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**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION**

*IN RE BROILER CHICKEN ANTITRUST
LITIGATION*

No. 1:16-cv-08637

This Document Relates To:

Honorable Thomas M. Durkin
Magistrate Judge Jeffrey T. Gilbert

All End-User Consumer Plaintiff Actions

**DECLARATION OF DR. LUIS CABRAL IN SUPPORT OF END-USER CONSUMER
PLAINTIFFS' MOTION FOR CLASS CERTIFICATION**

REDACTED VERSION

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I. EXPERIENCE AND QUALIFICATIONS

1. My name is Luís Cabral. I am an economist specializing in the dynamics of firm competition. I have conducted extensive research, both conceptual and empirical, on firm competition. My research has been applied to industries such as aircraft manufacturing, retail gasoline, banking, computers, media and entertainment. I have published numerous articles and books on these subjects. My curriculum vitae is attached to this report as Exhibit 1.

2. I have served as the Paganelli-Bull Professor of Economics and International Business, Stern School of Business, New York University, since 2013. At the Stern School of Business, I served as Chair of the Department of Economics from 2003 to 2006 and again from 2015 to the present. I have been a Professor of Economics at the Stern School of Business, New York University since 2000. I have also held teaching positions at the London Business School, the University of California (Berkeley), Yale, and University of Navarra's IESE Business School.

3. I have served on numerous national and international panels concerned with economic policy in general and antitrust policy in particular. I was Chief Economic Consultant of the Portuguese Competition Authority from 2002-2007. I was one of 12 members of the Economic Policy Group advising the President of the European Commission from 2005-2010. I am a Research Fellow of London-based Centre for Economic Policy Research. I am a member of the Advisory Board of MaCCI, the Mannheim (Germany) Center for Competition and Innovation. From 2009-2011, I was President of the European Association for Research in Industrial Economics.

4. I am the author of *Introduction to Industrial Organization*, a textbook translated and adopted by universities in dozens of countries. This text, the second edition of which was published by MIT Press in March 2017, provides a general introduction to the study of market competition. In particular, it includes a discussion of issues such as market power and collusion, both from a conceptual point of view and from the perspective of multiple real-world examples. Leading scholars have widely praised the book, including Harvard's Ariel Pakes (Cabral "has done the field a great service") and Stanford's Matthew Gentzkow (the book "is a rare commodity: an intellectually rigorous textbook that is elegant, concise, and a pleasure to read. Cabral manages to communicate difficult ideas precisely while keeping the focus squarely on issues that matter for the real world").

5. My professional experience in the areas referenced above, my scholarly work, and my research informs my opinions in this report. My scientific publications in these areas have, for the most part, been externally reviewed for scientific merit by other experts prior to publication as articles or books, and my public service on relevant advisory panels and groups are listed in Exhibit 1.

6. I have been undertaking research, and publishing books, articles, and reports on the operation of cartels since 1994. I have written or edited several peer-reviewed books and peer-reviewed articles on economic issues due to cartel behavior over this period. So I believe it is fair to say that I have deep economic expertise on the economics of both cartel activity and

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industrial competition that long predates this litigation. The analysis and opinions found in this and my previous reports are based on this experience and expertise.

7. I have been retained by counsel for the End User Consumer Plaintiff Class as a source of expert consulting on the economics of information exchanges and collusion. My compensation for time spent on this matter is \$800 per hour. This compensation does not depend on the opinions and conclusions I reach or the outcome of this lawsuit. My analysis of this matter is continuing, and I reserve the right to supplement and revise my opinions as additional information becomes available to me. Exhibit 2 lists the materials I have relied upon in preparing this declaration.

II. PURPOSE, SCOPE, AND SUMMARY OF MY ANALYSIS

A. Purpose and Scope of My Analysis

8. I was retained by the End User Consumer Plaintiffs (“EUCP”) Class. I understand that the proposed EUCP Class encompasses:

All persons and entities who indirectly purchased the following types raw chicken, whether fresh or frozen: whole birds (with or without giblets), whole cut-up birds purchased within a package, breast cuts or tenderloin cuts, but excluding chicken that is marketed as halal, kosher, free range, organic, diced, minced, ground, seasoned, flavored or breaded – from Defendants or co-conspirators for personal consumption in the Repealer Jurisdictions from January 1, 2012 to July 31, 2019.

The Repealer Jurisdictions are those states which have “repealed” the Supreme Court’s holding in *Illinois Brick Co. v. Illinois*¹ and which provide standing to indirect purchasers of a price-fixed good.² Excluded from the class are the Defendants and co-conspirators, any entities or personnel related to the Defendants and co-conspirators, government entities, and any judicial officers involved in this proceeding.

9. EUCP Class Counsel have asked me to address three questions:

- (1) According to economic theory, under what circumstances are information exchanges likely to be anticompetitive?
- (2) Are those circumstances present in the broiler chicken market?

¹ 431 U.S. 720 (1977).

² For the purposes of this class certification motion, those jurisdictions are: California, District of Columbia, Florida, Hawaii, Illinois, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Carolina, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, and Wisconsin.

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agreement was in place or not in the present case, the evidence strongly suggests that information exchanges among chicken processors had anticompetitive effects, if nothing else through facilitating de facto oligopolistic coordination, which resulted in higher prices and lower output levels.

III. ANALYSIS

A. Background on the Chicken Industry

1. Background on Chicken Production

14. To explain why the chicken processors' information exchanges through Agri Stats and EMI were likely anticompetitive, it is helpful to first set out the basic steps chicken processors take to grow and slaughter chickens. The term "chicken," as used in this report, means broiler chicken. As explained in the Complaint, broiler chickens are "chickens raised for meat consumption to be slaughtered before the age of 13 weeks, and which may be sold in a variety of forms, including fresh or frozen, raw or cooked, whole or in parts, or as a meat ingredient in a value added product, but excluding chicken that is grown, processed, and marketed as halal, kosher, free range, or organic."⁶

15. The process of raising chickens for meat consumption is very complex and involves raising several generations of birds. [REDACTED]

Grandparent chickens lay eggs that hatch into "breeder" chickens. When breeder chickens reach maturity, they lay eggs that hatch into broiler chickens (which are raised for slaughter).

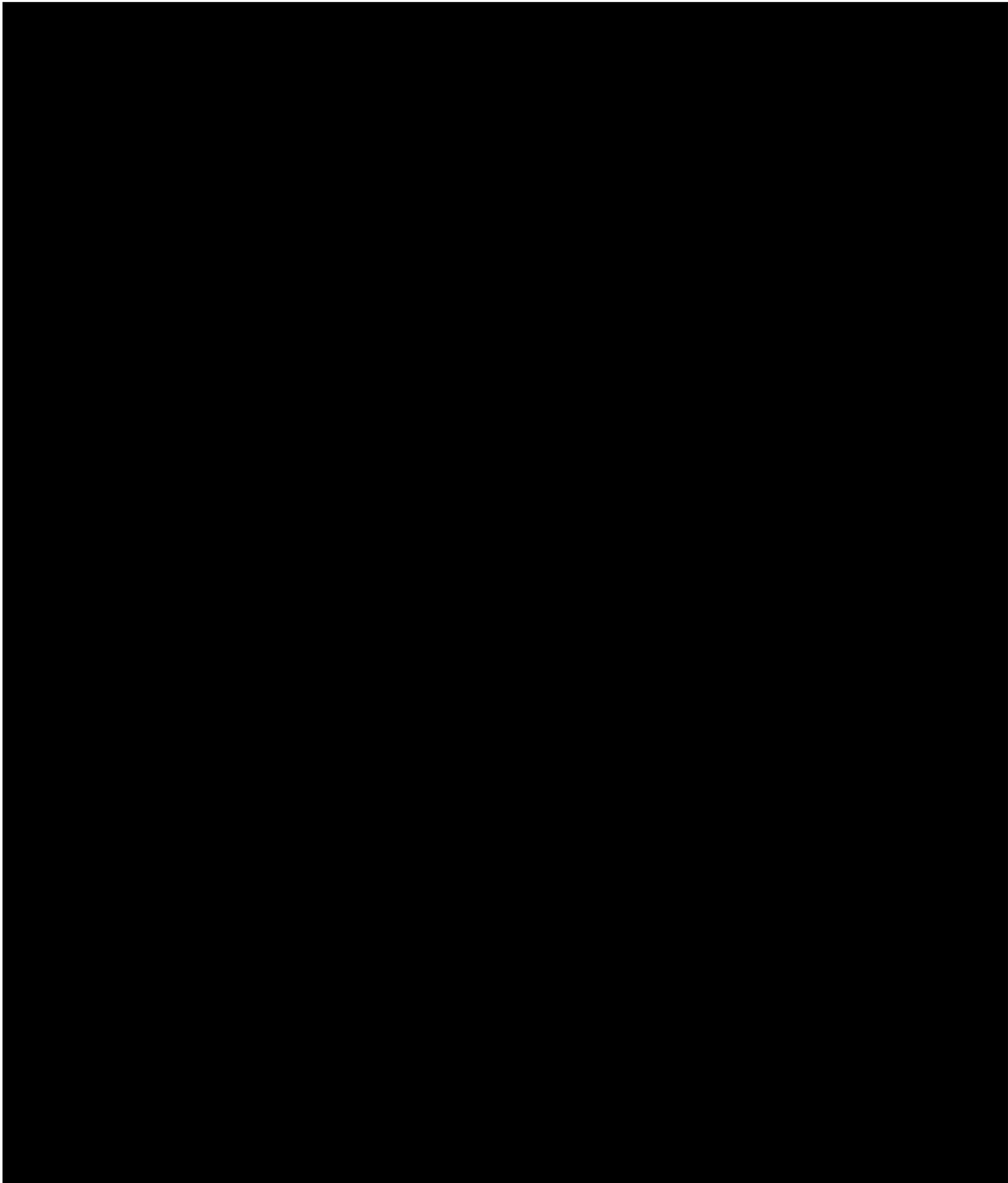
16. The following graph depicts the chicken family tree. Light green rows represent generations of chickens owned by primary breeder companies. Blue rows represent generations of chickens owned by chicken processors:

⁶ Fifth Am. Compl. ¶ 126, ECF No. 3748.

⁷ [REDACTED] at 459.

⁸ *Id.*

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19. Generally, broiler chickens are slaughtered and processed in three phases. During “first processing,” workers slaughter and clean the chickens, turning them into usable meat. During “second processing,” workers cut the chicken into pieces and occasionally remove the bones. Finally, at some processing plants, chicken meat undergoes “further processing,” where it is turned into a product with multiple ingredients (*e.g.*, chicken nuggets).

2. Background on Agri Stats and EMI

20. In 1970, chicken processors formed the National Broiler Marketing Association, a trade group that helped chicken processors fix prices—in part by exchanging past, present, and future price information—and reduce output.¹⁶ The cartel was prosecuted in 1971, and the Supreme Court resolved the case in favor of the government in 1978.¹⁷

21. Less than a decade later, in 1985, Agri Stats was formed. Agri Stats helps the chicken industry (among other agricultural industries) exchange detailed information about their operation with one another. Like the National Broiler Marketing Association, Agri Stats and its subsidiary EMI helped chicken processors share past, present, and future price information. Agri Stats also helped chicken processors exchange a bevy of other competitively sensitive data about their operations.

22. As a Tyson executive acknowledged during his deposition, Agri Stats [REDACTED]

23. After collecting and auditing information from each chicken processor, Agri Stats compiles it into several different reports. [REDACTED]

¹⁶ See 1972 Annual Report of the Attorney General of the United States at 101.

¹⁷ See *Nat’l Broiler Mktg. Ass’n v. United States*, 436 U.S. 816 (1978).

¹⁸ [REDACTED] Tr. 33:3-23.

¹⁹ [REDACTED] r. 34:18-35:17 ([REDACTED])

²⁰ See, *e.g.*, [REDACTED] . 66-67 [REDACTED]

²¹ [REDACTED] 97.

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[REDACTED]

24.

[REDACTED] .²³ Each month, each Chicken Processing Defendant²⁴

[REDACTED]

25.

[REDACTED]²⁷

26. Agri Stats has a subsidiary, Express Markets, Inc. (EMI) that publishes regular reports with extremely current information about chicken prices and output.²⁸ E [REDACTED]

[REDACTED]²⁹ EMI disseminates these predictions in

²² See [REDACTED] Tr. 65, 72. [REDACTED]

[REDACTED]

²⁴ Chicken Processing Defendants are all of the Defendants in the EUCP Complaint who process chicken (*i.e.*, all of the Defendants except for Agri Stats).

²⁵ [REDACTED] 42-43; Popowycz Tr. 275-276.

²⁶ See [REDACTED] 198.

²⁷ See [REDACTED] 107-110 & Ex. 2215; *see also, e.g.*, [REDACTED]

[REDACTED]

²⁸ See AGSTAT-00341889; AGSTAT-14720192; FF-BC-00270002; FIELDALE_0191722; FIELDALE_0196074; FIELDALE_1220918; KF_0381949; KOCH_0000520693; MTA-PL0001157847; PECO0000146313-317 at 315; PILGRIMS-0002958876; PILGRIMS-0009964142-146 at 146; TF-0002830906-929 at 921.

²⁹ [REDACTED] (Ex. 1500).

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[REDACTED]

27. I believe that Agri Stats and EMI reached their full anticompetitive potential in 2007, when [REDACTED] Agri Stats and EMI.³⁴ Because [REDACTED] s.

28. Since 2008, Agri Stats and EMI have obtained information from—and disseminated information to—nearly all chicken processors. [REDACTED]

³⁰ See Response to EUCPs' Third Interrogatory. Subscribers include chicken processors, food distributors, investment bankers, and other parties interested in the chicken industry.

³¹ See [REDACTED] (Ex. 1063), [REDACTED] Tr. 40-43.

³² See [REDACTED]

³³ See, e.g., [REDACTED] Ex. 1519).

³⁴ [REDACTED] (Ex. 2212).

³⁵ See [REDACTED] 36-37.

³⁶ See [REDACTED] 80-81.

³⁷ See Koch Defs.' Objs. & Resps. to DPPs, CIIPPs, and EUCPs Second Interrogs. to all Defs. at 7-8, Feb. 27, 2018; Koch Defs.' Am. Objs. & Resps. to Interrog. No. 4 of DPPs, CIIPPs, and EUCPs' Second Interrogs. to All Defs. at 7-10, July 28, 2020; Tyson Defs.' Objs. & Resps. to All Pls.' Second Interrogs. to All Defs. at 4-8, Feb. 27, 2018; Pilgrim's Pride Corp.'s Resps. & Objs. to DPPs, CIIPPs and EUCPs' Second Interrogs. to All Defs. at 3-8, Feb. 27, 2018; Perdue Defs.' Objs. & Resps. to All Pls.' Second Interrogs. at 6-8, Feb. 27, 2018; Sanderson Farms Defs.' Am. Objs. & Resps. to DPPs, CIIPPs, and EUCPs Second Interrogs. to All Defs. at 5, Feb. 18, 2020; Wayne Farms LLC's Objs. & Resps. to All Pls.' Second Interrogs. at 9-13, Feb. 18, 2018; Mountaire Defs.' Objs. & Resps. to DPPs, CIIPPs and EUCPs' Second Interrogs. to All Defs. at 5-7, Feb. 27, 2018; Peco Foods Inc.'s Resps. & Objs. to All Pls.' Second Interrogs. to All Defs. at 5-8, Mar. 2, 2018; Foster Farms Defs.' First Suppl. Answers & Objs. to All Pls.' Second Interrogs. at 12-15, 19-20, Aug. 3, 2018; House of Raeford Farms, Inc.'s Resps. & Objs. to DPPs, CIIPPs and EUCPs Second Interrogs., Attach. AP-4(1) at 16-18, Feb. 27, 2018; Simmons Defs.' Suppl. Resps. & Objs. to All Pls.' Second Interrogs. to All Defs. at 4-7, Mar. 30, 2018; Fieldale Farms' Objs. & Resps. to DPPs, CIIPPs, and EUCPs' Second Interrogs. to All Defs. at 2-4, Feb. 27, 2018; George's Defs.' Suppl. Objs. & Resps. to DPPs, CIIPPs and EUCPs'

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B. Circumstances Under Which Information Exchanges Tend to Be Anticompetitive

29. In some industries, competing firms exchange information about their operations with one another. Occasionally, firms enlist the help of a third party (such as a trade association) to coordinate the information exchange, collecting data from each firm and circulating it throughout the industry. Economic literature identifies several circumstances under which information exchanges among rival firms are likely to be anticompetitive, leading to lower output and higher prices in the relevant industry.³⁸

1. Background on Coordinated Action

(a) Forms of Coordinated Action

30. In describing the circumstances under which information exchanges can be anticompetitive, I will reference three basic ways that rival firms coordinate their actions.

