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UNITED STATES OF AMERICA
BEFORE THE FEDERAL TRADE COMMISSION
OFFICE OF ADMINISTRATIVE LAW JUDGES

In the Matter of	)	
BENCO DENTAL SUPPLY CO., **a corporation,**	)	
HENRY SCHEIN, INC., **a corporation, and**	)	**DOCKET NO. 9379**
PATTERSON COMPANIES, INC. **a corporation.**	)	

COMPLAINT COUNSEL'S POST-TRIAL BRIEF IN REPLY TO RESPONDENTS BENCO DENTAL SUPPLY CO., PATTERSON, AND HENRY SCHEIN'S POST-TRIAL BRIEFS

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INTRODUCTION

Competitors do not discuss their bids with each other. This is a basic tenet of antitrust. Certainly, competitors who are acting unilaterally do not have discussions with each other about whether particular customers are the type of customer with whom they do business. And competitors who are acting unilaterally do not communicate when they are uncertain whether to bid on particular customers, nor do they advise each other of their bids. But all that, and more, is what Respondents did here. That is not unilateral action; that is conspiracy.

None of Respondents' arguments come remotely close to explaining why any of their actions are permissible under the antitrust laws. Their constant refrain is that the three communicating competitors never reached a detailed agreement. But even assuming this were true—and the record shows it is not—a mountain of case law states that antitrust conspiracies do not require detailed, flyspecked conspiracy agreements. To the contrary, courts have repeatedly found *per se* illegal conspiracies on facts far less clear, and with terms of agreement far less detailed, than the record establishes here.

Moreover, Respondents have never offered any legitimate business justification for their senior executives' repeated assurances to each other—made by email, by text messages, and by phone calls—that they would not compete by discounting to buying groups. Respondents can neither erase nor explain at least *fifteen* inter-firm communications about buying groups,[1] strategically shared with internal management, and countless instructions to employees to reject buying groups in order to thwart a "race to the bottom." They have offered no justification because there is none. It is a bedrock antitrust principle that competitors should not be assuring

[1] (1) January 13, 2012, Schein's Sullivan and Benco's Cohen spoke on the telephone about a buying group. (Complaint Counsel Post-Trial Proposed Findings of Fact ("CCFF") ¶¶ 955-972); (2) February 8, 2013, Cohen emailed Patterson's Guggenheim about a buying group and about Benco's no buying group policy. (CCFF ¶¶ 474-490); (3) February 8, 2013, Guggenheim emailed Cohen about a buying group and Patterson's no buying group policy. (CCFF ¶¶ 491-502); (4) March 25, 2013, Cohen and Sullivan spoke on the telephone about a suspected buying group. (CCFF ¶¶ 1022-1048, 1051); (5) March 25, 2013, Cohen and Sullivan exchanged text messages about a suspected buying group. (CCFF ¶¶ 1045-1048, 1051, 1057-1058); (6) March 26, 2013, Cohen texted Sullivan about a buying group. (CCFF ¶¶ 944-1004); (7) March 27, 2013, Cohen texted Sullivan about a suspected buying group. (CCFF ¶¶ 1061-1071); (8) June 6, 2013, Guggenheim emailed Cohen about a suspected buying group and Benco's policy on buying groups. (CCFF ¶¶ 564-573); (continued on next page)

each other of their future plans for bidding, pricing, or customers to chase. Respondents cite not a single case holding that such conduct is permissible.

Respondents' other arguments are equally feeble. It does not matter that the executives at the center of the illegal communications claimed in after-the-fact, made-for-court testimony that they did not really mean what they said; nor does it matter that they denied having conspired. Conspirators usually deny their wrongdoing, and courts have no difficulty seeing through those denials. While the executives may not call their conduct an "agreement," the antitrust laws do. Such conduct is *per se* unlawful because it threatens "'the central nervous system of the economy' by creating a dangerously attractive opportunity for competitors to enhance their power at the expense of others."[2]

Respondents likewise cannot avoid liability by nitpicking Dr. Marshall's opinions. Dr. Marshall simply corroborated clear record evidence that, absent conspiracy, each Respondent would have had a unilateral incentive to discount to buying groups that presented attractive profit opportunities. And, if there was any doubt about Dr. Marshall's conclusion, Respondents' own words resolve it. They themselves said that their unilateral incentives to deal with buying groups could trigger a "price war."[3] They feared that unless they all stood together, one of them would be "the first company to open the floodgates to the dangerous world of GPOs."[4] This fear of a "race to the bottom"[5] resulted in Respondents' "conscious commitment to a common scheme"[6] of not discounting to buying groups. Nothing more is needed for *per se* illegality.

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(9) June 8, 2013, Cohen emailed Guggenheim about its no buying group policy. (CCFF ¶¶ 574-579); (10) June 10, 2013, Guggenheim emailed Cohen about the no buying group policy. (CCFF ¶¶ 580-588); (11) October 1, 2013, Benco's Ryan and Schein's Foley spoke on the telephone about a buying group. (CCFF ¶¶ 1005-1019); (12) January 6, 2014, Patterson's Misiak and Schein's Steck spoke on the telephone about a buying group. (CCFF ¶¶ 1123-1128); (13) January 21, 2014, Steck emailed Misiak about a buying group. (CCFF ¶¶ 1129-1132); (14) April 16, 2014, Cohen emailed both Guggenheim and Sullivan about a buying group. (CCFF ¶¶ 1133-1137); (15) Unspecified date(s) when Cohen informed Sullivan of Benco's no buying group policy. (CCFF ¶¶ 661-664).

[2] *United States v. Apple, Inc.*, 791 F.3d 290, 326 (2d Cir. 2015) (quoting *United States v. Socony-Vacuum Oil Co.*, 310 U.S. 150, 224 n.59 (1940)).

[3] CCFF ¶ 197 (quoting CX2113 at 001).

[4] CCFF ¶ 713 (quoting CX2458 at 001).

[5] CCFF ¶ 198 (quoting CX1149 at 002).

