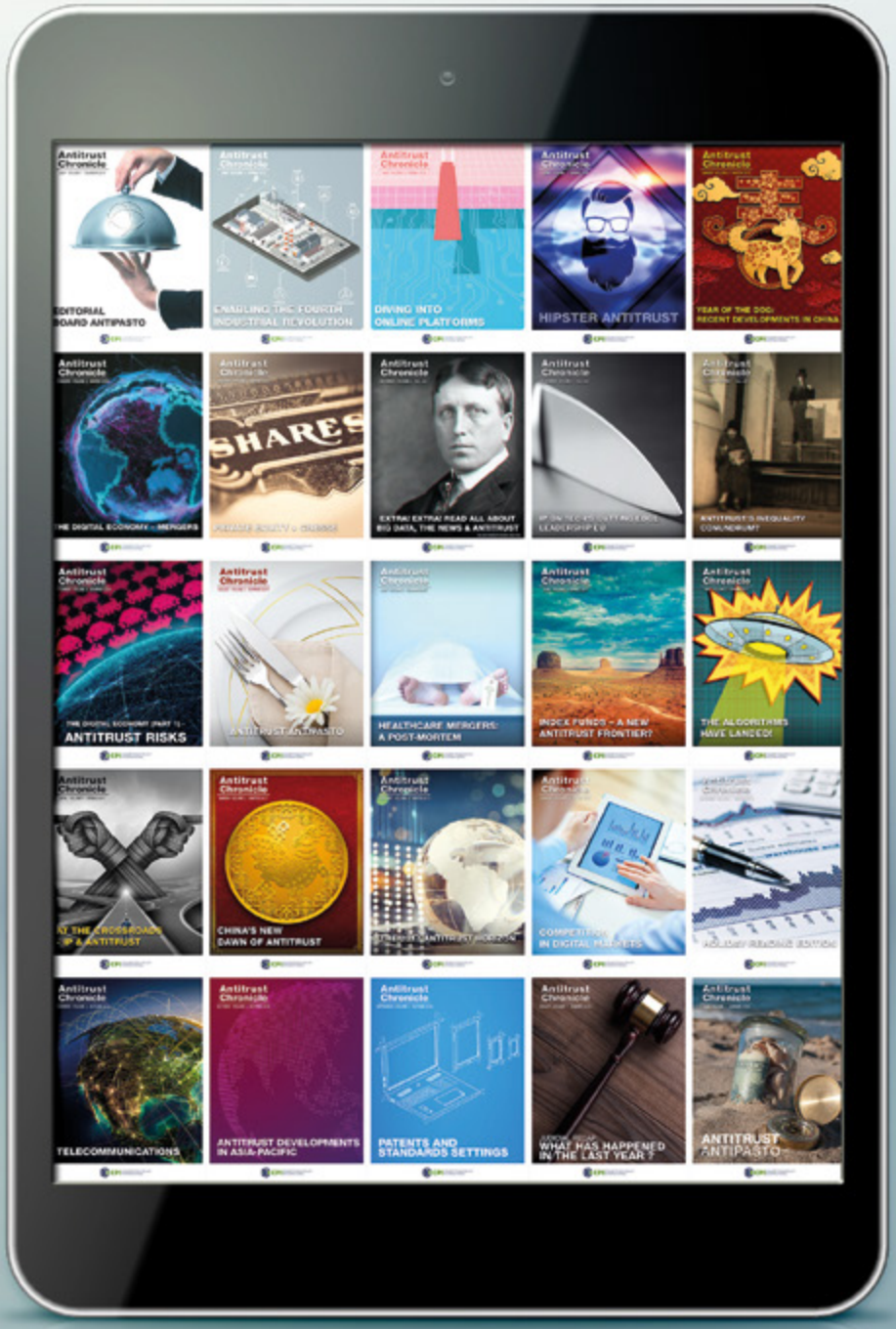


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