31. *First*, rivals can form an explicit agreement to raise prices or decrease output. To form an explicit agreement, rivals discuss and agree upon specific price or output goals for the industry, and may even agree on specific mechanisms for achieving those goals.

32. *Second*, rivals can form a tacit agreement to raise prices or decrease output. Rivals reach tacit agreements without discussion; instead, they rely on actions, such as punishing firms that underprice their products, to reach an understanding about industry pricing or output.

33. *Third*, rivals can engage in “parallel accommodating conduct” not pursuant to any (express or tacit) agreement.³⁹ “Parallel accommodating conduct includes situations in which each rival’s response to competitive moves made by others is individually rational, and not motivated by retaliation or deterrence nor intended to sustain an agreed-upon market outcome,

Interrog. Nos. 4, 5 & 7 to All Defs. at 1-5, Sept. 12, 2018; OK Food Defs.’ Objs. & Resps. to DPPs, CIIPPs and EUCPs’ Second Interrogs. to All Defs. at 8-9, Feb. 27, 2018; Claxton Poultry Farms’ Objs. & Resps. to All Pls.’ First Interrogs. to Claxton Poultry, Harrison Poultry, & Mar-Jac Poultry at 8-11, Apr. 30, 2018; Mar-Jac Defs.’ Resps. & Objs. to Pls.’ First Interrogs. to Claxton, Mar-Jac & Harrison at 10-13, Apr. 30, 2018; AGSTAT-00795929; AGSTAT-00795932; AGSTAT-00795933; AGSTAT-00795934; AGSTAT-00795935; AGSTAT-00795936. I have seen evidence that Harrison and Koch paid for Agri Stats’ services, but I have not seen evidence that they paid for EMI’s services.

³⁸ In commodity-like industries, price and output are the two sides of the same coin. That is, by the law of demand there is a negative relation between price and output. So, achieving higher price levels is tantamount to achieving lower output levels.

³⁹ U.S. Dep’t of Just. & Fed. Trade Comm’n, *Horizontal Merger Guidelines* § 7 (2010) (“*Horizontal Merger Guidelines*”).

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but nevertheless emboldens price increases and weakens competitive incentives to reduce prices or offer customers better terms.”⁴⁰ For the remainder of this report, I will refer to parallel accommodating conduct as “oligopolistic coordination.”

34. While these three types of coordination may have different legal implications (a matter upon which I do not opine), their economic implications are the same. As Kühn put it, the economic theory of collusion does not depend on rivals’ communication, the way an agreement is reached, or even if an agreement is reached at all. If rival firms understand the mechanism for coordination and act according to it, the market outcome will be higher prices and reduced output.⁴¹ Thus, throughout this report, I will refer to all three types of coordinated action as “collusion.”

(b) Markets Susceptible to Collusion

35. Economists recognize a variety of characteristics that make some industries more susceptible to collusion than others. First, collusion is more likely in industries with high barriers to entry. In a market with collusive (i.e., higher) profit margins, there is a temptation for new firms to enter the market and capture market share by offering lower prices. High barriers to entry prevent the formation of these new, competitive firms, allowing older firms to maintain their high prices and profit margins without fear of losing customers.⁴²

36. In addition, collusion is generally easier to maintain when firms interact frequently.⁴³ Frequent interaction makes it easier to achieve the level of transparency required for a stable agreement. The temptation to deviate from a collusive arrangement is also lower when firms interact more frequently because deviations are more likely detected and there is a shorter period of time between deviation and “punishment” by other firms.

37. Furthermore, it is generally accepted that transparency improves the probability of a stable collusive equilibrium.⁴⁴ The more information firms have about one another’s actions,

⁴⁰ *Id.*

⁴¹ Kai-Uwe Kühn, *Fighting Collusion by Regulating Communication between Firms*, 16 *Econ. Pol’y* 168 (2001).

⁴² See Marc Ivaldi et al., *The Economics of Tacit Collusion - Final Report for DG Competition, European Commission* (2003); see also Margaret C. Levenstein & Valerie Y. Suslow, *What Determines Cartel Success*, 44 *J. Econ. Lit.* 43 (2006) (describing evidence that low barriers to entry are the leading cause of cartel dissolution).

⁴³ James Friedman, *A Noncooperative Equilibrium for Supergames*, 28 *Rev. Econ. Stud.* 1 (1971).

⁴⁴ This is the dominant view in the literature, though there are some dissenters. See David Genesove & Wallace P. Mullin, *Rules, Communication, and Collusion: Narrative Evidence from the Sugar Institute Case*, 91 *Am. Econ. Rev.* 379 (2001).

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the faster any deviation from the arrangement will be detected and punished, thereby lowering the rewards of deviating.

38. Product homogeneity likewise enables collusive information exchanges. When firms produce nearly identical products, it is easier for them to make apples-to-apples comparisons of their output and prices.⁴⁵ At the same time, when firms are making the same commodity product, they have a limited ability to lure customers away from competitors by offering a slightly different and better product for the same price.⁴⁶ In other words, firms have fewer options for cheating on a collusive arrangement.

39. Perhaps counterintuitively, collusion may be more likely to occur during times of economic hardship than during a boom.⁴⁷ When deciding whether to cheat on a collusive arrangement, firms must compare the benefits of cheating to the benefits of staying the course. The payoff of cheating is the profit a firm would make by undercutting rivals and capturing market share until rivals realize what is happening and take some action in response. In boom times, firms can make a significant (short-term) profit by defecting from a collusive arrangement and selling more product until they are caught by rivals; by contrast, when demand is weak, there

⁴⁵ As explained in Michael Raith, *Product differentiation, uncertainty and the stability of collusion* LSE STICERD Rsch. Paper No. EI16 (1996), firms offering a different mix of products face different fluctuations in overall demand. An imperfectly informed cartel who observes two of its members following different pricing and production strategies may be unable to determine whether this disparate behavior is a legitimate response to different demand conditions for their different mix of products, or whether one of the firms is deviating from the collusive arrangement. Without the ability to effectively monitor its members, the cartel will unravel.

⁴⁶ See Raphael Thomadsen & Ki-Eun Rhee, *Costly collusion in differentiated industries*, 26 *Mktg. Sci.* 660 (2007); for a theoretical argument; empirical evidence of the importance of homogeneity in sustaining collusive agreements includes: George Hay & Daniel Kelly, *An Empirical Survey of Price Fixing Conspiracies*, 17 *J. L. & Econ.* 13 (1974); Levenstein & Suslow, *supra* note 42; and Alexis Jacquemin et al., *A dynamic Analysis of Export Cartels: The Japanese Case*, 91 *The Econ. J.* 685 (1981).

⁴⁷ See Julio J. Rotemberg & Garth Saloner, *A supergame-theoretic model of price wars during booms*, 76 *Am. Econ. Rev.* 390 (1986). The relationship between business cycles and the propensity to collude is a complex issue. Green and Porter (1984) show that, *if competitors do not possess granular information regarding each competitor's output*, then it is possible for collusive prices to break down during times of economic hardship. However, the information assumptions underlying the Green and Porter (1984) observation are at odds with the broiler industry, where information at the firm level is available. See Edward J. Green, & Robert H. Porter, *Noncooperative Collusion under Imperfect Price Information*, 52 *Econometrica* 87 (1984).

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is limited scope for firms to make additional profit by expanding sales, so the temptation to cheat is lower.⁴⁸

40. Finally, collusion is more likely in concentrated industries than in fragmented ones, especially when there is no centralized mechanism for information exchange among competitors.⁴⁹ Firms in concentrated industries can more easily coordinate on collusive outcomes, monitor their rivals' behavior, and punish any deviation from the collusive arrangement.^{50,51}

2. How Information Exchanges Facilitate Collusion

41. Information exchanges can facilitate collusion in several ways, including: reducing strategic uncertainty, influencing the terms of an express or tacit agreement (if there is one), allowing rivals to monitor one another's behavior, and building trust within an industry.⁵²

42. First, information exchange helps reduce strategic uncertainty (what will my rivals do?), which in turn greatly enhances the possibility and the profitability of collusion. Reducing strategic uncertainty is particularly important for rivals with tacit agreements or oligopolistic coordination because they have not expressly discussed their plans with one another.

⁴⁸ Notably, after leaving Agri Stats in 2004 [REDACTED] rejoined in late 2007, just as the Global Financial Crisis (which weakened demand) and grain price spikes (which increased costs) were beginning. [REDACTED] (Ex. 2212). As will be explained further below, there is reason to believe [REDACTED] data improved Agri Stats' ability to facilitate collusion in the chicken industry.

⁴⁹ Luis Cabral, *Introduction to Industrial Organization* § 9.3 (MIT Press, 2nd ed. 2017).

⁵⁰ See Nathan H. Miller, & Matthew C. Weinberg, *Understanding the Price Effects of the MillerCoors Joint Venture*, 6 *Econometrica* 85, 1763 (2017) (increased consolidation in the U.S. brewing industry, following a merger between the second and third largest firms' domestic operations, facilitated coordination between A-B Inbev and MillerCoors on supra-competitive price levels).

⁵¹ In sufficiently concentrated industries, it may even be possible for a subset of firms to engage in *unilateral* punishment of their rivals who defect from the collusive arrangement, obviating the need to coordinate punishment strategies across multiple firms. In the case at hand,

[REDACTED]

⁵² Levenstein & Suslow, *supra* note 42 at 67; Svend Albaek et al., *Government-Assisted Oligopoly Coordination? A Concrete Case*, 45 *J. Indus. Econ.* 429 (1997).

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43. In addition, information exchange can influence the terms of collusion among rivals. When rivals decide to collude on price or output, they need to choose price or output levels toward which they will all strive. Information exchanges can help rivals create such a “focal point.” Moreover, if firms are very different from each other — in terms of size, cost levels, or product mix — then information exchange may play an important role in determining each firm’s role in an agreement (if there is one).⁵³

44. Information exchanges also help rivals monitor one another’s behavior, including deviations from a collusive agreement (which in turn allows firms to punish deviants).⁵⁴ For example, suppose a given seller receives fewer orders than expected. Absent any additional information, the seller is unable to decide whether the drop in firm-specific demand results from a drop in overall customer demand or from the fact a rival is acting more aggressively, either by decreasing price or by increasing output or both. If firms are unable to observe their rival’s strategic decisions, then they are unable to resolve a fundamental inference problem, which in turn renders efforts to collude less effective.

45. Relatedly, by providing a forum for repeated interaction, information exchanges help increase the level of trust among colluding partners.⁵⁵ Through frequent observation of their rivals’ actions and reactions, firms learn how to successfully cooperate with one another, a phenomenon that has been documented repeatedly by social scientists both in the lab and in the field.⁵⁶

46. An additional feature of information exchange that occurs through an intermediary is that the firms need not trust each other, so long as they trust the intermediary. The intermediary’s ability to verify the information submitted by each firm is the foundation of

⁵³ At a theoretical level, the argument that information exchange may be required for collusive efforts to be successful and efficient was made, among others, by Susan Athey & Kyle Bagwell, *Optimal Collusion with Private Information*, 32 RAND J. Econ. 428–65 (2001).

⁵⁴ George Stigler, *A Theory of Oligopoly*, 72 J. of Pol. Econ. 44 (1964). *See also*, Francisco Gomez-Martines et al., *Firm-specific Information and Explicit Collusion in Experimental Oligopolies*, 82 European Econ. Rev. 132 (2015) (working paper for experimental evidence that communication of firm-specific information reduces the level of competitiveness in the market.); *See also*, M. Bennett & P. Collins, *The Law and Economics of Information Sharing: The Good, The Bad, and The Ugly*, 6 European Comp. J. 311 (2010); H. Gerlach, *Stochastic Market Sharing, Partial Communication, and Collusion*, 27 Int’l J. Indus. Org. 655 (2009); and Massimo Motta, *Competition Policy: Theory and Practice* 151-154 (Cambridge University Press 2004).

⁵⁵ Genesove & Mullin, *supra* note 44

⁵⁶ An authoritative overview can be found in Elinor Ostrom & James Walker, *Trust and Reciprocity: Interdisciplinary Lessons for Experimental Research* (Russell Sage Foundation 2003).

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the collusive agreement: otherwise, a competitor's (implicit) promise to raise prices or reduce output may be dismissed as "cheap talk."⁵⁷

3. Suspect Information Exchanges

47. Certain types of information exchanges are more likely to be anticompetitive (i.e., lead to higher prices and lower output). As Bergman explains in a summary of the literature, "private communication among the participating firms about future plans as well as the exchange of individual data on prices and quantities carries high risks of collusion; exchange of individual data on demand and cost carries medium risks; while the exchange of aggregate data carries low risks."⁵⁸ Other things equal, information exchanges with the following features pose a greater threat to competition.

(a) Output and Price Information

48. Exchanging information on output and levels is particularly damaging because output and price are the two drivers of industry profitability—and therefore the two dimensions along which competitors tend to collude. If an industry colludes to keep output low or prices high, all firms in the industry can reap higher profits.

49. An industry cannot sustain restricted output or higher prices, however, unless firms within the industry know what output levels and prices are. It is only within each firm's interest to reduce its *own* output or raise its *own* prices if it knows that the rest of the industry is doing the same. If a firm lowers its output or raises prices and others in the industry do not follow suit, the firm will simply lose market share to competitors. But if the entire industry restricts output or raises prices, industry-wide profits will rise. Thus, "[o]ther things being equal, the sharing of information relating to price [or] output . . . is more likely to raise competitive concern than the sharing of information relating to less competitively sensitive variables."⁵⁹

(b) Forecasting Future Plans

50. Sharing information about future plans allows rivals with tacit agreements or coordinated oligopolistic behavior to coalesce around a particular price or output goal (i.e., a "focal point").⁶⁰ When rival firms form a traditional cartel, they can schedule meetings to jointly determine price and output levels. With less explicit forms of collusion, shared forecasts provide

⁵⁷ In the famous Lysine and citric acid price fixing conspiracy, a trade association played the role of information auditor. See Joseph Harrington, *How do cartels Operate?* 2 Foundations and Trends in Microeconomics 1 (2006).

⁵⁸ See Mats Bergman, *The Pros and Cons of Information Sharing*, 5 Swedish Comp. Auth. 5, 15 (2006).

⁵⁹ U.S. Dep't of Just. & Fed. Trade Comm'n, *Antitrust Guidelines for Collaborations among Competitors* at 15 (2000) ("Collaboration Guidelines").

⁶⁰ *Id.* at 44.

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a substitute mechanism for rivals to get on the same page with respect to price or output. U.S. antitrust authorities have therefore advised that, “if competitors secretly share information on intended future pricing and output, this comes very close to actually making anti-competitive agreements.”⁶¹ Thus, these authorities have concluded, “[o]ther things being equal, the sharing of information on . . . future business plans is more likely to raise concerns than the sharing of historical information.”⁶²

(c) Current Information

51. Collusion is generally easier to maintain when firms exchange current data on a frequent basis. Such a robust data exchange helps firms detect deviations from a collusive strategy quickly. When firms know that deviations from a collusive strategy will be detected quickly—before they have a chance to capture meaningful market share from competitors—they are more likely to conclude that deviating from the collusive strategy is not worth the risk.⁶³

(d) Highly Disaggregated and Non-Anonymous Information

52. To maintain a collusive arrangement, firms generally monitor their competitors to answer three questions: (1) is there cheating on the collusive arrangement; (2) how widespread is the cheating; and (3) which specific firms are responsible for the cheating? While colluding firms would like to know the answer to all three questions, the ability answer to any one of these questions makes collusive arrangements more stable.

53. Exchanging disaggregated information—i.e., information about specific producers’ operations rather than industry averages—can help members of a collusive industry answer the first two questions above. Exchanging disaggregated information on a non-anonymous basis goes one step further, telling the industry how each firm is behaving so that cheaters can easily be identified. Thus, economic theory suggests that the collusive potential of an information exchange is particularly high when rivals exchange firm-specific data on output and prices. By contrast, the exchange of aggregate data (such as industry-wide totals or averages) is less frequently associated with collusive agreements.⁶⁴

⁶¹ *Id.* at 20.

⁶² *Id.* at 15.

⁶³ See Daniel Friedman & Ryan Oprea, *A continuous dilemma*, 102 *Am. Econ. Rev.* 337 (2012).

⁶⁴ This is the conclusion of the theoretical literature in economics, see Xavier Vives, *The Pros and Cons of Information Sharing*, 5 *Swedish Comp. Auth.* 83, 88-93 (2006); Roy Radner et al., *An Example of a Repeated partnership game with discounting and with uniformly inefficient equilibria*, 1 *The Rev. Econ. Stud.* 5359 (1986); and Drew Fudenberg et al., *The Folk Theorem with Imperfect Public Information*, 62 *Econometrica* 997 (1994), as well as the American, European, and Japanese antitrust authorities.