Finally, Respondents cannot take refuge in cases dealing with parallel conduct resulting from oligopolistic interdependence. To the contrary, the whole theory underlying oligopolistic interdependence is that communications are not required for the oligopolists to act in parallel. Oligopolies that actually communicate and coordinate with one another are called cartels. And that is precisely what the record establishes here. Competitors watch each other like hawks, but *conspirators*, like Respondents, do more than watch: they call, text, email, and meet with each other to assure each other of how they are going to compete, and, most importantly, not compete.

[6] *Monsanto Co. v. Spray-Rite Serv. Corp.*, 465 U.S. 752, 764 (1984) (quoting *Edward J. Sweeney & Sons, Inc. v. Texaco, Inc.*, 637 F.2d 105, 111 (3d Cir. 1980)).

COMPLAINT COUNSEL'S REPLY TO BENCO'S POST-TRIAL BRIEF

The record shows that Benco's CEO, Chuck Cohen, communicated repeatedly with the Presidents of its two largest rivals about a policy against discounting to buying groups; that internal company documents regularly referenced Respondents' collective refusal to compete by discounting to buying groups; that Respondents' executives confronted one another with market intelligence of deviations; that they communicated about whether an account qualified as a buying group; and that Benco abided by a no buying group policy at the same time as these competitor communications. These facts are not based on inferences, but on the words of Respondents' executives documented in trial exhibits. Benco does not dispute that these events took place. Instead, Benco asks this Court to ignore the contemporaneous words of its executives and its rivals, based solely on the executives' *ex post* testimony that they did not enter into an unlawful agreement. That is not how the antitrust laws work. Numerous courts have already found that competitors violated the antitrust laws by communicating with their competitors and adhering to a common course of conduct. When confronted with such evidence, courts often find the existence of an unlawful agreement even when defendants' executives deny any such agreement, as Respondents do here. As the Fifth Circuit found, "[w]here such testimony is in conflict with contemporaneous documents we can give it little weight."[7]

To this day, Benco has not explained *why* its top executives communicated directly with its rivals about a policy to refuse to discount to buying groups, *why* Respondents' top executives confronted each other about deviations from that policy, or *why* they conferred with each other about whether an account qualified as a buying group. Benco similarly offered no explanation for *why* it approached Burkhart on *three* separate occasions and invited Burkhart to refuse to discount to buying groups. Complaint Counsel, on the other hand, has adduced testimony admitting to the lack of any legitimate business purpose for these communications. Indeed, rather than offer a procompetitive explanation, Cohen testified that he communicated with his

[7] *Gainesville Utils. Dep't v. Fla. Power & Light Co.*, 573 F.2d 292, 301 n.14 (5th Cir. 1978) (quoting *United States v. U.S. Gypsum Co.*, 333 U.S. 364, 396 (1948)).

competitors to "maintain a *high level of credibility*" and a desire to be "*honest and open*."[8] This is not how businesses in a competitive market operate. Nor can Benco point to a single case that suggests that the antitrust laws permit a naked horizontal agreement untethered to any procompetitive purpose. In the end, Benco's Post-Trial Brief does nothing but expose its lack of any viable defense for its conduct.

I. COMPLAINT COUNSEL'S EVIDENCE ESTABLISHES AN AGREEMENT AMONG RESPONDENTS NOT TO DISCOUNT TO BUYING GROUPS.

Benco misstates the legal standard by arguing that this Court must begin by distinguishing between direct and circumstantial evidence.[9] It is well established that "in Section 1 cases, it is unnecessary for a court to engage in the exercise of distinguishing strong circumstantial evidence of concerted action from direct evidence of concerted action, for both are 'sufficiently unambiguous.'"[10] And where Complaint Counsel's theory is "not implausible," as here, it is "doubly unnecessary" to distinguish between direct and unambiguous circumstantial evidence.[11] More importantly, there is no requirement that conspiracies be proven only by "direct evidence";[12] thus, whether evidence is designated as "direct" or "circumstantial" is irrelevant. Indeed, many cases have found a conspiracy without engaging in the exercise that

[8] CCFF ¶ 1076 (quoting Cohen, Tr. 723) (emphasis added); CCFF ¶ 278 (quoting Cohen, Tr. 553) (emphasis added).

[9] Benco Post-Tr. Br. at 6, 8.

[10] *Petruzzi's IGA Supermkts. v. Darling-Del. Co.*, 998 F.2d 1224, 1233 (3d Cir. 1993) (internal citation omitted).

[11] *Petruzzi's IGA Supermkts.*, 998 F.2d at 1233 (distinguishing between strong circumstantial evidence and direct evidence "is doubly unnecessary because [plaintiff's] theory [of conspiracy] is not implausible").

[12] *Petruzzi's IGA Supermkts.*, 998 F.2d at 1230 ("[P]laintiff in a section 1 case does not have to submit direct evidence . . . but can rely solely on circumstantial evidence and the reasonable inferences drawn from such evidence."). The preponderance of the evidence standard can be met through the use of direct or circumstantial evidence. *See In re Trade Advert. Assocs., Inc., et al. trading as Trade Union News*, Docket No. 8582, 1964 WL 72959, at *4 (FTC May 15, 1964); *In re Wash. Crab Ass'n*, Docket No. 7859, 1964 WL 73029, at *8 (FTC July 10, 1964) (violation of Sherman Act, Section 2, and thus FTC Act, "established by a preponderance of the reliable, probative and substantial evidence and the fair and reasonable inferences drawn therefrom").

Benco proposes.[13] In the end, "'[u]nambiguous evidence of an agreement to fix prices . . . is all the proof a plaintiff needs' to establish a violation of Section 1."[14] That is exactly what Complaint Counsel has put forth in spades.

A. Direct and Unambiguous Evidence Establishes Respondents' Unlawful Agreement.

Benco claims there is no evidence of agreement because none of the competitor communications or documents used the word "agreement," and Benco never explicitly asked its competitors to refrain from taking any action.[15] But "[t]he government . . . is not required to prove a formal, express agreement."[16] Instead, an agreement is found upon a showing of a "unity of purpose or a common design and understanding, or a meeting of minds in an unlawful arrangement,"[17] or evidence that "reasonably tends to prove that the [defendants] . . . 'had a conscious commitment to a common scheme designed to achieve an unlawful objective.'"[18] It is

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[13] *United States v. Foley*, 598 F.2d 1323, 1331-35 (4th Cir. 1979) (finding conspiracy where court's analysis did not distinguish between direct and circumstantial evidence and noting that "[p]roof of a § 1 conspiracy need not be direct"); *Gainesville Utils. Dep't v. Fla. Power & Light Co.*, 573 F.2d 292, 300-03 (5th Cir. 1978) (same); *Esco Corp. v. United States*, 340 F.2d 1000, 1005-08 (9th Cir. 1965) (same); *United States v. Apple Inc.*, 952 F. Supp. 2d 638, 691-94 (S.D.N.Y. 2013), *aff'd*, 791 F.3d 290 (2d Cir. 2015) (analyzing evidence without distinguishing between direct and circumstantial evidence and finding that Apple engaged in a horizontal price-fixing conspiracy).

[14] *Apple*, 952 F. Supp. 2d at 689. Notably, even where a plaintiff relies on ambiguous evidence to prove its claim, the plaintiff does not bear the burden of showing that the existence of a conspiracy is the "sole inference" to be drawn from the evidence. *Apple*, 952 F. Supp. 2d at 690 (citation omitted). "The plaintiff is only required to present evidence that is sufficient to allow the fact-finder 'to infer that the conspiratorial explanation is more likely than not.'" *Apple*, 952 F. Supp. 2d at 690 (internal citation omitted).

[15] Benco Post-Tr. Br. at 2.

[16] *United States v. MMR Corp.*, 907 F.2d 489, 495 (5th Cir. 1990); *see also Gainesville*, 573 F.2d at 300 ("[P]roof of a conspiracy under [Section] 1 of the Sherman Act does not require the existence of an express agreement. It is 'enough that, knowing that concerted action was contemplated and invited, the distributors gave their adherence to the scheme and participated in it."); *Esco*, 340 F.2d at 1006-07 ("Nor are we so naïve as to believe that a formal signed-and-sealed contract or written resolution would conceivably be adopted at a meeting of price-fixing conspirators in this day and age. . . . A knowing wink can mean more than words."); *In re Polyurethane Foam Antitrust Litig.*, 152 F. Supp. 3d 968, 978 (N.D. Ohio 2015) ("No formal agreement is necessary to constitute an unlawful conspiracy. . . . The essential combination or conspiracy in violation of the Sherman Act may be found in a course of dealings or other circumstances as well as in any exchange of words.") (quoting *Am. Tobacco Co. v. United States*, 328 U.S. 781, 809-10 (1946) (alteration in original).

[17] *Copperweld Corp. v. Independence Tube Corp.*, 467 U.S. 752, 771 (1984) (quoting *Am. Tobacco Co. v. United States*, 328 U.S. 781, 810 (1946)).

[18] *Monsanto Co. v. Spray-Rite Serv. Corp.*, 465 U.S. 752, 764 (1984) (quoting *Edward J. Sweeney & Sons, Inc. v. Texaco, Inc.*, 637 F.2d 105, 111 (3d Cir. 1980)).

well established that "proof that the defendants got together and exchanged assurances of common action or otherwise adopted a common plan" constitutes an antitrust agreement.[19] So too is evidence of "[a]cceptance by competitors . . . of an invitation to participate in a plan, the necessary consequence of which, if carried out, is restraint of interstate commerce."[20] Indeed, even without an exchange of assurances, an agreement is shown when a competitor follows conduct "suggested or outlined by a competitor in the presence of other competitors."[21] Further, "assent" to a conspiracy is shown when competitors "either confronted others about cheating on the cartel, or reassured others . . . that they were abiding by the agreement."[22]

The direct and unambiguous evidence shows that Benco engaged in not just one or two of the acts courts have found sufficient to establish an "agreement" that can give rise to antitrust liability. Instead, Benco engaged in *all* of the above conduct to orchestrate an agreement with its two largest competitors, Schein and Patterson, to refuse to do business with buying groups.

1. There is Direct and Unambiguous Evidence of an Agreement.

Benco first argues that there is no direct evidence of an agreement, ignoring all of the direct and unambiguous evidence of an agreement in this case.[23] Uncontroverted documentary evidence shows that when Benco discovered Patterson had partnered with a buying group called New Mexico Dental Coop ("NMDC"), Benco's Chuck Cohen emailed Patterson's Paul Guggenheim on February 8, 2013: "*Just wanted to let you know about some noise I've picked up from New Mexico. FYI: Our policy at Benco is that we do not recognize, work with, or offer discounts to buying groups (though we do work with corporate accounts) and our team understands that policy*."[24] Guggenheim responded, "*Thanks for the heads up. I'll investigate*

[19] *In re Flat Glass Antitrust Litig.*, 385 F.3d 350, 361 (3d Cir. 2004).
[20] *Interstate Circuit v. United States*, 306 U.S. 208, 227 (1939).
[21] *Esco*, 340 F.2d at 1007-08.
[22] *United States v. Beaver*, 515 F.3d 730, 738 (7th Cir. 2008).
[23] Benco Post-Tr. Br. at 6-7.
[24] CCFF ¶ 483 (quoting CX0056 at 001) (emphasis added).

the situation. We feel the same way about these."[25] Cohen and Guggenheim both admitted that, following this communication, they each understood that the other would not discount to buying groups as a matter of "policy."[26] A "policy" is defined as "a definite course or method of action . . . to guide and determine present and future decisions."[27]

As Benco acknowledges, direct evidence includes any "document or conversation explicitly *manifesting the existence of the agreement* in question."[28] But Benco ignores the February 2013 Cohen-Guggenheim exchange, which constitutes direct evidence of an agreement because it manifests the "meeting of the minds" and a "common design and understanding"[29]—not based on an inference, but directly on the words used by Respondents' executives. In addition, the February 2013 communication is direct evidence that Cohen and Guggenheim "got together and exchanged assurances of [the] common action"[30] of refusing to discount to buying groups. Further, courts have held that a memorandum describing the discussions from a competitor meeting constitutes direct evidence of conspiracy.[31] Here, the record includes not just a memorandum describing the exchange of assurances between Benco and Patterson, but the competitor exchange *itself*.