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54. Exchanges of firm-specific information are particularly suspect because, while they have high collusive potential, they are often unnecessary to achieve market efficiencies: Industry-wide totals and averages generally provide sufficient information to help rivals compete effectively.⁶⁵

(e) Information Restricted to Competitors (i.e., Not Available to the Public or Other Market Participants)

55. Empirical research shows that, when buyers have knowledge of the various sellers' prices, then they can more easily force them to compete with each other.⁶⁶ Thus, when firms share their price information with one another, but *not* with buyers, the information is more likely to raise competitive concerns.

(f) Information Sharing at Meetings Where a Number of Competitors Gather

56. As Adam Smith put it, "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices." Indeed, trade associations have been at the heart of many of the highest profile cartel cases of the 20th Century, including the choline chloride cartel, the lysine cartel, the copper plumbing tubes cartel, the zinc phosphate cartel, the industrial and medical gases cartel, and the carbonless paper cartel, to name a few.⁶⁷

4. Historical Examples of Collusive Exchanges and Coordinated Effects

57. Several historical examples confirm that information exchanges with the problematic features described above can lead to anticompetitive outcomes including higher prices and reduced output.

(a) International Lysine Conspiracy

58. The lysine case illustrates the importance of sharing information on production capacity and sales when rival firms work to lower output and raise prices in a commodity market. Originally produced solely in Japan, lysine is an animal-feed additive that speeds the development of lean muscle tissue. From the industry's inception in the 1960s, up through the 1980s, lysine manufacturers engaged in tacit collusion, pushing the international price to an artificially high level. However, following the aggressive entry of U.S. firm Archer Daniels Midland (ADM) in the early 1990s, the pre-existing arrangement broke down, and was replaced

⁶⁵ Motta, *Competition Policy: Theory and Practice*, at 152. The UK Tractor's case discussed below is consistent with this view.

⁶⁶ Douglas D. Davis & Charles A. Holt, *Consumer Search Costs and Market Performance*, 34 *Econ. Inquiry* 133 (1996).

⁶⁷ Harrington, *supra* note 57.

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in 1992 by an explicit cartel involving all the major producers.⁶⁸ The cartel assigned each constituent firm a production quota and all firms agreed to sell at the cartel designated price.

59. Due to large recent investments in capacity by ADM and Korean producer Sewon, cartel members were unwilling to set production quotas based on historical market shares alone. Instead, from the very outset, firms exchanged detailed information about their production capacities:

“The participants exchanged information on ADM’s and Cheil’s production capacity and sales volumes. Some days before the meeting Cheil communicated the information on its production capacity and sales volumes to Ajinomoto by telephone.”⁶⁹

60. After market shares were agreed upon, cartel members endeavored to make sure that the collusive agreement was being upheld by all parties. Each month, cartel members would communicate their sales to an executive at Ajinomoto, the largest lysine manufacturer, who would compile the reports into a spreadsheet that was handed out at the cartel’s quarterly meetings.⁷⁰ Cartel members then checked to see whether actual sales corresponded to previously agreed-upon market shares.

61. While this system was effective, concerns remained that cartel members might misreport their production and sales numbers. Indeed, it was not uncommon for member firms to misreport, as in the case of Korean manufacturer, Cheil Jedang, who claimed that their submitted data on sales volumes “were continuously incorrect as they understated actual sales.”⁷¹ In response to this concern, ADM advocated for the creation of a lysine trade association that could audit production and sales information from each of the cartel members. In fact, ADM went further, and argued that cartel members should employ an independent accounting firm to perform the audit, as was the practice in their concurrent citric-acid price fixing conspiracy, but the other members would not agree.⁷² Though issues with the accuracy of audits persisted,⁷³ they were nevertheless effective enough that actual cartel volumes seldom differed greatly from agreed-upon market shares.

⁶⁸ John M. Connor, “*Our Customers are our Enemies*”: *the Lysine Cartel of 1992–1995*, 18 Rev. of Indus. Org. 5 (2001).

⁶⁹ From page 63 of Official Journal of the European Union, L 152/24, 7.6.2001, Case COMP/36.545/F3 – Amino Acids, Decision of June 7, 2000, Harrington, *supra* note 57.

⁷⁰ Connor, *supra* note 68.

⁷¹ Official Journal of the European Union, L 152/24, 7.6.2001, Case COMP/36.545/F3 – Amino Acids, Decision of June 7, 2000, quoted in Harrington.

⁷² Conner, *supra* note 68 at 12.

⁷³ See Harrington, *supra* note 57 at 52-53.

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62. Finally, any discrepancy between agreed-upon and actual sales would be resolved before the end of the year through guaranteed “buy-in” agreements, whereby any producer who had exceeded its allotted sales was obliged to buy lysine from another producer who had not yet met their sales target.⁷⁴ Thus, the continuous monitoring of sales information, combined with an inter-firm market for the commodity, allowed manufacturers to coordinate global production of lysine so as to keep the price artificially high for years, until the conspiracy was uncovered through an FBI investigation.

63. While the lysine case involved an explicit agreement not to raise output, it provides important lessons for many types of collusive arrangements in commodity markets (including tacit agreements not to raise output and oligopolistic coordination). First, information about rivals’ output information allows firms to gauge whether an industry is successfully restraining supply. In addition, firms with collusive arrangements place a particularly high value on information that is collected and audited by a third party because that makes it easier to identify deviations from a collusive strategy.

(b) US Large Turbine Generators

64. The large turbine generators case demonstrates that exchanging detailed price information can be anticompetitive. In the 1950s, GE, Westinghouse, and other smaller competitors fixed the prices of large turbine generators, but the price-fixing agreement eventually broke down. Thus, in the 1960s and 1970s, GE and Westinghouse turned to a new method of buoying prices: While not explicitly agreeing on bids submitted to customers, GE and Westinghouse exchanged detailed price information. More specifically, GE unilaterally decided to publish its “price book,” a manual that detailed its price-setting process. In this way, they made it easier for rivals to predict their future prices. What in the past had been treated with the utmost secrecy (the price book) became a transparent process (GE also hired an outside auditor to provide greater credence to their move.).

65. Although there was no direct communication between GE and Westinghouse, within weeks Westinghouse decided to follow GE’s example and publish its own price book. Not only that, but it happened that their (most likely revised) price book coincided almost exactly with GE’s. With GE and Westinghouse adhering to the high price levels in their price books, the companies effectively maintained abnormally high bids in auctions for large turbine generators for more than a decade.⁷⁵ In fact, prices were considerably higher from 1963-1974 than they were during the 1950s, when GE and Westinghouse had a secret, explicit cartel agreement.

66. This example shows that an information exchange can lead to anticompetitive outcomes even if participants do not reach an explicit agreement about their business strategy.

⁷⁴ James B. Lieber, *Rats in the Grain: The Dirty Tricks and Trials of Archer Daniels Midland* (New York: Four Walls Eight Windows 2000), quoted in Harrington.

⁷⁵ See, e.g., George A. Hay, *Oligopoly, Shared Monopoly, and Antitrust Law*, 67 Cornell L. Rev. 439 (1982).

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By sharing their price books, GE and Westinghouse solved the problem of achieving a focal point of high auction bids (the price book level). At the same time, the competitors had a benchmark against which they could measure their competitors' conduct: By considering whether their rival was bidding in accordance with its price book, the companies could confirm that they were both adhering to a tacit agreement.⁷⁶ Alternatively, even if there was no tacit agreement, the high prices in GE's price book could have "emboldened" Westinghouse to raise its prices in a coordinated fashion. Regardless of the interpretation of the events (tacit collusion or oligopolistic coordination), the fact is that the information exchanged allowed the firms to raise prices above the competitive level.

(c) UK Tractors

67. The UK tractor case is a perfect illustration of how the exchange of detailed firm-specific price and quantity information can facilitate oligopolistic coordination as well as more express forms of collusion. In the early 1990s, the UK tractor market was declining. To aid the market, a trade association created a "detailed and frequent information exchange [regarding tractor auctions] allowing identification of most tractor sales."⁷⁷

68. Despite "the potential efficiency reasons for the exchange (to deal with warranty claims and to monitor the performance of retailers and salespeople)," [European antitrust authorities] concluded tractor manufacturers had violated European competition law with their information exchange.⁷⁸ As the authorities explained, if tractor manufacturers were truly interested in efficiency, it would have been sufficient for each company to compare its own sales data to "aggregate industry data That is, individual data of other firms were not necessary."⁷⁹ The authorities emphasized that the information exchange was particularly anticompetitive because the tractor market was concentrated, the information exchange "allowed each firm to monitor sales of rivals," the exchange "constituted a barrier to entry," and the "information exchanged was not made available to [tractor] purchasers."⁸⁰ Relying on this case, the Swedish Competition Authority concluded that the "[e]xchange of (private or public) disaggregated information about past prices and quantities has a very significant potential to

⁷⁶ In this context, the competitors could have reached a tacit agreement by adopting a "tit-for-tat" pricing strategy: If either company deviated from the pricing methodology prescribed in the price book, the other would immediately know and could respond by cutting their own prices. Because each company knew this, neither company had an incentive to undercut the rival's price in the short run, knowing that would only lead to lost profits for both companies in the long run.

⁷⁷ Vives, *supra* note 64 at 92.

⁷⁸ *Id.*

⁷⁹ *Id.*

⁸⁰ *Id.*

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improve oligopolistic coordination and should be prohibited, especially if the information is hard and new. Relevant cases might [include] . . . UK Tractors.”⁸¹

(d) US Airline Tariff Publishing Company (ATP)

69. Likewise, the ATP case shows that competitors’ exchange of price information and price forecasts can raise prices. In the 1980s, major airlines shared a computerized ticket reservation system maintained by the Airline Tariff Publishing Company (“ATP”). Arguably, a shared reservation system could promote efficiency: frequently, an airline will need to sell one of its customers a seat in another airline’s flight (when the route requires travel in both airlines). Nevertheless, the DOJ sued the airlines for anticompetitive conduct.

70. The DOJ alleged that “[t]he airlines engaged in a process that involved repeated exchanges through ATP of price increase proposals and counterproposals, with the effect of raising fares to consumers.”⁸² Specifically, the ATP system allowed airlines to “communicate” and “coordinate” pricing plans by announcing fare changes. For example, a given airline might announce that its fares would increase in a week’s time. The other airlines could then follow by announcing a fare increase effective the same date; or by not doing so, in which case the first airline could reverse its initial announcement. This frequently resulted in a pattern of uniform fares and parallel fare changes across airlines. The DOJ argued that this system effectively worked like the “smoke-filled room” of traditional price-fixing conspirators. The airlines eventually settled, agreeing to discontinue advance fare announcements.

71. This case illustrates the power of “forecasts” about prices: Through the ATP system, airlines were able to effectively communicate to their rivals plans to change fares. Rivals were therefore able to coalesce around a strategy of setting higher prices.

(e) Danish Concrete

72. The Danish concrete case also illustrates the competitive dangers that arise when rivals exchange price information. The Danish ready-mixed concrete industry can be described roughly as a collection of fairly tight regional oligopolies with a few firms active in most sub-markets and most firms active in only one or two sub-markets. Until 1993, list prices for ready-mixed concrete were frequently subject to individual, confidential discounts of a considerable amount. In October 1993, however,

the [Danish Competition] Authority decided to gather and publish firm-specific transactions prices for two grades of ready-mixed concrete in three regions of Denmark. By so doing, the Authority

⁸¹ *Id.* at 124.

⁸² Dep’t of Just., *Justice Department Files Price Fixing Suit Against Eight Airlines and Fare Dissemination System* (Dec. 21, 1992), https://www.justice.gov/archive/atr/public/press_releases/1992/211323.htm

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hoped to inform customers of bargain deals and expected them to take a tougher stand in subsequent negotiations. However, following the initial publication of this information, average prices increased by 15-20 per cent within a year in the Aarhus region . . . Improved transparency seems to have led to improved coordination of the pricing policies: after a year of publication, the initial price dispersion was all but gone. Further evidence shows that average prices increased because firms stopped granting the large individualised discounts.⁸³

73. In other words, the data suggests that the increase in market transparency, rather than benefiting consumers, resulted in a “facilitating device” for firms to set uniformly higher prices.

74. While some authors refer to collusion in the context of the Danish concrete market, there is no public evidence that concrete producers had an express agreement to raise prices. Rather, observers have concluded, “the Danish Competition Council, by providing reliable price reporting services, . . . unwittingly assisted firms in reducing the intensity of competition and thereby allowed them to increase prices.”⁸⁴ Before the Competition Council began publishing price information, it would have been difficult for concrete makers to detect deviations from the expected high price level (in the form of secret price cuts, a pattern that had been very common before price sharing took place). After the Council began sharing information, however, it was easier for rivals to monitor one another. The price information also allowed concrete makers to converge on a particular (high) price level (as evidenced by the fact that pricing variation all but disappeared in the first months of the information-sharing regime). Thus, the Danish Competition Council facilitated a tacit agreement or coordinated oligopolistic behavior. In January 1995, the Danish Competition Council stopped collecting and publishing prices.

(f) South African Milk Distribution

75. The South African milk case reveals the competitive harm that purportedly independent third parties can inflict when they help rivals exchange business information, including price and output information. In March 2006, the South African Competition Commission initiated a complaint against various milk processors, i.e., firms that buy raw milk from farmers and convert it into various products for their customers. The Commission alleged that, from January 2002 to March 2006, these firms directly and indirectly fixed procurement milk prices by means of information exchanges:

Some of the firms individually appointed an independent agricultural economist to collect pricing data which was collated in

⁸³ Peter Møllgaard & Per Baltzer Overgaard, *The Pros and Cons of Information Sharing*, 5 Swedish Comp. Auth. 101, 112-114 (2006).

⁸⁴ Albaek, *supra* note 52.

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price comparison reports. Although these reports were compiled for the individual firms, they contained very specific pricing data relating to the factors used in the price determining formulas by the different firms. . . . The information exchanges between the processors included numerous discussions on forthcoming price reductions and magnitudes, strategic decisions of individual processors including communications on changes to pricing structures, prices paid by different processors in different regions and individualised information regarding future price movements. . . . [It also included] firm-specific forecasted volumes for a range of products.⁸⁵

76. The detailed “exchange of input price information enabled processors to pay lower prices to their producers. Put differently, the information exchange allowed processors to act as if they were a monopsony buyer of raw milk.”⁸⁶ As two observers explained:

The exchange of such information could well have facilitated the ongoing collusion that Sasol admitted to in its settlement with the [South African Competition] Commission. The information shared was highly disaggregated and reflected firm-specific forecasted volumes for a range of products. This information was only available to NBC members and not accessible to the general public. The detailed nature and frequency of the information exchanged created a high level of transparency, allowing each firm to forecast competitors’ market shares for the next year and have insight on future strategic decisions of competitors.⁸⁷

77. Thus, the information exchange provided all the essential machinery for industry-wide collusion.

C. Class-Wide Evidence Suggests that the Chicken Industry is Susceptible to Collusive Information Exchanges

78. The Chicken Industry is susceptible to collusive information exchanges for several reasons. First, barriers to entry are high. As an internal presentation from [REDACTED] explains:

⁸⁵ Reena das Nair & Liberty Mncube, “The role of information exchange in facilitating collusion — insights from selected cases,” In Kasturi Moodaliyar and Simon Roberts (Editors), *The Development of Competition Law and Economics in South Africa*, 2013.

⁸⁶ *Id.*

⁸⁷ *Id.*

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82. Finally, chickens are living animals greatly affected by changes in their environment. It would therefore be difficult for Defendants to collude without a service like Agri Stats, which provides detailed, current information about all facets of the chicken production process.

D. Class-Wide Evidence Suggests that Chicken Processors' Information Exchanges Through Agri Stats and EMI Had Anticompetitive Features and Effects

83. Chicken processors' information exchanges through Agri Stats and EMI had several of the features that raise competitive concerns for economists (explained above in § (III)(A)(3)). Class-wide evidence suggests that, as economic theory would predict, chicken processors exploited these features to keep chicken output low and prices high.

1. Current and Future Output Information

84. Agri Stats and EMI provided a robust set of current and future output information, allowing Chicken Processing Defendants and their coconspirators to determine: (a) what current chicken supply was; (b) whether individual chicken processors were doing their fair share to keep industry supply low; and (c) what steps chicken processors should make to keep chicken output low and prices high.

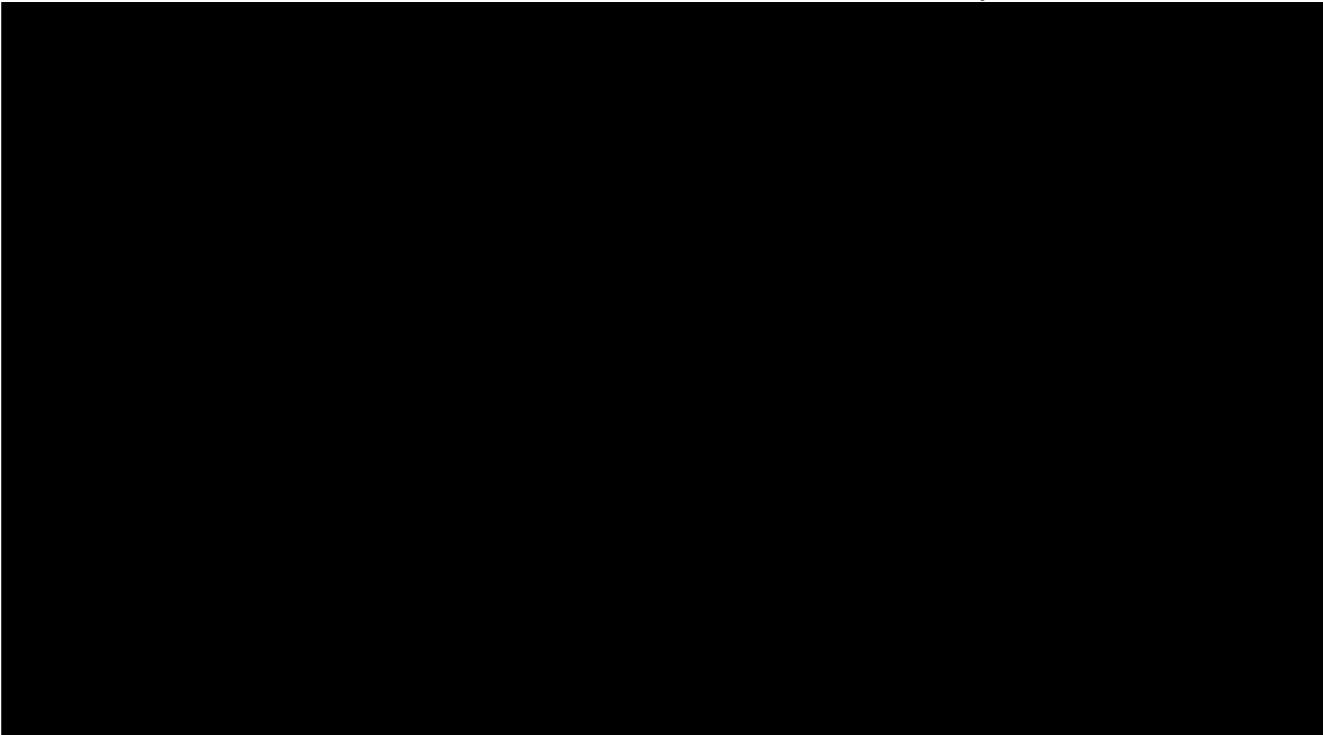
(a) Agri Stats and EMI Reports Allow Chicken Processors to Gauge Current Industry Supply Levels

85. As explained above, economic theory recognizes that it is difficult for an industry to maintain an output restriction unless firms within the industry know what output levels are. When firms have a mechanism for gathering and disseminating reliable information about current industry output, they can assess whether their own output decisions are part of an industry-wide effort to limit supply and gauge whether that effort has been effective. Several regular Agri Stats and EMI reports helped Chicken Processing Defendants with these tasks, including:

86. *EMI Commodity Reports.* EMI's Commodity Reports tell broiler processors how much chicken the industry sold on a *daily* basis.⁹⁴ This output data is broken down by cut of meat—such as whole birds, breast meat, leg meat, and wings—so broiler processors know how much of each type of product the industry is selling.

⁹⁴ EMI, *Reports & Services*, <https://www.expressmarketsinc.com/node/16> (last visited Oct. 26, 2020) (“EMI publishes daily broiler commodity prices on over 65 fresh and frozen categories”); EMI, *Commodity Broiler Report: Fresh Items*, (July 20, 2010), https://www.expressmarketsinc.com/SampleReport/daily/html/Broiler_Daily_Commodity.html (Sample commodity report with output data).

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89. Class-wide evidence suggests that Chicken Processing Defendants listened to and acted on this supply information. [REDACTED]

[REDACTED]

95 [REDACTED]

96 [REDACTED] t 503.

97 [REDACTED] at 674 (Ex. 2011).

98 [REDACTED] Ex. 2215).

99 [REDACTED]

100 [REDACTED] 718.

101 [REDACTED]

[REDACTED]

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[REDACTED]

90. This evidence suggests that, as in the Lysine case discussed above, chicken processors were relying on supply information from their competitors to understand whether their output restriction was successful enough to sustain high prices. The evidence is also consistent with the allegation that chicken processors could trust the supply information they received from [REDACTED] in other words, the evidence suggests [REDACTED] provided the type of reliable output data that the Lysine industry deemed beneficial for collusion.

(b) Agri Stats Reports Allowed Chicken Processors to Monitor Whether Firms Were Doing Their Fair Share to Keep Output Low.

91. Chicken Processing Defendants also relied on Agri Stats information to verify that their competitors were keeping output low.

92. [REDACTED]

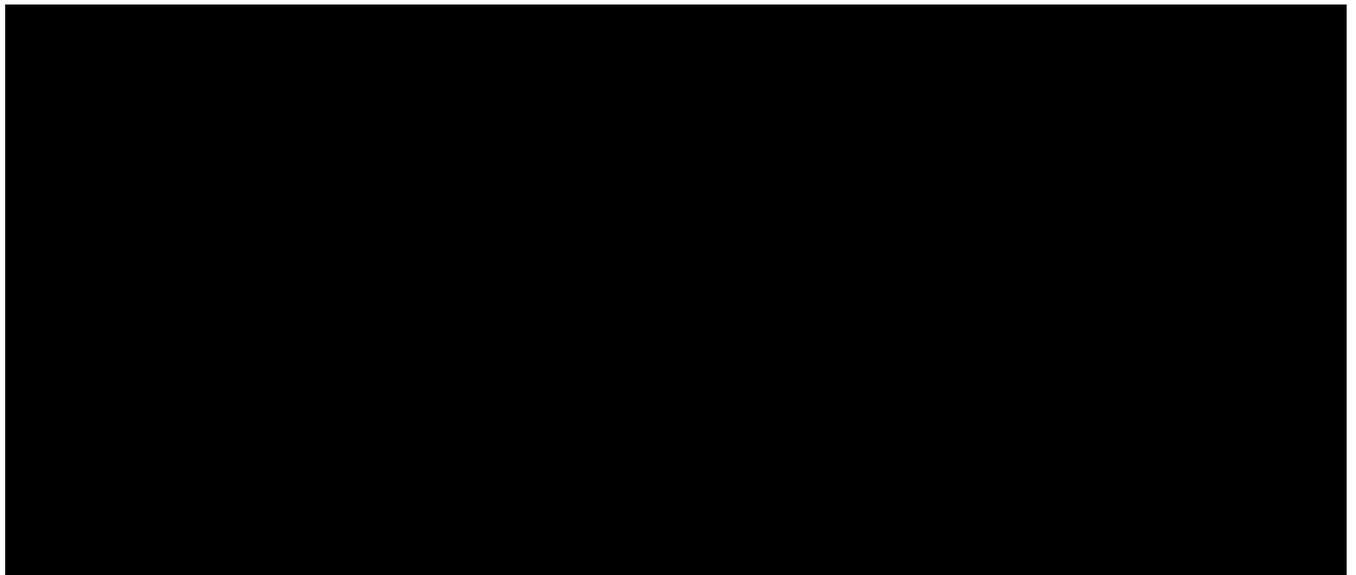
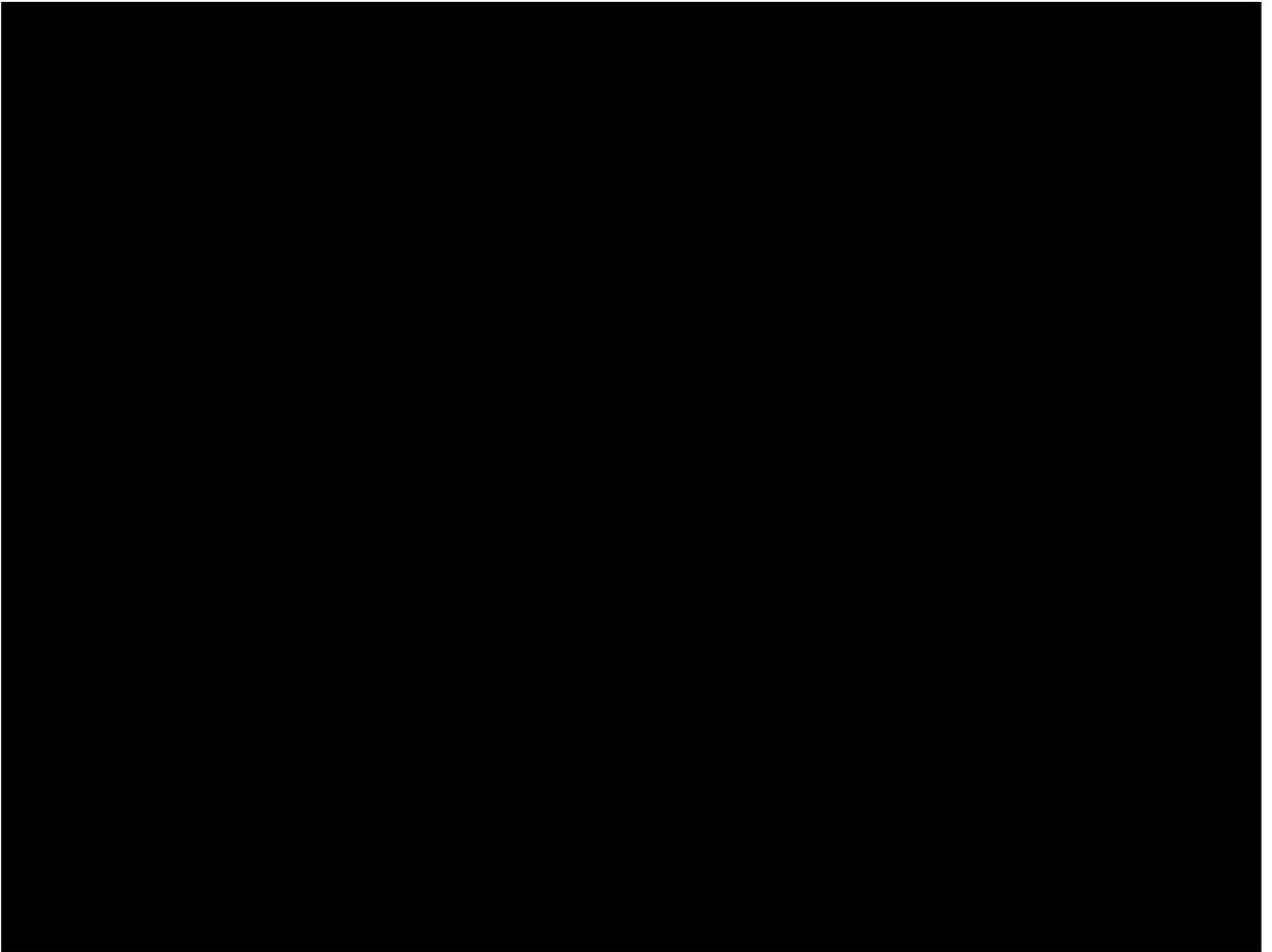
¹⁰³ [REDACTED] 967 (Ex. 1404) (emphasis added).

¹⁰⁴ *Id.*

¹⁰⁵ [REDACTED] 42:8-43:20; [REDACTED] 214; [REDACTED] 303; [REDACTED] (Ex. 55 [REDACTED])

¹⁰⁶ [REDACTED] Ex. 557).

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[REDACTED] 111

95. Second, [REDACTED] allow chicken processors to monitor their competitors' average profit per pound of chicken produced. Tracking chicken processors' profits per pound of chicken produced can be an effective way of monitoring whether the processors are currently expanding production. If a processor increased production and cut prices to capture market share, its average profit per pound of chicken produced would decrease (though the processor would sell more pounds of chicken, so its overall profits would rise).

96. Class-wide evidence suggests that Chicken Processing Defendants relied on Agri Stats profit reports to monitor competitors' profitability and punish those who were not doing their fair share to keep production low. For example, [REDACTED]

[REDACTED] 113

97. [REDACTED] 15

(c) Agri Stats and EMI Data Help Chicken Processors Predict and Adjust Future Chicken Supply.

98. Agri Stats and EMI provide several "forecasts" of future broiler chicken supply, which help chicken processors coalesce around strategies for keeping industry output low and prices high. [REDACTED]

[REDACTED] 117

111 [REDACTED] (Ex. 3601).

112 [REDACTED] (Ex. 1417) (emphasis added).

113 *Id.*

114 [REDACTED]

115 *Id.*

116 [REDACTED] (Ex. 1500).

117 [REDACTED] (Ex. 1500).

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99. *EMI Analytics Reports*. Each week, EMI predicted [REDACTED]

[REDACTED].¹¹⁸ EMI also made weekly predictions about how the prices for 26 cuts of fresh chicken and six cuts of frozen chicken would change in response to these output strategies.¹¹⁹ By setting out the industry's future supply plans and connecting those plans to future prices, EMI provided a roadmap for chicken processors to hit shared output and pricing goals.

100. [REDACTED]

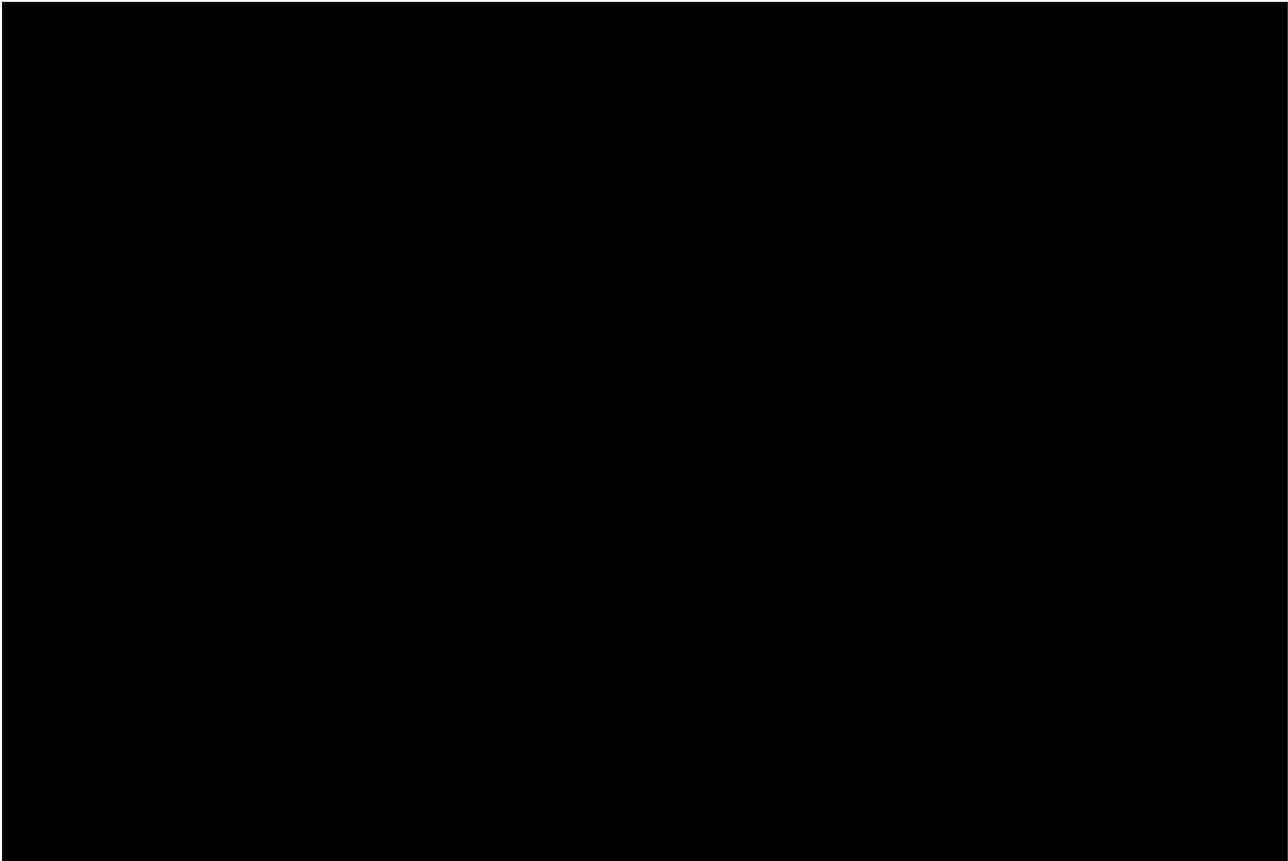
¹¹⁸ [REDACTED]

¹¹⁹ EMI, *EMI Broiler Forecast* (July 22, 2008), https://www.expressmarketsinc.com/SampleReport/ea/chicken/1_1/report/EMIWeeklyPriceForecast.htm

¹²⁰ *See, e.g.*, [REDACTED] (Ex. 1063), [REDACTED] r. 40-41.