Within days of this exchange, Patterson ended negotiations with the NMDC buying group,[32] and mere weeks later, Patterson implemented a no buying group strategy by instructing its sales representatives not to work with buying groups.[33]

Benco also omits that Guggenheim confronted Cohen four months later upon hearing a rumor that Benco was discounting to a buying group. In June 2013, Patterson received market

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[25] CCFF ¶ 495 (quoting CX0090 at 001) (emphasis added).
[26] CCFF ¶¶ 489-490, 500.
[27] Merriam-Webster Dictionary, https://www.merriam-webster.com/dictionary/policy.
[28] Benco Post-Tr. Br. at 6-7 (citing *In re Ins. Brokerage Antitrust Litig.*, 618 F.3d 300, 324 n.23 (3d Cir. 2010)).
[29] *Copperweld Corp. v. Independence Tube Corp.*, 467 U.S. 752, 771 (1984) (quoting *Am. Tobacco Co. v. United States*, 328 U.S. 781, 810 (1946)).
[30] *In re Flat Glass Antitrust Litig.*, 385 F.3d 350, 361 (3d Cir. 2004).
[31] *Arnold Pontiac-GMC, Inc. v. Budd Baer, Inc.*, 826 F.2d 1335, 1338 (3d Cir. 1987).
[32] CCFF ¶¶ 503-506.
[33] CCFF ¶¶ 630-631; *see also* CCFF ¶¶ 544-547, 549, 589-629, 632-652.

intelligence that Benco was discounting to an entity it believed to be a buying group—Atlantic Dental Care ("ADC").[34] Guggenheim testified that he viewed Benco's arrangement with this buying group as a deviation from Cohen's prior assurance of a no buying group policy.[35] Guggenheim went back to the February 2013 Cohen email and responded to it, asking Cohen to "shed some light" on Benco's business arrangement with ADC and whether Benco would still abide by a no buying group policy.[36] Cohen knew exactly why his competitor was asking these questions—he understood that Guggenheim wanted to know why Benco was doing business with ADC given Cohen's prior assurance of a no buying group policy.[37] In response, Cohen reassured Guggenheim that he was keeping his side of the agreement: "*As we've discussed, we don't recognize buying groups.*"[38] To assure Guggenheim of compliance, Cohen shared confidential and commercially sensitive information to prove that ADC was *not* a buying group, explaining that each of the individual practices of ADC had merged to form a single corporate dental account.[39] And as Cohen and Guggenheim had discussed in the February 2013 email, corporate accounts were fair game for competition.[40] Cohen proceeded to further allay Guggenheim's suspicion that ADC was a buying group by promising to "ensure" that ADC merged its practices to become a corporate account.[41]

"[D]irect evidence of conspiracy . . . removes any ambiguities that might otherwise exist with respect to whether the parallel conduct in question is the result of independent or concerted action."[42] The June 2013 exchange and the executives' testimony do just that—they confirm the existence of a prior agreement, since "assent" to a conspiracy is shown when "the co-conspirators either confronted others about cheating on the cartel, or reassured others . . . that

[34] CCFF ¶¶ 565-566.
[35] CCFF ¶¶ 572.
[36] CCFF ¶¶ 568-570.
[37] CCFF ¶ 573.
[38] CCFF ¶¶ 575 (quoting CX0062 at 001) (emphasis added).
[39] CCFF ¶¶ 574-577; CCFF ¶¶ 1062-1065; *see also* CCFF ¶¶ 580-581.
[40] CCFF ¶ 483 (CX0056 at 001) ("we do work with corporate accounts").
[41] CCFF ¶¶ 575-579.
[42] *In re Ins. Brokerage Antitrust Litig.*, 618 F.3d 300, 324 n.23 (3d Cir. 2010).

they were abiding by the agreement."[43] Following these exchanges, both companies repeatedly and consistently instructed their employees to reject buying groups.[44]

The direct and unambiguous evidence of an agreement is not limited to Benco and Patterson. Following a similar pattern, Benco's Cohen and Schein's President, Tim Sullivan, exchanged similar assurances that neither would work with buying groups. As with Patterson, Cohen admitted that he informed Sullivan that Benco refused to discount to buying groups as a matter of policy.[45] Again, Benco does not account for the direct evidence showing that Benco reached out to Schein to discuss buying groups on no fewer than six occasions.[46] As the Sixth Circuit held, "An agreement . . . may ultimately be proven . . . by direct evidence of communications between the defendants."[47] These communications between Benco and Schein doubtlessly related to buying groups—the evidence in the record consists of text messages

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[43] *United States v. Beaver*, 515 F.3d 730, 738 (7th Cir. 2008); *see also United States v. Foley*, 598 F.2d 1332-33 (4th Cir. 1979) (finding evidence of competitors calling each other about failure to adopt a higher commission as probative of conspiracy to raise commission rate); *United States v. Maloof*, 205 F.3d 819, 830-31 (5th Cir. 2000) (finding that defendant orchestrated an antitrust price-fixing conspiracy by, *inter alia*, informing his competitor when "sales representatives from other companies deviated from the agreed upon pricing"); *United States v. Gravely*, 840 F.2d 1156, 1161 (4th Cir. 1988) ("[T]he efforts of the conspirators to enforce their agreement, by policing and subsequent meetings, is further proof of the conspiracy."); *United States v. FMC Corp.*, 306 F. Supp. 1106, 1150 (E.D. Penn. 1969) (finding persuasive evidence of a conspiracy where "exchanges of assurances continued after the initial [agreement].").

[44] CCFF ¶¶ 416-417, 422-424, 527-528, 540-546, 607-611, 622-625, 630-652.

[45] CCFF ¶¶ 661-664.