¹²¹ [REDACTED] 293, 301.

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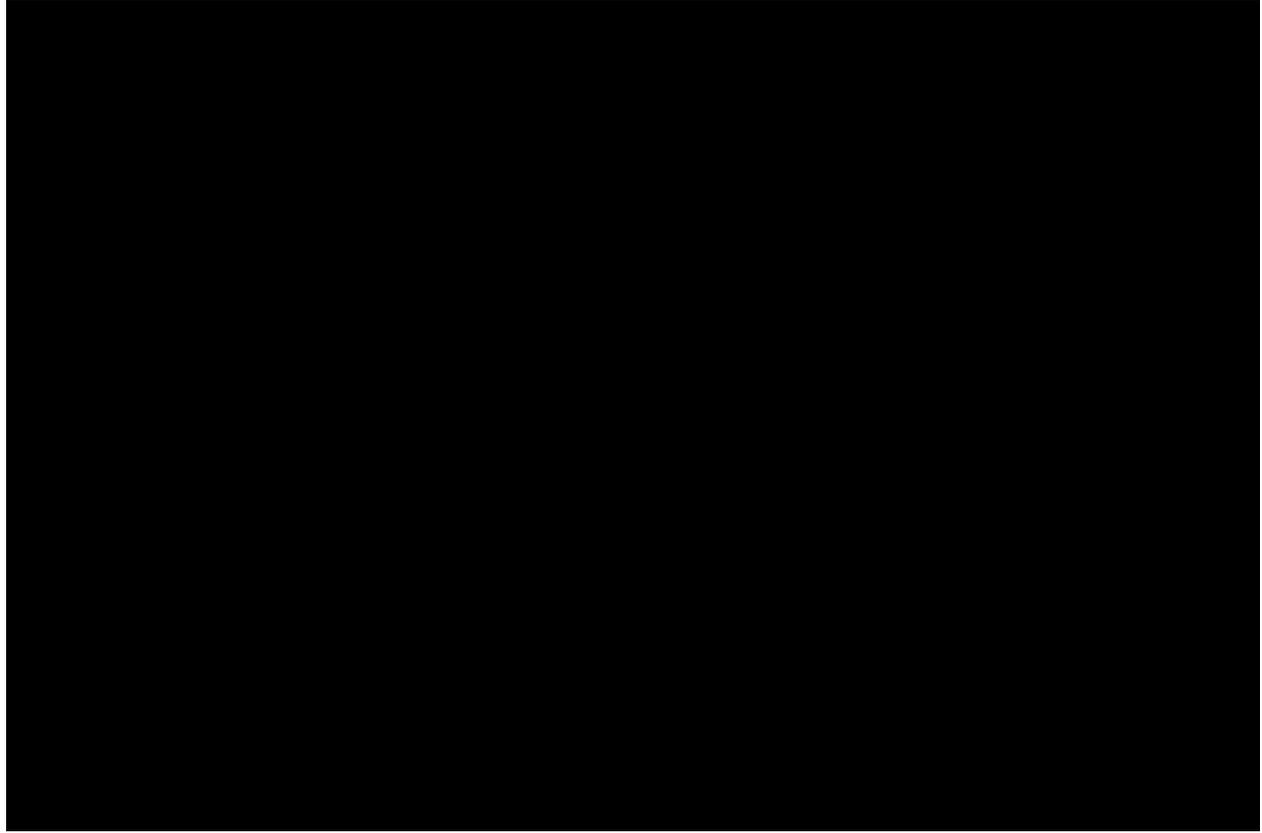
101.



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102. [REDACTED]

[REDACTED] ¹²³ As explained above, economic theory confirms that there is in fact a danger to competition when members of an industry provide these kinds of instructions, which provide a focal point for industry-wide action. [REDACTED]

103. *Private Communications with EMI.* [REDACTED]

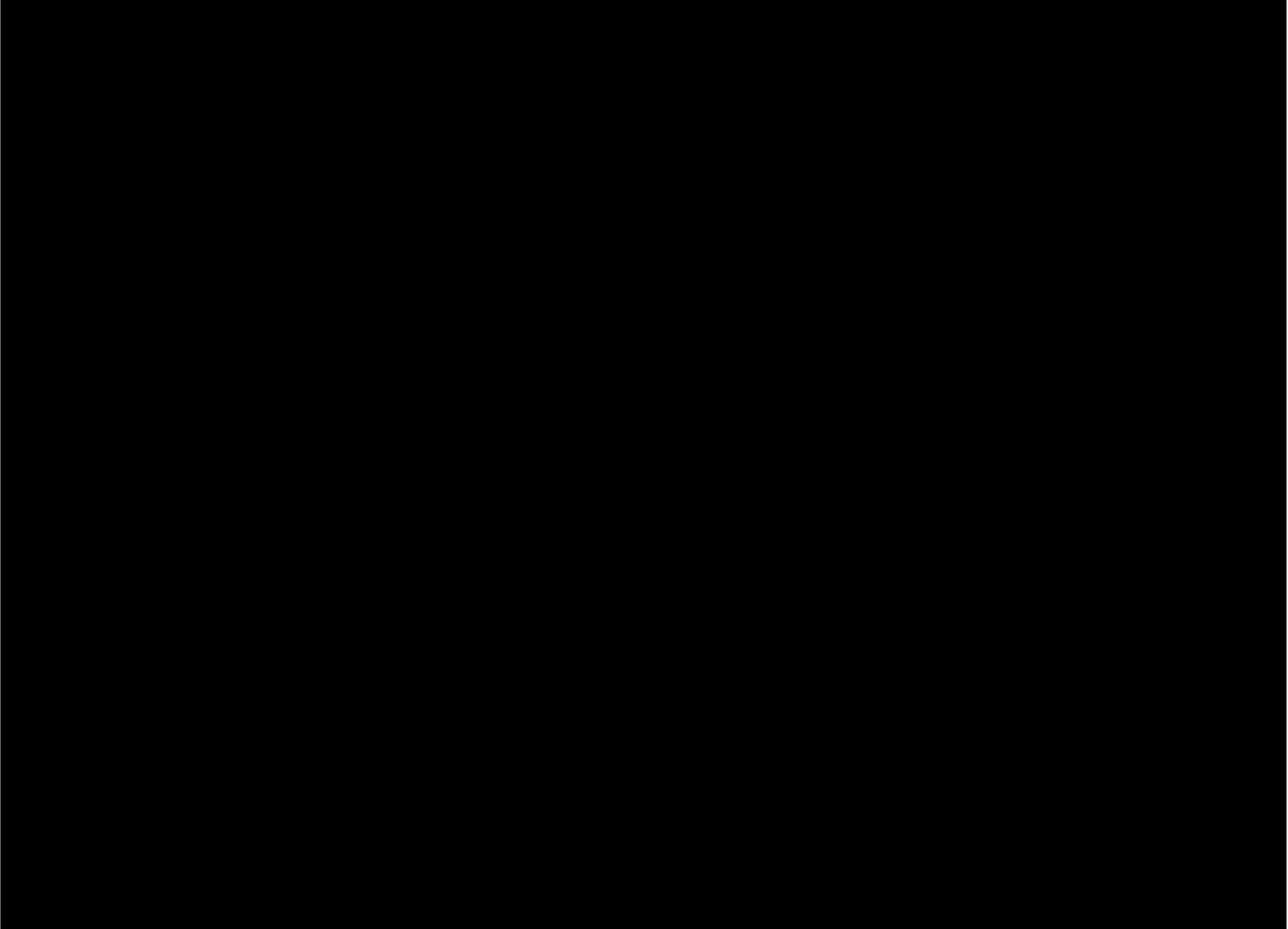
¹²⁵

¹²³ See [REDACTED] (Ex. 27).

¹²⁴ *Id.*

¹²⁵ [REDACTED] (Ex. 1519).

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¹²⁶ *Id.* at 979

¹²⁷ (Ex. 1518)

(Ex. 1514).

¹²⁸

¹²⁹ *See, e.g.,*

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[Redacted]

¹³⁰ [Redacted] 71:1-7.

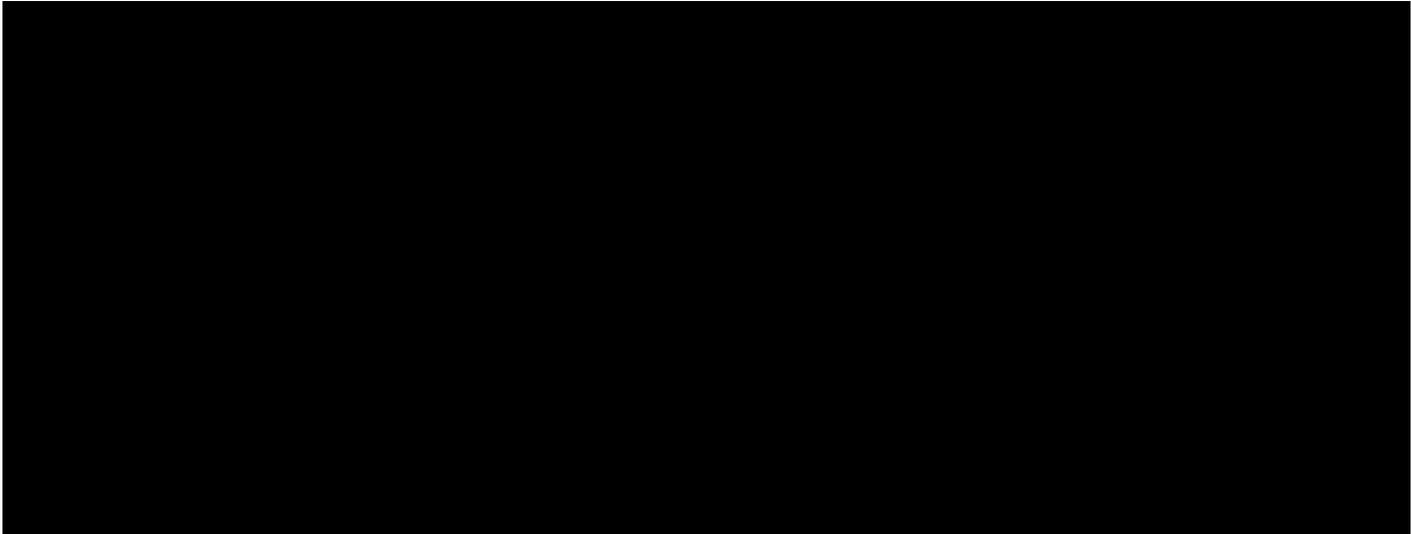
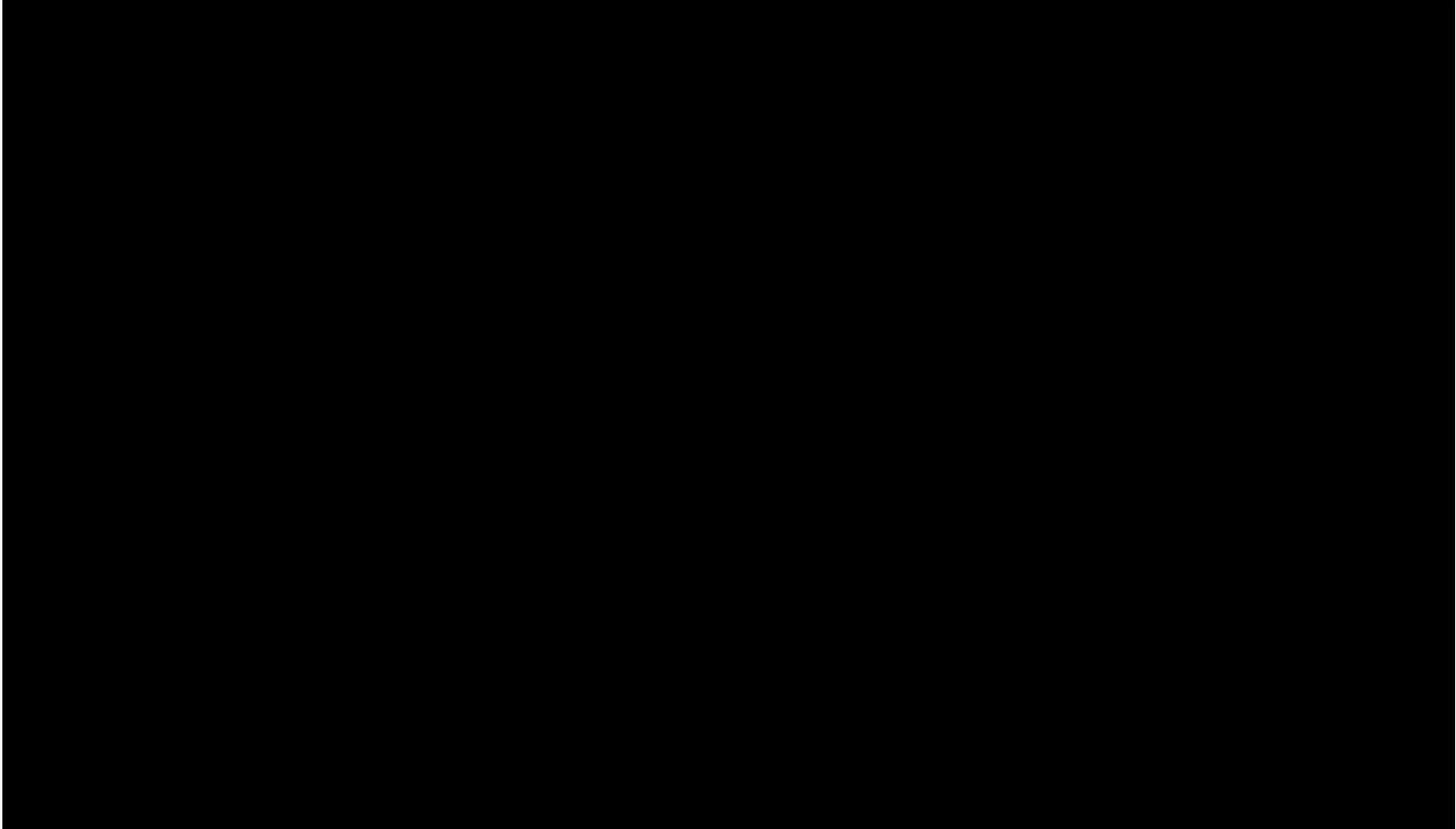
¹³¹ *See* [Redacted] 107-110 & Ex. 2215; *see also, e.g.*, [Redacted]
[Redacted]

¹³² [Redacted]

¹³³ [Redacted] x. 2233).

¹³⁴ [Redacted]
[Redacted]

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135 [redacted] 791.

136 [redacted] 591 (emphasis added).

137 [redacted] (Ex. 3467).

138 [redacted]

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[REDACTED]

111. EMI and Agri Stats' output forecasts functioned much like the volume forecasts that were challenged in the South African Milk case: both sets of forecasts helped producers align their future production plans. As economic analysis of the South African Milk case confirms, such alignment is highly detrimental to competition.¹⁴²

2. Current and Future Pricing Information

112. Agri Stats and EMI also give chicken processors a robust set of current and future pricing information, helping Chicken Processing Defendants and their coconspirators to: (a) track current chicken prices; (b) work together to raise chicken prices; and (c) predict future chicken prices.

(a) Agri Stats and EMI Reports Allow Chicken Processors to Track Current Prices

113. As explained above, it is difficult for competitors to collude on pricing unless they know what industry pricing is. Exchanging current pricing information gives each firm in the industry confidence that, when they set or maintain high prices, their competitors are not undercutting them. During the Class Period, EMI provided extraordinarily detailed and current pricing information to chicken processors, giving chicken processors real-time feedback on the difference between their own prices and industry average prices. In addition, [REDACTED]

[REDACTED] Because these pricing reports were unavailable to the general public, they made it particularly easy for broiler processors to coordinate on price without giving chicken purchasers access to equivalent pricing transparency.

114. *EMI Sales Reports.* Several EMI reports helped chicken processors track industry prices on a daily basis. First, [REDACTED]

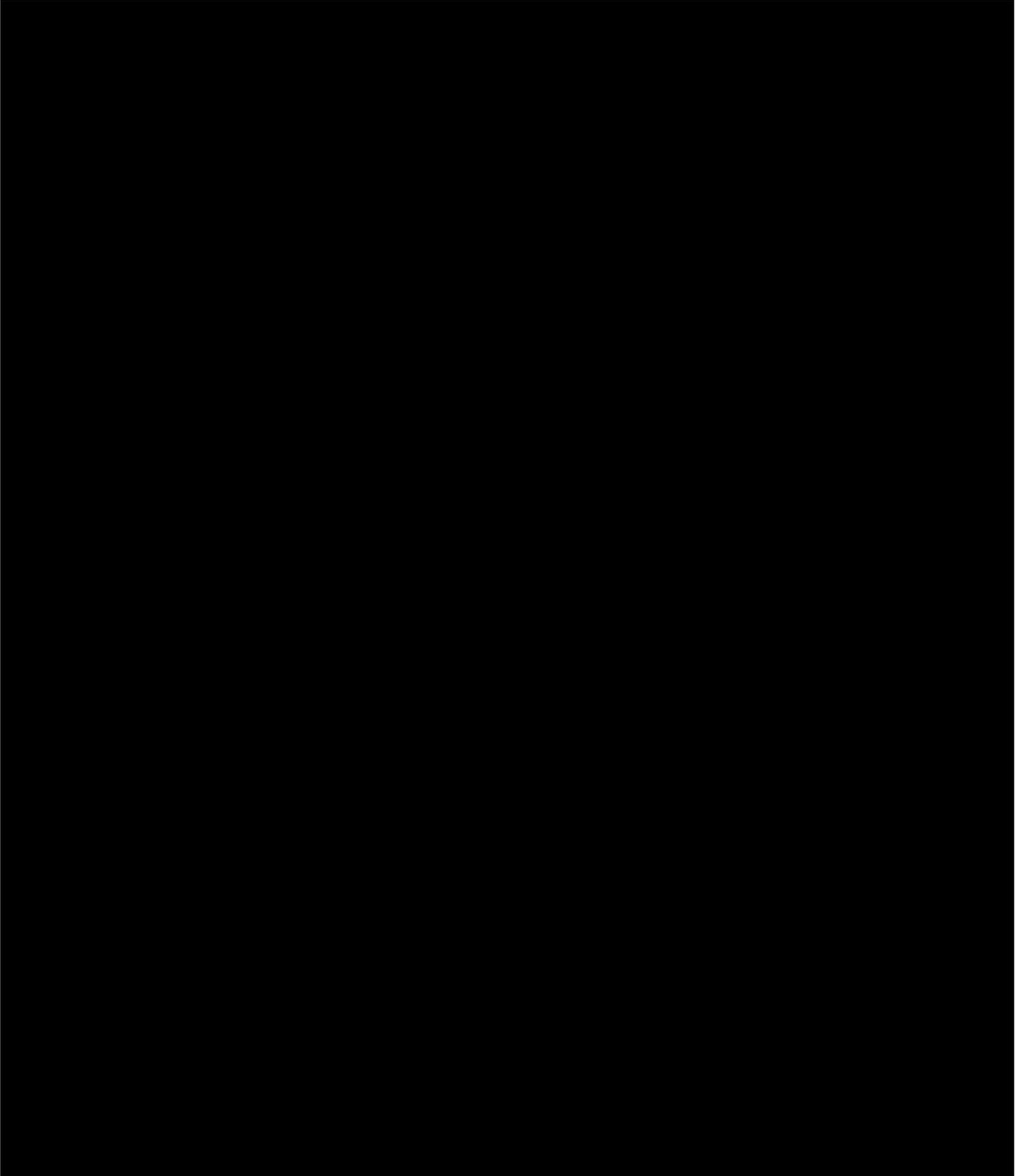
¹³⁹ [REDACTED] (Ex. 3467).

¹⁴⁰ [REDACTED] at 353.

¹⁴¹ [REDACTED] (Ex. 3466); [REDACTED]

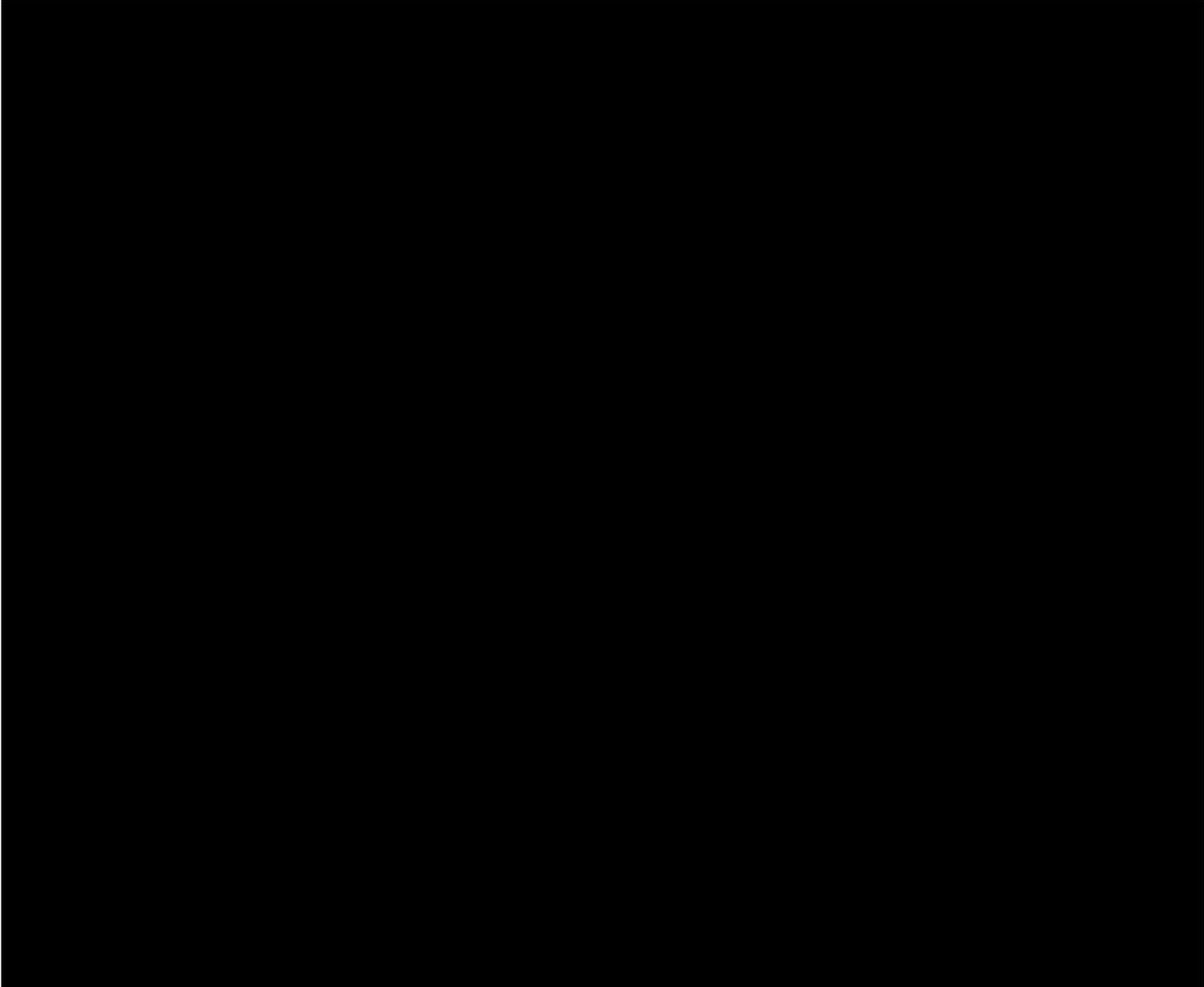
¹⁴² Reena das Nair & Liberty Mncube, *supra* note 85

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148 [redacted] at 747.

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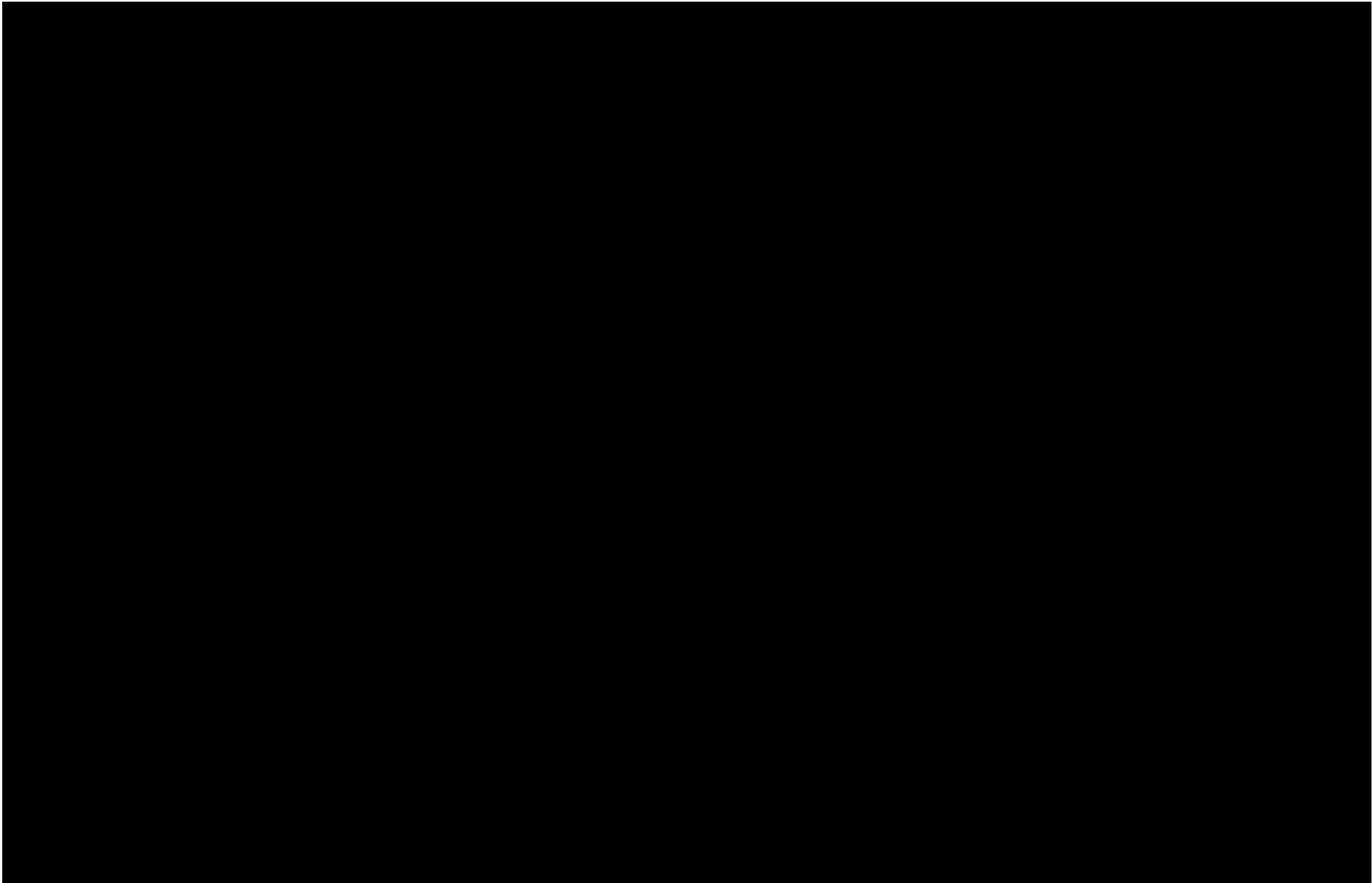


149 [Redacted]

[Redacted]

151 [Redacted] Ex. 2240).

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124. Taken together, the EMI and Agri Stats pricing reports provide

[REDACTED] Moreover, because these reports are kept confidential, chicken processors' customers cannot use them to check whether they are being offered above-average prices (and, if so, bargain for a better deal).

125. The robust and confidential pricing information provided by Agri Stats and EMI is analogous to the price information at issue in several of the economic case studies discussed above. The granularity of Agri Stats and EMI pricing information is similar to the granular price information exchanged in Large Turbine Generators, UK Tractors, and South African Milk Distribution. As the European Competition Authority explained in the UK Tractor case, this granularity is not necessary for competitive purposes; firms can achieve the procompetitive benefits of a price information exchange with "aggregate industry data."¹⁵² At the same time, the confidentiality of Agri Stats pricing data mirrors the confidentiality of pricing data in the South African Milk case. Thus, as economic theory predicts, the defining characteristics of Agri Stats and EMI's pricing information exchanges pose serious competitive threats.

¹⁵² Vives, *supra* note 64 at 92.

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[REDACTED]. This sent chicken processors another signal that they should operate collusively.

130. [REDACTED]

131. Class-wide evidence suggests that Chicken Processing Defendants followed this advice. [REDACTED]

132. For example, I have seen documents suggesting that, throughout the Class Period,

[REDACTED]

¹⁵⁴ [REDACTED] (Ex. 3160).

¹⁵⁵ *Id.* at 889.

¹⁵⁶ Ex. 346 [REDACTED]

¹⁵⁷ [REDACTED] 98-117, [REDACTED] 2341), [REDACTED] (Ex. 2342), [REDACTED] (Ex. 2343).

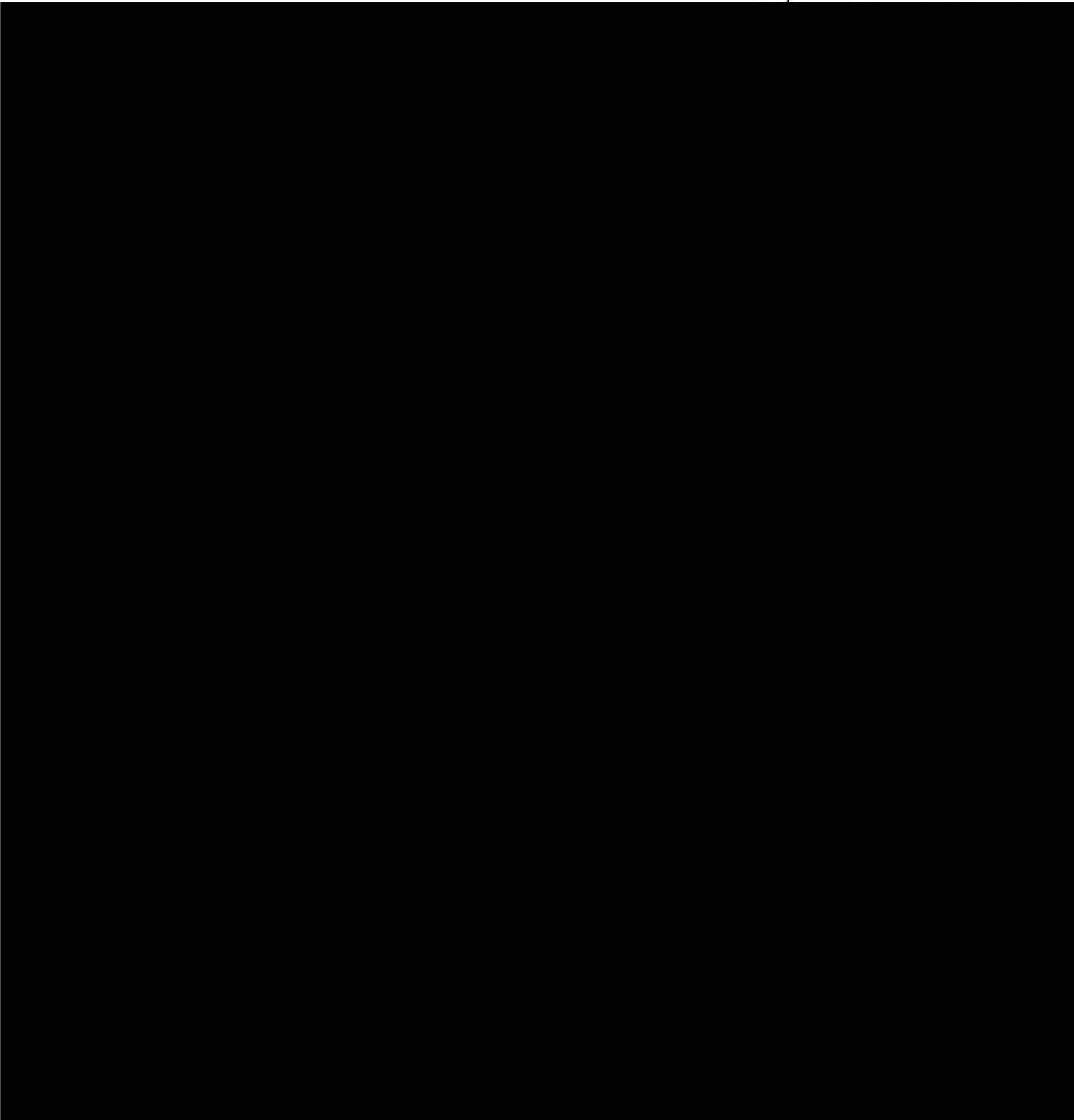
¹⁵⁸ *Id.*

¹⁵⁹ *See, e.g.*, [REDACTED] (Ex. 2342), [REDACTED]

¹⁶⁰ [REDACTED] 98-117, [REDACTED] (Ex. 2341), [REDACTED] (Ex. 2342), [REDACTED] (Ex. 2343).

¹⁶¹ [REDACTED]

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¹⁶² [redacted] at 559-567.