[46] CCFF ¶ 679. As discussed in more detail in Complaint Counsel's Post-Trial Brief, pages 29-35, the six communications consist of: (1) a communication during which Cohen informed Sullivan of Benco's no buying group policy (CCFF ¶¶ 662-664); (2) an 11 minute and 34 second call between Cohen and Sullivan on January 13, 2012 (CCFF ¶¶ 968, 955-967, 969-972); (3) an 8 minute and 35 second call between Cohen and Sullivan on March 25, 2013 (CCFF ¶¶ 1028-1037, 1045-1047, 1051); (4) a text message between Cohen and Sullivan on March 27, 2013 (CCFF ¶¶ 1067-1070); (5) a text message between Cohen and Sullivan on March 26, 2013 (CCFF ¶¶ 994-997); and (6) an 18 minute call between Benco's Ryan and Schein's Foley on October 1, 2013 (CCFF ¶¶ 1009-1017). In addition, Cohen planned to send a note in the mail to Sullivan about the buying group Smile Source in July 2012. CCFF ¶¶ 979-992. And Cohen sent Sullivan and Guggenheim an email regarding the TDA buying group in April 2014, after which he spoke with Sullivan on the telephone. CCFF ¶¶ 1133-1135. That is, of course, merely the evidence for which the two companies left a written trail. Cohen and Sullivan spoke on the telephone dozens of other times (CCFF ¶ 351 (56 calls between 2011 and 2015)); attended numerous industry events together (CCFF ¶¶ 355-356); and attended numerous private in-person meetings together during the relevant period (CCFF ¶¶ 357, 381, 383). Moreover, Sullivan exchanged additional communications with Cohen, including written notes and voicemail messages that are not part of the evidentiary record. CCFF ¶ 353. Sullivan testified that he may also have called Cohen from his office land line telephone, the records for which were not produced to Complaint Counsel. CCFF ¶ 354.

[47] *Erie Cnty. v. Morton Salt, Inc.*, 702 F.3d 860, 867–68 (6th Cir. 2012).

explicitly discussing buying groups, witness testimony confirming telephone calls relating to buying groups, and contemporaneous emails memorializing telephone conversations relating to buying groups.[48] Through these communications, Benco gained the understanding that Schein, just like Benco, would adopt a policy against recognizing buying groups.[49] As Cohen testified, he understood that "the policy that Henry Schein had was that they do not recognize GPOs."[50] Consistent with Benco's understanding, Schein adopted a no buying group strategy beginning in late 2011.[51]

Shortly thereafter, Benco began confronting Schein about perceived deviations from a no buying group strategy, further evidencing a prior "meeting of the minds," "unity of purpose," and "common design and understanding." In January 2012, Benco's Director of Sales, Patrick Ryan, forwarded to Cohen field intelligence about Schein working with a buying group, noting that it was specifically "for Timmy conversation," referring to Tim Sullivan of Schein.[52] After receiving this email, Cohen scheduled a call with Schein's Sullivan and responded to Ryan: "Talking this AM."[53] Phone records indisputably show that Cohen did in fact speak to Sullivan for 11 minutes and 34 seconds that morning.[54] A few months later, in July 2012, Ryan again forwarded information to Cohen that Schein was discounting to another buying group, Smile Source, again specifically for the explicit purpose of communicating with Schein's Sullivan: "*Better tell your buddy Tim to knock this shit off.*"[55] Cohen again responded in agreement: "Please resend this e-mail without your comment on top so that *I can print & send to Tim with a*

[48] CCFF ¶¶ 662-664, 955-971, 994-997, 1006-1017, 1028-1037, 1045-1047, 1069-1070, 1133.
[49] CCFF ¶¶ 665-684; *see also* CCFF ¶¶ 527, 1191, 1193.
[50] CCFF ¶¶ 676 (quoting Cohen, Tr. 583-584); *see also* CCFF ¶¶ 675-678. Buying groups are also referred to as group purchasing organizations ("GPOs"), buying clubs, and buying cooperatives (or co-ops) in the dental industry. CCFF ¶¶ 68-71.
[51] CCFF ¶¶ 717-721, 729-731, 733-737, 743-860.
[52] CCFF ¶¶ 956-961.
[53] CCFF ¶¶ 964-967.
[54] CCFF ¶ 968.
[55] CCFF ¶ 982 (quoting CX0018 at 001) (emphasis added); *see also* CCFF ¶¶ 978-981, 983-986.

note."[56] Benco continued to confront Schein when it perceived cheating the following year. In March 2013, Cohen received market intelligence that Schein was offering a 7% discount to a buying group, and Cohen immediately sent the information to Sullivan, noting that it could just be a "rumor" and "thank[ed]" Sullivan.[57] In October of that year, Benco again contacted Schein out of concern that Schein was distributing discounted products to the buying group Smile Source.[58] Benco's brief omits all of this evidence.

None of this evidence makes any sense in the absence of a prior agreement. And Complaint Counsel has adduced admissions that there was no other explanation. As Cohen testified:

> Q. [W]hy were you and Mr. Sullivan discussing buying groups? We've now seen a couple of examples of that. . . .
>
> A. I can't imagine any specific reasons why we were or why we weren't. I suppose it looks like the topic came up in this conversation.[59]

The evidence further shows that Benco contacted Schein for input on whether to bid on the ADC account because Benco was uncertain whether this account qualified as a buying group.[60] When Benco could not determine whether ADC was a buying group, Benco's Cohen created a reminder to "Call Tim Sullivan re: Buying Groups" on March 25, 2013, and then spoke with Sullivan that same day.[61] At trial, Cohen admitted he contacted Sullivan so that Benco would know "how we would handle that account"[62]—a direct admission that Cohen was seeking his *competitor's* input before bidding on an account. Direct evidence is that which "removes any

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[56] CCFF ¶ 990 (quoting CX0018 at 001) (emphasis added). Cohen admitted he was planning to print the email with information about Schein's involvement with a buying group and send it to Sullivan with a note. CCFF ¶¶ 991-992.

[57] CCFF ¶¶ 994-997.

[58] CCFF ¶¶ 1005-1017.

[59] CCFF ¶ 1004; *see also* CX0301 (Cohen, IHT at 287).