¹⁶³ [redacted] at 396.

¹⁶⁴ [redacted] at 923.

¹⁶⁵ *Id.*

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[REDACTED]

135. Likewise, on a monthly basis, [REDACTED]

[REDACTED] 169

136. Documents suggest that, in [REDACTED]

[REDACTED] 173

137. [REDACTED]

[REDACTED]

¹⁶⁶ [REDACTED] Ex. 1398).

¹⁶⁷ *Id.*

¹⁶⁸ *See, e.g.,* [REDACTED] at 423 (Ex. 3469); [REDACTED] Tr. 102-119; *compare* [REDACTED] at 277 (Ex. 3458) *with* [REDACTED] (Ex. 3469).

¹⁶⁹ [REDACTED] at 423 (Ex. 3469); [REDACTED]; *see* [REDACTED] 111-112; *see also* [REDACTED] . 136 [REDACTED]

[REDACTED]

¹⁷¹ Exhibit 3160 [REDACTED] emphasis added).

¹⁷² Exhibit 3160 [REDACTED] 889) (emphasis added).

¹⁷³ [REDACTED] (emphasis added).

¹⁷⁴ *See, e.g.,* [REDACTED]

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3. Information Sharing at Meetings Where a Number of Competitors Gather

145. EMI regularly shares price and output information and forecast [REDACTED]

[REDACTED]

4. Overall Impression of the Information Exchange

146. It is likely [REDACTED]. Both economic theory and class-wide evidence suggest that [REDACTED] for their coordinated behavior. At the same time, Agri Stats' very granular, high-frequency data on price and output levels [REDACTED]

The documents and testimony I reviewed suggest what I as an economist would expect to see in an industry where firms were using an information exchange anticompetitively.

147. More specifically, both trends in the chicken industry and Defendants' documents are consistent with the theory [REDACTED] the chicken industry has been learning how to stabilize prices. Industry trends show that [REDACTED]

¹⁹¹ See, e.g., [REDACTED] (Ex. 1063) (webcast slides).

¹⁹² [REDACTED] 86-87 (Feb. 7, 2019); see also, e.g., [REDACTED] Ex. 1068).

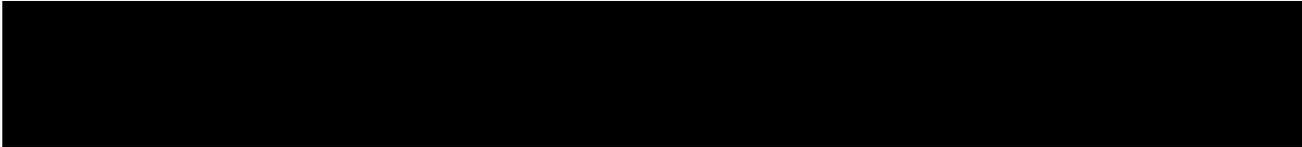
¹⁹³ [REDACTED]

¹⁹⁴ [REDACTED]

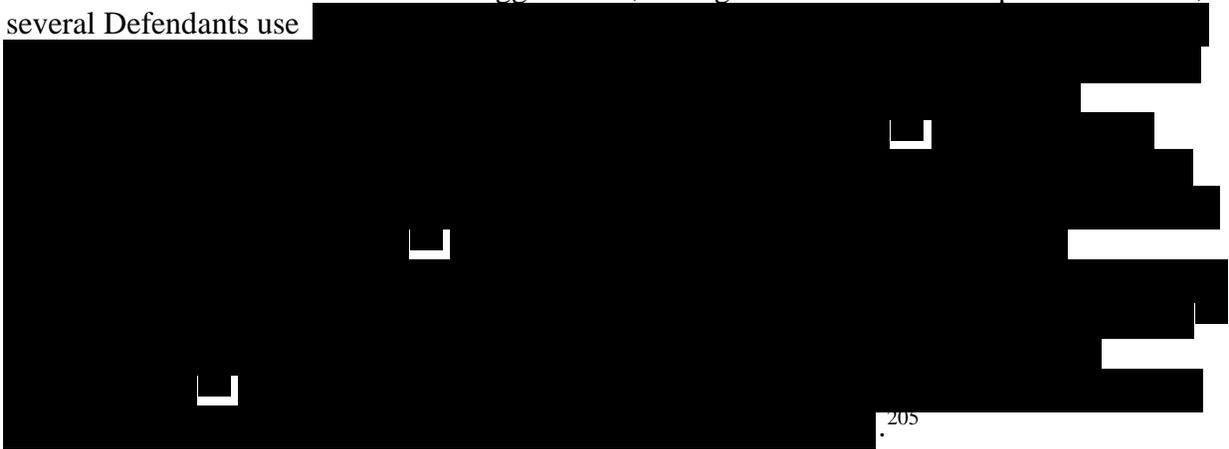
¹⁹⁵ [REDACTED]

¹⁹⁶ [REDACTED] at 769; [REDACTED] 993.

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148. Class-wide evidence suggests that, during the second round of production cuts, several Defendants use



205

149.



207

150. Class-wide evidence suggests that, after the success of the 2012 production cuts, some Defendants increased their reliance on

197 [redacted] at 800-805.

198 [redacted] t 022.

199 [redacted] at 022-025.

200 [redacted] at 555.

201 [redacted] 51 (discussing [redacted] Ex. 2335) dated 1/4/11).

202 [redacted]

203 [redacted]

204 [redacted] 3608) [redacted]

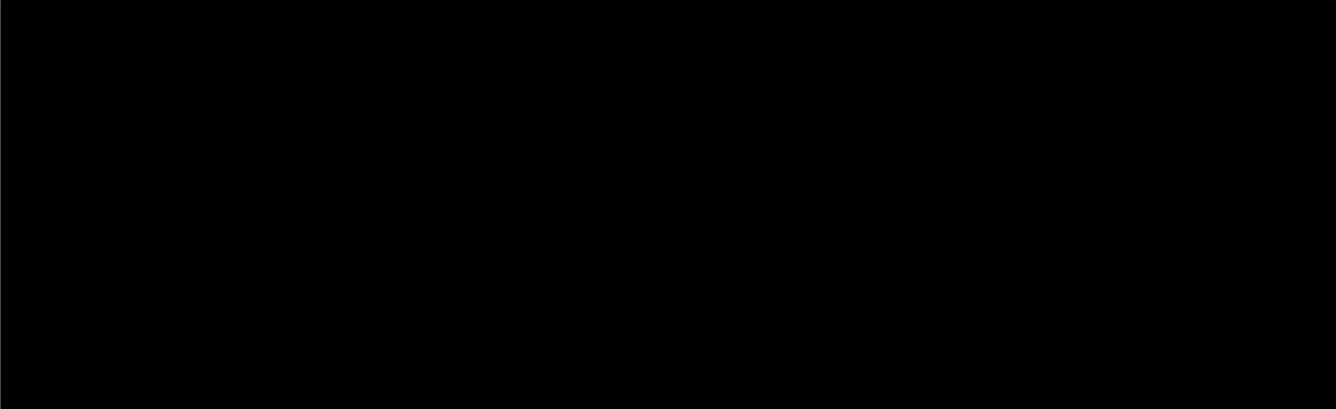
[redacted]

205 [redacted] (Ex. 3610).

206 *See, e.g.*, [redacted] t 150.

207 [redacted]

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151. As noted above, both economic theory and documentary evidence suggest that this learning process led to higher chicken prices and lower chicken output over the class period. One of Defendants' coconspirators seemed to recognize that Agri Stats caused such anticompetitive effects. [REDACTED]

[REDACTED] I indeed conclude that all of Agri Stats' clients contributed to an anticompetitive information exchange.

152. Defendants' anticompetitive conduct continued through the end of the class period: Defendants received anticompetitive Agri Stats and EMI reports through this entire window. Thus, there is every reason to expect that the chicken industry experienced anticompetitive effects at least through the end of the class period.

208 [REDACTED] (Ex. 3403).

209 *Id.*

210 [REDACTED]

211 [REDACTED] (Ex. 942).

212 [REDACTED] (emphasis added).

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I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct. Executed this 30th day of October 2020 in New York, New York.

Dated: October 30, 2020



Luís Cabral

EXHIBIT 1

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■ CURRENT APPOINTMENTS

Paganelli-Bull Professor of Economics (2013–),
Professor of Economics (2000–),
Professor of Management and Organizations (by courtesy) (2001–),
Chair, Department of Economics (2015–),
all at Stern School of Business, New York University.

■ PREVIOUS APPOINTMENTS

Professor of Economics, IESE Business School, 2009–2011.
W. R. Berkley Term Professor of Economics (2006–2013), New York University.
Visiting Professor, Dept. of Economics and Cowles Foundation, Yale University (2006–2007).
Chair, Department of Economics, Stern School of Business, New York University (2003–2006).
Research Professor (2000–2003), Stern School of Business, New York University.
Visiting Associate Professor, Haas School of Business, U. California–Berkeley (1999–2000).
Associate Professor (1996–1998), Professor (1998–2000), London Business School.
Summer intern, General Motors Research Laboratories (Operating Sciences Dept.), 1988.
Teaching and Research Assistant, Stanford University, 1988–89.
Teaching Assistant (1984–85), Assistant Professor (1989–92), Associate Professor (1992–96),
Professor (1996–2000), Faculdade de Economia, Universidade Nova de Lisboa.
Teaching Assistant, Universidade Católica Portuguesa, 1979–85.

■ EDUCATION

Ph.D. in Economics, June 1989, Stanford University.

Thesis committee: Paul Milgrom (chair), Michael Riordan, Tim Bresnahan, Roger Noll

Masters in Economics, June 1985, Universidade Nova de Lisboa.

B.A. (“Licenciatura”) in Economics, June 1983, Universidade Católica Portuguesa.

■ PUBLICATIONS: JOURNAL ARTICLES

Hellwig, Michael, Dominik Schober, and Lu'is Cabral (2020), "Low-Powered vs High-Powered Incentives: Evidence from German Electricity Networks," forthcoming in *International Journal of Industrial Organization*.

Cabral, Lu'is, and Sonia Gilbukh (2020), "Rational Buyers Search When Prices Increase," *Journal of Economic Theory* **187**, Article 104998.

Lead article

Cabral, Lu'is, and Gabriel Natividad (2020), "Movie Release Strategy: Theory and Evidence from International Distribution," *Journal of Economics and Management Strategy* **29**, 276-288.

Xu, Lei, Tingting Niam, and Lu'is Cabral (2020), "What Makes Geeks Tick? A Study of Stack Overflow Careers," *Management Science* **66**, 587-604.

Albuquerque, Rui, Lu'is Cabral, and Jose Guedes (2019), "Incentive Pay and Systemic Risk," *Review of Financial Studies* **32**, 4304-4342.

Featured on *Harvard Law School Forum on Corporate Governance and Financial Regulation*

Cabral, Lu'is (2019), "Some Economics of the Movie Industry," *Japanese Economic Review* **70**, 298-307.

Special Issue on Industrial Organization

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Lead article

Cabral, Lu'is (2019), "Towards a Theory of Platform Dynamics," *Journal of Economics and Management Strategy* **28**, 60-72.

Special issue on Platforms

Cabral, Lu'is, and Gonalo Pacheco-de-Almeida (2019), "Alliance Formation and Firm Value," *Management Science* **65**, 879-895.

Cabral, Lu'is, Zhu Wang and Daniel Xu (2018), "Competitors, Complementors, Parents and Places: Explaining Regional Agglomeration in the U.S. Auto Industry," *Review of Economic Dynamics* **30**, 1–29.

Lead article

Cabral, Lu'is (2018), "We're Number 1: Price Wars for Market Share Leadership," *Management Science* **64**, 2013–2030.

Cabral, Lu'is (2017), "Competition Policy in the Global Era," *New Zealand Economic Papers* **51**, 100–108.

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Cabral, Lu'is(2016), "Dynamic Pricing in Customer Markets with Switching Costs," *Review of Economic Dynamics* **20**, 43–62.

Cabral, Lu'is(2016), "Living Up To Expectations: Corporate Reputation and Persistence of Firm Performance," *Strategy Science* **1**, 1–10.

Lead article in new journal

Cabral, Lu'is, and Gabriel Natividad (2016), "Cross-selling in the US home video industry," *Rand Journal of Economics* **47**, 29–47.

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Cabral, Lu'is, Erkut Ozbay and Andrew Schotter (2014), "Intrinsic and Instrumental Reciprocity: An Experimental Study," *Games and Economic Behavior* **87**, 100–121.

Cabral, Lu'is (2014), "Good Turnover and Bad Turnover: Barriers to Business and Productivity," *Economics Letters* **125**, 179–181.

Cabral, Lu'is, and David Salant (2014), "Evolving Technologies and Standards Regulation," *International Journal of Industrial Organization* **36**, 48–56.

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Cabral, Lu'is(2014), "Aftermarket Power and Foremarket Competition," *International Journal of Industrial Organization* **35**, 60–69.

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Lead article

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Lead article (EARIE Presidential Address)

Cabral, Lu'is, and Artur Fishman (2011), "Business as Usual: A Consumer Search Theory of Sticky Prices and Asymmetric Price Adjustment," *International Journal of Industrial Organization* **30**, 371–376.

Co-winner of the 2013 Paul Geroski Prize for Best Paper Published in IJIO

Cabral, Lu'is, and Helder Vasconcelos (2011), "Vertical Integration and Right of First Refusal," *Economics Letters* **113**, 50–53.

Cabral, Lu'is(2011), "Dynamic Price Competition with Network Effects," *Review of Economic Studies* **78**, 83–111.

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Cabral, Lu'is (2005), "An Equilibrium Approach to International Merger Policy," *International Journal of Industrial Organization* **23**, 739–751.

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Finalist, 2005 John D. C. Little Best Paper Award (INFORMS Society for Marketing Science).

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Cabral, Lu'is (2004), "Simultaneous Entry and Welfare," *European Economic Review* **48**, 943–957.

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Cabral, Lu'is (2003), "R&D Competition When Firms Choose Variance," *Journal of Economics and Management Strategy* **12**, 139–150.

Cabral, Lu'is (2002), "Increasing Dominance With No Efficiency Effect," *Journal of Economic Theory* **102**, 471–479.

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Cabral, Luís(1988), “Asymmetric Equilibria in Symmetric Games with Many Players,” *Economics Letters* **27**, 205–208.

Lead article (not sure it means anything)

■ PUBLICATIONS: BOOKS

Cabral, Luís(2017), *Introduction to Industrial Organization, 2nd Ed*, Cambridge, Mass.: MIT Press.

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Translated into Italian, Greek, Chinese, Russian.

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Original in Portuguese, translated into Spanish.

■ PUBLICATIONS: BOOK CHAPTERS

Cabral, Luís(2012), “Reputation on the Internet,” in Peitz and Waldfogel (Eds), *Oxford Handbook of the Digital Economy*, Oxford University Press.

Cabral, Luís(2010), “Modelling Competition and Regulation in Wireless Telecommunications: A Progress Report,” in Mateus and Moreira (Eds), *Competition Law and Economics*, Edward Elgar.

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Cabral, Luís, and W. Robert Majure (1994), “An Empirical Analysis of Bank Branching: Portugal 1989–1991,” in D. Neven and L.-H. Roller (Eds), *The Empirical Analysis of Industrial Organization* (Report of a conference organized by the WZB, Berlin), London: CEPR, pp. 111–136.

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■ PUBLICATIONS: OTHER

- Aoki, Reiko, and Lu'is Cabral (2019), "Introduction to Special Issue on Industrial Organization," *Japanese Economic Review* **70**, 279-279.
- Cabral, Lu'is, Martin Peitz, and Julian Wright (2019), "Introduction to Special Issue on Platforms," *Journal of Economics and Management Strategy* **28**, 3-4.
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- Cabral, Lu'is (2010), "Introduction to Special Issue," *International Journal of Industrial Organization* **28**, 335-335.
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- Cabral, Lu'is (2008), "Barriers to Entry," in Steven N. Durlauf and Lawrence E. Blume (Eds), *The New Palgrave Dictionary of Economics*, 2nd edition, Basingstoke and New York: Palgrave Macmillan.
- Cabral, Lu'is (2006), "Market Power and Efficiency in Card Payment Systems: A Comment on Rochet and Tirole," *Review of Network Economics* **5**, 15-25.
- Cabral, Lu'is (2005), "Collusion Theory: Where to Go Next?," *Journal of Industry, Competition and Trade* **5**, 199-206.
- Cabral, Lu'is (2003), Review of R. Hardin's "Trust and Trustworthiness," in *Journal of Economic Literature* **41**, 953-954.
- Cabral, Lu'is (2002), "The California Electricity Crisis," *Japan and the World Economy* **14**, 335-339.
- Cabral, Lu'is (2002), Comments on Clemons, Hitt, Gu, Thatcher, and Weber, *Journal of Financial Services Research* **22**, 91-93.
- Cabral, Lu'is (1999), Comments on D. Sull and C. Markides, "easyJet's \$500 Million Gamble," *European Management Journal* **17**, 20-38.
- Opinion articles in various newspapers and magazines in Europe and the U.S.

■ TEACHING MATERIALS (INCLUDING CO-AUTHORED)

- Costs and pricing: Monsanto's Roundup; Wednesdays at Cinemex; Merck, Aids, and Africa; Eurotunnel; Airbus Beluga.
- Firm, markets and public policy: DeBeers; Jumbo Jet; The Oil Market; Advertising Commodities; NYU Taxi Medallions; Has the Patent System Expired?; The Portuguese Housing Market.
- Antitrust: GE and Westinghouse; Virgin Atlantic and British Airways; Spirit Airlines; The Failed GE-Honeywell Merger; Microsoft; Mars and Unilever.
- Industrial Policy: Endesa; Airbus and Boeing; Two Generations of Wireless Telecom.
- Media and entertainment: Trends and Media and Entertainment; The Economics of Rock Stars; TV Power Games: Friends and Law & Order; Exporting Sports Entertainment: the NBA in China; Formula One: the 2009 Crisis.
- More information at <http://luiscabral.net/economics/teaching/>

■ INVITED PRESENTATIONS

In the U.S. and Canada: Bank of Canada, Bell Communications Research Labs, Boston U (3+), California Institute of Technology, Columbia U (2), Cornell U (2), Dartmouth (Tuck School of Business), Department of Justice, Drexel U (2), Duke-UNC (2), Federal Trade Commission, General Motors Research Labs, Georgetown U (2), Georgia Tech, GTE Labs, Harvard Business School (3+), Harvard U, Indiana U, Iowa State U (2), Johns Hopkins U, Michigan State U, MIT, New York U (3+), Northwestern U (3+), PennState U, Ohio State U, Purdue U, Queens U (2), Rutgers U, Stanford U (3+), SUNY Stony Brook, U Arizona, U British Columbia (3+), U California-Berkeley (3+), U California-Irvine (2), U California-Los Angeles (2), U California-San Diego, U California-Santa Cruz, U Chicago, U Colorado-Boulder, U Illinois-Urbana (2), U Louisville, U Maryland, U Michigan (3+), U Montreal, U Notre Dame, U Oklahoma, U Pennsylvania (2), U Rochester (3+), U Southern California, U Toronto (3+), U Virginia, U Wisconsin-Madison, Vanderbilt U, Yale U (3+).

In the U.K.: Cambridge U (2), Imperial College (2), London Business School (3+), London School of Economics (3+), Oxford U (2), Queen Mary and Westfield College, U College London, U East Anglia, U Edinburgh, U Essex, U Nottingham, U Southampton (2), Warwick U (2), York U.

In Europe: Bocconi U (2), CORE (2), ECARES (ULB), École des Mines, École Polytechnique, European Commission, European University Institute (Florence), Fundacion Empresa Publica (Madrid), HEC Paris, IESE Business School (3+), Insead (2), ISEG (Lisbon) (2), Paris School of Economics (3+), Toulouse School of Economics (3+), Tilburg U, Trinity College Dublin, U Alicante (3+), U Athens, U Autónoma de Barcelona (2), U Autónoma de Madrid (2), U Barcelona, U Bergen, U Bern, U Católica Portuguesa (3+), U Carlos III de Madrid (2), U Complutense de Madrid, U Copenhagen (2), U Lausanne (2), U Leuven (KUL), U Lisbon (CMAF), U Mannheim, U Minho, U Munich, U Murcia, U Navarra (3+), U Nova de Lisboa (3+), U Oslo, U Pompeu Fabra (3+), U Porto (2), U Rovira i Virgili, U Salamanca, U Tromsø, U Vienna, U Vigo, U Zurich (2), WZB (Berlin) (2).

Elsewhere: Atami (Japan), Fudan U, N U Singapore, U Auckland, Australian National U, U Canterbury, Gertulio Vargas (Rio de Janeiro), Hebrew U Jerusalem (2), Hokkaido U, Hong Kong Technical U, Hong Kong UST, Lima School of Economics, PUC (Rio de Janeiro), Tel-Aviv U (3+), U de los Andes (Santiago, Chile), U Beijing, U Católica de Chile, U Kobe, U Melbourne, U New South Wales, U Piura, U Queensland, U de la Republica (Uruguay), U Sidney.

Distinguished lectures: Keynote Speaker, Portuguese Industrial Organization Society (Lisbon, January 2003). Keynote speaker, Southern European Association for Economic Theory (Barcelona, November 2004). Keynote Speaker, European Association for Research in Industrial Economics (Porto, September 2005). Distinguished Visitor, Drexel University (May and November 2008). Keynote speaker, Jornadas de Economia Industrial (September 2010). Keynote speaker, CEPR Conference on Applied Industrial Organization (Cyprus, May 2012). Keynote speaker, Nordic IO Conference (Oslo, June 2014). J-J Laffont Lecture, CRESSE (Corfu, July 2014), Keynote speaker, OLIGO (Madrid, June 2015). Keynote speaker, ATE Conference (Auckland, December 2015). Keynote Speaker, V International Academic Symposium, Institut d'Economia de Barcelona (February 2017). Keynote Speaker, Lisbon Game Theory Conference (November 2019).

Other invited presentations: Econometrics Society European Winter Meetings (Alicante, 1990). Finnish Doctoral Program Annual Meeting (Helsinki, June 1990). IDEE Workshop (Toulouse, 1991). Network of Industrial Economics (Lancaster University, 1997). UBC Summer IO Conference (various years). Competitive Strategy Conference (Montreal, June 2002).

Conference on Networks and Standards (Moscow, June 2003). Conference on Strategy (St Louis, May 2007). Conference on Standards and Public Policy (Chicago, May 2004). Workshop on Competition Policy (Berkeley, October 2007). I and II Lisbon Conferences on Competition Law and Economics (Lisbon, November 2005 and 2007). OECD 100th Meeting Conference (Paris, February 2008). Workshop on the Economics of Marketing (Frankfurt, June 2008). Microeconomics Workshop (Shanghai, June 2010). CRA Annual Conference (Brussels, December 2010). IO Workshop (Zapallar, Chile, December 2010). ICT Workshop (Évora, March 2011). ICT Workshop (Mannheim, June 2012). Innovation Workshop (Tokyo, August 2014), Search Workshop (Groningen, May 2014). Triangle Conference (UNC, April 2017). OECD (Paris, June 2018). International Conference on Game Theory (Stony Brook, July 2017), Munich Summer Institute (June 2018), Cambridge Competition Policy Conference (May 2019), Hokkaido Conference (July 2019).

Other presentations at conferences and workshops (**accepted submissions**): Econometric Society, AEA, EEA, EARIE, IIOS annual conferences (various years since 1988). CEPR: various workshops (IO programme). NBER: various workshops (IO and entrepreneurship groups).

Recent invited presentations: Nova SBE (April 2018), Munich (June 2018), Catolica (June 2018), U Porto (October 2018), U Illinois Champaign-Urbana (October 2018), U Alabama (November 2018). U Oklahoma (April 2019), Lima School of Economics (May 2019), Japan Federal Trade Commission (July 2019)

■ TEACHING EXPERIENCE

Undergraduate: microeconomics, industrial organization, economics of media and entertainment.

Graduate: microeconomics, industrial organization, game theory, strategy.

MBA: microeconomics; game theory; public policy and business strategy.

Mini-courses and lectures: The Economics of Reputation and Trust (Zurich, 2002); Strategy Summer Camp (Beijing, 2008); Dynamic Oligopoly Competition (Fordham, 2008; European Commission's DGComp, 2008; Paris School of Economics, 2014; Universidad Catolica de Chile, 2014; Bank of Portugal, 2018). Entrepreneurship Summer Camp (NBER, 2009).

■ GRADUATE STUDENTS

Doctoral theses committees (main advisor): Pedro P. Barros, 1993; Margarida Lopes, 1999; Tobias Kretschmer, 2001; Flavio Toxvaerd, 2002; Cristian Dezso, 2006; Ali Yurukoglu, 2009; Anna Ingster, 2010; Hong Luo, 2011; Lai Jiang, 2012; Yunok Cho, 2014; Sandy Yu, 2015; Jihye Jeon, 2017; Sonia Gilbukh, 2018; Tommaso Bondi, exp. 2020; Weichen Yan, exp. 2020. (For placement information, visit luiscabral.net/economics/students/)

Doctoral theses committees (member): Alessandro Gavazza, 2005; Giovanni Serio, 2006; Martin Paredes, 2007; Ashton Hawk, 2009; Selvin Akkus-Clemens, 2013; Krzysztof Wozniak, 2013; Vivian Figer, 2014; Lei Xu, 2015; Malika Krishna, 2016; Bang Nguyen, exp. 2020; Lena Song, exp. 2021; German Gutierrez, exp. 2021.

Doctoral theses external examiner: Paul Povel (LSE, 1998); Vasco Rodrigues (Católica Porto, 2002); Helder Vasconcelos (European University Institute, 2002), Jeanine Thal (Toulouse, 2006), João Montez (Lausanne, 2007), Thomas Fagart (Paris School of Economics, 2016).

Master's theses committees (main advisor): Pedro Pereira, 1991; Margarida Lopes, 1993; Isabel Ucha da Silva, 1994; Nuno Martins, 1996.

■ EDITORIAL DUTIES

Co-Editor, *Journal of Economics and Management Strategy*, 2004–.

General Editor, *Journal of Industrial Economics*, 1999–2003.

Chair of the Senior Advisory Board, *International Journal of Industrial Organization*, 2013–.

Associate Editor: *Journal of Industrial Economics* (2013–), *Review of Network Economics* (2000–2011), *Portuguese Economic Journal* (2002–), *B.E. Journal of Economic Analysis and Policy* (2005–2011), *International Journal of Industrial Organization* (1995–1998), *Investigaciones Economicas* (1994–1998), *Economia* (1989–2003).

Referee: *American Economic Review*, *Econometrica*, *Economic Journal*, *European Economic Review*, *International Economic Review*, *International Journal of Industrial Organization*, *Journal of Economic Dynamics and Control*, *Journal of Economic Theory*, *Journal of Economics and Management Strategy*, *Journal of the European Economic Association*, *Journal of Industrial Economics*, *Journal of Political Economy*, *Journal of Public Economics*, *Management Science*, *Marketing Science*, *Quarterly Journal of Economics*, *Rand Journal of Economics*, *Review of Economic Studies*, and other journals. Excellence in Refereeing Award, *American Economic Review*, 2008.

■ ADDITIONAL CURRENT AND PAST AFFILIATIONS

Visiting Scholar, Santa Fe Institute (1989), Boston University (1989, 1993, 1994), Stanford University (1993), Institut d'Anàlisi Econòmica (1993).

Research Fellow, Centre for Economic Policy Research, London (1992–).

Research Associate, Center for Japan-U.S. Business and Economic Studies, NYU (2002–2011).

Member of the Advisory Board, Center for Global Economy and Business, NYU (2015–).

Member of the Advisory Board, Research Unit on Complexity in Economics (UECE/ISEG, Lisbon, Portugal) (2002–).

Chief Economic Adviser, Portuguese Competition Authority (2003–2008).

External member, Group of Economic Policy Analysis (GEPA, an advisory group to the President of the European Commission), 2005–2010.

Faculty Affiliate, Center for Experimental Social Science, New York University (2005–).

Research Fellow, Public Sector – Private Sector Research Center, IESE Business School (2009–).

Research Fellow, Institute for Media and Entertainment, IESE Business School, (2009–).

Affiliate, Law and Economics Consulting Group (2001–); Applied Economic Solutions (2001–); Charles River Associates (2011–).

Member of the Research Advisory Board, CEFAGE, University of Évora (Portugal) (2012–).

Member of the Advisory Board, Mannheim Centre for Competition and Innovation (2013–2017).

Research Fellow, Mannheim Centre for Competition and Innovation (2016–).

Member of the Advisory Board, Lima School of Economics (2016–).

Member of EdP University Advisory Board (2016–).

Member of the International Advisory Board, Barcelona Economic Analysis Team (2017–).

Member of the Faculty Advisory Council, Center for Sustainable Business, NYU Stern (2017–).

Member of the Advisory Board, Nova School of Economics and Business (2017–).

Founding Chair, Scientific Board, Asia-Pacific Industrial Organization Society, 2018.

Chief Economist, Creative Destruction Lab - NYC (2018–2019). Chief Scientist–Economics, Endless Frontier Lab (2019–)

Member, American Economic Association, Econometric Society, other learned societies.

■ ACADEMIC ASSOCIATIONS AND CONFERENCES

President (2009–2011), Past President (2011–2013), European Association for Research in Industrial Economics (EARIE).

First President (2017–2019), Member of the Scientific Board (2017–), Asia Pacific Industrial Organization Society (APIOS).

Member of the Executive Committee: Southern European Association for Economic Theory (ASSET), 1992–1996. European Association for Research in Industrial Economics (EARIE), 1994–1999, 2009–.

Founder (2003) and organizer (2003–2007), IO Day (a.k.a. New York Commuter Industrial Organization Workshop).

Conference organizer or co-organizer: European Summer Symposium in Economic Theory, Gerzensee, Switzerland, (various years during the 1990s); ASSET Annual Meeting, Lisbon, November (1994); Portuguese Economics Research Society 1st Meeting, Lisbon (1996); European Association for Research in Industrial Economics (2009); Asia-Pacific Industrial Organisation Conference (2016, 2017).

Member of the Program Committee: Econometric Society European Meeting (1999, 2006, 2007). European Association for Research in Industrial Economics (1994, 1997, 2001, 2002, 2003, 2007, 2011–2017). European Economic Association (1995, 1996, 2002). European Research Workshop in International Trade (1992). International Telecommunications Society World Conference (1996).

■ OTHER PROFESSIONAL ACTIVITIES

Consultant: Federal Reserve Bank of New York, Bank of Portugal, Pfizer Pharmaceuticals, OECD, European Commission, Portugal's Minister of Finance, various other companies and government institutions.

Media coverage. Professor Cabral's research has been covered on television (e.g., NBC), radio (e.g., BBC) and the press (e.g., *The Wall Street Journal*). In addition to the U.S., media coverage includes (in alphabetical order) Brazil, Chile, Portugal, Spain, and the United Kingdom.

■ HONORS

Banco Português do Atlântico Prize (best student in undergraduate class), 1983.

A. Melo Foundation Prize (best student in Masters program), 1985.

Fulbright scholarship, 1985-89, 1993.

European Association for Research in Industrial Economics (EARIE) prize (best young scholar paper, co-winner), 1989 (first time prize was awarded).

Research Professor, 2002–2007. W. R. Berkley Term Professor of Economics, 2007–2013;
Paganelli-Bull Professor of Economics, 2013– (all at NYU's Stern School of Business).

President (2009–2011), European Association for Research in Industrial Economics.

■ PERSONAL

Born on June 8, 1961 in Lisbon, Portugal. Portuguese and U.S. citizen. Hobbies include painting and saxophone playing. Additional information at luiscabral.net

■ CASES TESTIFIED (LAST 4 YEARS)

Expert Report of Dr. Luis Cabral, In re Optical Disk Drive Antitrust Litigation, No. 3:10-md-02143 RS (N.D. Cal. Feb. 1, 2017).

EXHIBIT 2

Documents Relied Upon

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141. Koch Defendants’ Am. Objections & Responses to Interrogatories No. 4 of DPPs, CIIPPs, and EUCPs’ Second Interrogatories to All Defendants, July 28, 2020
142. Koch Defendants’ Objections & Responses to DPPs, CIIPPs, and EUCPs Second Interrogatories to all Defendants, Feb. 27, 2018
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161. Michael Raith, Product differentiation, uncertainty and the stability of collusion LSE STICERD Rsch. Paper No. EI16 (1996)
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187. OKFoods_0001300333

188. Peco Foods Inc.'s Responses & Objections to All Plaintiffs' Second Interrogatories to All Defendants, Mar. 2, 2018

189. PECO0000108634

190. PECO0000116622

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196. Perdue Defendants' Objections & Responses to All Plaintiffs' Second Interrogatories at 6-8, Feb. 27, 2018

197. Sanderson Farms Defendants' Am. Objections & Responses to DPPs, CIIPPs, and EUCPs Second Interrogatories to All Defendants, Feb. 18, 2020

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199. PERDUE0000049877
200. PERDUE0000052266
201. PERDUE0000173452
202. PERDUE0000245421
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238. PILGRIMS-0009964142
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241. Deposition of Michael Popowycz (September 30, 2020)
242. Deposition of Tim Price (December 4, 2018)
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268. Susan Athey & Kyle Bagwell, Optimal Collusion with Private Information, 32 RAND J. Econ. 428-65 (2001)

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