[60] CCFF ¶¶ 1022-1037, 1044-1048.

[61] CCFF ¶¶ 1028-1036. Sullivan claims that during this call, he told Cohen they should not discuss ADC, but as discussed in more detail in Complaint Counsel's Reply to Schein Post-Tr. Br. § III.A.1, this claim is contradicted by Cohen's testimony and contemporaneous documents. CCFF ¶¶ 1054-1060.

[62] CCFF ¶ 1037 (quoting Cohen, Tr. 720). Benco's Cohen also communicated with Patterson's Guggenheim about whether ADC was a buying group. CCFF ¶¶ 569-579.

ambiguities . . . with respect to whether the parallel conduct in question is the result of independent or concerted action."[63] Cohen's admission removes any ambiguities that he was acting in concert rather than independently, for "independent" is defined as "*not* looking to others for one's opinions or for guidance in conduct."[64]

Benco fails to mention that on an 8-minute phone call on March 25, 2013, Cohen and Sullivan "exchang[ed] information about whether Atlantic Dental Care was a [] group purchasing organization or a DSO [corporate account]."[65] Sullivan testified that during that call, Cohen "basically said to me that they [Benco] don't plan to, you know, bid on their – this group."[66] After getting the advice of outside legal counsel the next day, however, Benco concluded ADC was a corporate account rather than a buying group.[67] Evidencing a conscious commitment to Schein, Benco's Cohen immediately shared this confidential and privileged information with Sullivan, noting that Benco was "going to bid" because ADC was "not a buying group."[68] Cohen admitted that telling his top competitor that Benco was going to bid on ADC may be viewed as "counter-rational,"[69] but he did so because he did not want Sullivan to think he was "duplicitous in [the] first call" or trying to "head-fake" Schein.[70] Cohen testified that he did so out of an obligation to be truthful to his rival: he wanted to "maintain a *high level of*

[63] *In re Ins. Brokerage Antitrust Litig.*, 618 F.3d 300, 324 n.23 (3d Cir. 2010).

[64] Merriam-Webster Dictionary, https://www.merriam-webster.com/dictionary/independent (emphasis added).

[65] CCFF ¶ 1036.

[66] CCFF ¶ 1038. While Sullivan changed his testimony at trial, his trial testimony confirmed that he and Cohen discussed Atlantic Dental Care. CCFF ¶ 1035 (Sullivan, Tr. 3946).

[67] CCFF ¶¶ 1062-1067.

[68] CCFF ¶¶ 1069 (quoting CX0196 at 010), 1068, 1070. Following Sullivan's receipt of Cohen's March 27, 2013 text message, Sullivan and Cohen tried to reach each other on the telephone several times. On April 3, 2013, they finally connected and spoke for 5 minutes and 36 seconds. CCFF ¶¶ 1079-1080, 1088.

[69] CCFF ¶¶ 1073-1074.

[70] CCFF ¶ 1076. Cohen's testimony that he did not want to "head fake" Sullivan is in stark contrast to the facts of *In re McWane* where the competitors were *trying* to "head fake" their competitors to gain a competitive advantage. *In re McWane Inc.*, Docket No. 9351, 2013 WL 8364918, at *232 (FTC May 1, 2013) (Initial Decision).

credibility," and he wanted his competitor to know he was "*honest*."[71] In a competitive market, rivals do not strive to maintain credibility with their competitors.

Further, Benco omits that there is direct evidence of explicit communications between Respondents about the Texas Dental Association ("TDA") buying group, and whether each would continue to attend the TDA trade show in light of its creation of this buying group. Patterson's VP of Sales, David Misiak, called Schein's VP of Sales, David Steck, to inform him that "Patterson was withdrawing from the [following] TDA meeting."[72] In return, Steck "felt an *obligation* to get back to Mr. Misiak . . . regarding what Schein's plans were" once Schein made a decision.[73] Moreover, Benco's Cohen emailed Schein's Sullivan and Patterson's Guggenheim with an article about the TDA buying group.[74] Following inter-firm communications, all three Respondents withdrew from the next TDA trade show as a result of TDA's creation of a buying group.[75] This unambiguous evidence is yet another manifestation of Respondents' coordination in response to the buying group threat.

The evidence of agreement extends beyond the direct competitor-to-competitor communications about buying groups. Benco does not account for the contemporaneous internal company documents demonstrating that the senior executives of the Big Three were confident that all three would reject buying groups:[76]

- Benco: On February 23, 2013, the final day of an industry conference attended by the Big Three, "*[A]ll of the major dental companies*[77] *have said, 'NO'* [to buying

[71] CCFF ¶ 1076; *see also* CCFF ¶ 1075.

[72] CCFF ¶¶ 1124-1125; *see also* Complaint Counsel's Response to Benco's Proposed Findings of Fact ("CCRF (Benco)") ¶¶ 596-597 (quoting Steck, Tr. 3701).

[73] CCFF ¶¶ 1126, 1129; *see also* CCRF (Benco) ¶¶ 596-597 (quoting Steck, Tr. 3702 (emphasis added)).

[74] CCFF ¶ 1133. Following this email, Sullivan and Cohen spoke on the telephone the same day. CCFF ¶ 1135. Guggenheim made himself a calendar entry task to call Cohen about the TDA Perks letter, and later marked the task 100% complete. CCFF ¶ 1136.

[75] CCFF ¶¶ 1142-1146; *see also* CCRF (Benco) ¶¶ 596-599.

[76] CCFF ¶¶ 1183-1195.

[77] Ryan testified that he was referring specifically to Benco, Schein, and Patterson through his statement "all of the major dental companies." CCFF ¶ 528.

groups], and that's the stance we will continue to take."[78]

- Patterson: "*Confidential and not for discussion . .our 2 largest competitors stay out of [buying groups] as well.*"[79]

- Patterson: "*We don't need GPO's in the dental business. Schein, Benco, and Patterson have always said no. I believe it is our duty to uphold this and protect this great industry.*"[80]

- Benco: "*I already KNOW that Patterson and Schein have said NO* [to buying groups]."[81]

- Benco: "We don't allow [volume discount] pricing unless there is common ownership. *Neither Schein nor Patterson do either*."[82]

- Schein "The good thing here is that *PDCO, Benco and us are on the same page regarding these buying groups*/consortiums."[83]

- Schein: "*Schein, PDCO and Benco all refused to bid* on their business when they entered the *GPO/Buying Group* world."[84]

Benco overlooks this evidence, but such knowledge of a collective refusal[85] constitutes unambiguous evidence of an agreement.[86] Indeed, at least one court identified such evidence as

[78] CCFF ¶ 527 (quoting CX1149 at 002) (emphasis added). The date of this email is notable because it was a mere two weeks after the exchange of assurances between Benco and Patterson, and also the final day of the Chicago Dental Society industry meeting attended by the Big Three. CCFF ¶¶ 518, 527. Guggenheim, Misiak, and Rogan for Patterson; Cohen and Ryan for Benco; and Sullivan for Schein all attended the Chicago Dental Society industry meeting held from February 21, 2013 through February 23, 2013. CCFF ¶¶ 519-526. While Ryan testified that he wrote this based on "what [he] could tell" in the marketplace (Ryan, Tr. 1083), no amount of observation of a competitor's conduct could have confirmed for Ryan that the Big Three would "continue to take" that stand in the future.

[79] CCFF ¶¶ 549, 1187 (quoting CX0093 at 001) (bolded but not italicized in original).

[80] CCFF ¶¶ 603, 1190 (quoting CX0106 at 001) (emphasis added).

[81] CCFF ¶¶ 1191, 425 (quoting CX0012 at 001). Again, Ryan testified that he wrote this based on "experience" that Benco gets approached after Schein and Patterson (Ryan, Tr. 1209-1210), the evidence in the record does not support that explanation. Kois, for example, had discussions with Schein and Benco nearly simultaneously. CCRF (Benco) ¶ 414. NMDC approached Benco before Patterson refused them. CCRF (Benco) ¶ 414. Likewise, Smile Source approached Benco when it was already working with Schein. CCFF ¶¶ 532, 669 (CX1116: "We currently use Henry Schein for our services, but, want to see what sort of relationship could be established with Benco.")).

[82] CCFF ¶ 1193 (quoting CX1185 at 002) (emphasis added).

[83] CCFF ¶¶ 1194, 1138 (quoting CX2106 at 001) (emphasis added).

[84] CCFF ¶¶ 1195, 947 (quoting CX2094 at 001) (emphasis added).

[85] Benco did not reference the majority of these documents in their Post-Trial submissions. As discussed previously, Benco has, at times, claimed that this knowledge of collective refusal came from "market intelligence," *(e.g.*, Ryan, Tr. 1083), but it points to no record of such market intelligence. The pre-conspiracy market intelligence actually indicated the opposite—that Schein and Patterson were working with buying groups. CCFF ¶¶ 533, 665-667, 669-670, 672-673, 682-684.

direct evidence of a conspiracy.[87] In addition, these repeated statements of Respondents' collective refusal were often uttered in the same breath as instructions to its employees not to discount to buying groups, showing that the collective refusal was relevant to Respondents' decision not to do business with buying groups. For example, immediately after Benco's Director of Sales, Patrick Ryan, told the company's sales team that "Benco does not recognize GPOs," he assured them that "all of the major dental companies[88] have said, 'NO' [to buying groups], and that's the stance we will continue to take."[89] Similarly, immediately after Patterson's VP of Sales, David Misiak, instructed his regional manager to say no to a buying group, he told the manager "[c]onfidential and not for discussion . .our 2 largest competitors stay out of these as well."[90]

Further, erasing any doubt of the conspiracy among the Big Three, when the regional distributor, Burkhart Dental, rebuffed Benco's invitation to stop working with buying groups,[91] Benco's Ryan asked Cohen to tell Schein and Patterson to stay the course on their no buying group position, just as Benco was maintaining its policy: "CHUCK---maybe what you should do is make sure you *tell Tim [Sullivan of Schein] and Paul [Guggenheim of Patterson] to hold their positions as we are[.]*"[92] Cohen testified he understood that Ryan was suggesting he "reiterate" Benco's no buying group policy to his competitors,[93] proving that the Benco's understanding of the Big Three's collective refusal to discount to buying groups was based on none other than the competitors' prior exchange of assurances. This email is a further example of direct evidence manifesting Respondents' prior agreement.

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[86] *B&R Supermarket, Inc. v. Visa, Inc.*, No. C 16-01150 WHA, 2016 WL 5725010, at *6 (N.D. Cal. Sept. 30, 2016).

[87] *B&R Supermarket*, 2016 WL 5725010, at *6 (credit card company executive's statement about the conduct of all competitors was "direct evidence of a conspiracy").

[88] Ryan testified that he was referring specifically to Benco, Schein, and Patterson through his statement "all of the major dental companies." CCFF ¶ 528.

[89] CCFF ¶ 527 (quoting CX1149 at 002).

[90] CCFF ¶ 549 (quoting CX0093 at 001).

[91] CCFF ¶¶ 1208-1218, 1240.

[92] CCFF ¶ 1103 (quoting CX0023 at 001) (emphasis added); *see also* CCFF ¶ 1104.

[93] CCFF ¶ 1105.

Finally, Patterson's executive, Neal McFadden, informed a potential customer that the reason Patterson could not engage with buying groups was that, "*[W]e've signed an agreement that we won't work with GPOs.*"[94] While there does not appear to be a *signed* agreement among the Big Three, McFadden's statement explicitly referenced a prior commitment that constrained Patterson's ability to work with buying groups.[95] This statement requires no further inference of collusion and constitutes another piece of direct evidence of agreement.[96]

While Benco argues that there is no evidence of an agreement,[97] numerous precedents have found liability based on considerably less.[98] Furthermore, the direct and unambiguous evidence discussed above is precisely the type of evidence that has led other courts to a find an unlawful agreement.[99] In *Gainesville Utilities Department v. Florida Power & Light Co.*, the Eighth Circuit found an unlawful market division agreement on evidence that the competitors informed each other that they would not serve customers in certain territories.[100] The court found that the "exchange of letters between high executives . . . . points so strongly to the

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[94] CCFF ¶ 657 (quoting CX0164 at 002) (emphasis added).

[95] Any claims that this statement was an innocent lie is contradicted by other contemporaneous evidence. CCFF ¶¶ 658-660. Indeed, where "testimony is in conflict with contemporaneous documents [courts] give it little weight, particularly when the crucial issues involved mixed questions of law and fact." *United States v. U.S. Gypsum Co.*, 333 U.S. 364, 395-96 (1948).

[96] *Toledo Mack Sales & Serv. v. Mack Trucks, Inc.*, 530 F.3d 204, 222 (3d Cir. 2008).

[97] Benco Post-Tr. Br. at 2, 7.

[98] *See e.g.*, *United States v. Maloof*, 205 F.3d 819, 830-31 (5th Cir. 2000) (finding defendant orchestrated an antitrust price-fixing conspiracy by, *inter alia*, informing his competitor when "sales representatives from other companies deviated from the agreed upon pricing"); *United States v. Gravely*, 840 F.2d 1156, 1161 (4th Cir. 1988) ("[T]he efforts of the conspirators to enforce their agreement, by pooling and subsequent meetings, is further proof of the conspiracy."); *In re Plywood Antitrust Litig.*, 655 F.2d 627, 633-34 (5th Cir. 1982) (finding internal memoranda sufficient evidence to find an agreement); *Foley*, 598 F.2d at 1332-33 (finding evidence of competitors calling each other about their failure to adopt a higher commission as probative of conspiracy to raise commission rate); *Standard Oil Co. of Cal. v. Moore*, 251 F.2d 188, 209-12 (9th Cir. 1957) (finding evidence of parallel behavior and communications between defendants concerning practices not at issue in the case probative of an agreement to refuse to serve a customer); *United States v. FMC Corp.*, 306 F. Supp. 1106, 1150 (E.D. Penn. 1969) (finding persuasive evidence of a conspiracy that "[t]hese exchanges of assurances continued after the initial [agreement].").

[99] Although not every piece of evidence described constitutes direct evidence of an agreement, as discussed previously, "in Section 1 cases, it is unnecessary for a court to engage in the exercise of distinguishing strong circumstantial evidence of concerted action from direct evidence of concerted action for both are 'sufficiently unambiguous.'" *Petruzzi's IGA Supermkts. v. Darling-Del. Co.*, 998 F.2d 1224, 1233 (3d Cir. 1993) (citation omitted).

[100] 573 F.2d 292, 299 (5th Cir. 1978).

existence of a conspiracy that 'reasonable men could not arrive at a contrary verdict.'"[101] Here, just as in *Gainesville*, the direct evidence shows that Respondents' senior executives informed each other they would not do business with or discount to buying groups.[102] In *United States v. Foley*, the Fourth Circuit affirmed a *per se* criminal price fixing conviction where one defendant remarked to his competitors that his firm would charge a certain commission rate, and competitors "expressed an intention or gave the impression that his firm would adopt a similar change."[103] The court affirmed an agreement even though the defendant explicitly stated that "he did not care what the others did."[104] The direct evidence in this case shows Respondents behaved in the same way. Further, just as Respondents confronted each other about deviations for a no buying group strategy and assured each other of compliance, in *United States v. Beaver*, the Seventh Circuit upheld a criminal price-fixing conviction in part because competitors "confront[ed] someone whom they believed was cheating" and "reassured others . . . that they were abiding by the agreement."[105]

None of these courts went through the exercise of parsing evidence as either direct or circumstantial, as Benco proposes. Instead, the courts in these, and numerous other cases, looked to the totality of the evidence to find an agreement.[106] Thus, regardless of whether each piece of evidence in the record is labeled "direct" or "circumstantial," the above evidence constitutes unambiguous proof that Respondents entered into an unlawful agreement to refuse to do business with buying groups.

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[101] *Gainesville*, 573 F.2d at 301 (quoting *Boeing Co. v. Shipman*, 411 F.2d 365, 374 (5th Cir. 1969)).

[102] *E.g.*, CCFF ¶¶ 483-488, 495-496, 500, 661-664, 680-681, 958-969, 997, 1011-1017.

[103] 598 F.2d 1323, 1332 (4th Cir. 1979).

[104] *Foley*, 598 F.2d at 1332.

[105] 515 F.3d 730, 738 (7th Cir. 2008).

[106] *Esco Corp. v. United States*, 340 F.2d 1000, 1005-08 (9th Cir. 1965) (finding conspiracy where court's analysis did not distinguish between direct and circumstantial evidence); *United States v. Apple Inc.*, 952 F. Supp. 2d 638, 691-94 (S.D.N.Y. 2013), *aff'd*, 791 F.3d 290 (2d Cir. 2015) (analyzing evidence without distinguishing between direct and circumstantial evidence and finding that Apple engaged in a horizontal price-fixing conspiracy).

2. Witness Denials Are Not Sufficient to Overcome the Overwhelming Unambiguous Evidence of Agreement.

Benco argues that witness testimony denying the existence of a conspiracy is direct evidence of a lack of agreement, citing this Court's decision in *In re McWane, Inc.*[107] But this case is nothing like *McWane*, because here, unlike *McWane*, there is unambiguous evidence establishing that the competitors directly communicated about the subject matter of the conspiracy.[108] After finding an absence of evidence showing an agreement, this Court held in *McWane* that witnesses denying that they discussed the alleged conspiracy or agreed "further weigh[ed] against a finding of an agreement."[109] By contrast, Respondents' executives *admit* that they communicated directly with one another—through private emails and text messages—about a policy against discounting to buying groups.[110] They *admit* that they communicated when they saw deviations from a no buying group policy.[111] They *admit* that they communicated when uncertain whether an account qualified as a buying group.[112] Moreover, Respondents' contemporaneous documents manifest the agreement, expressly reference a joint refusal to discount and acknowledge a "duty to uphold" the collective refusal.[113] In the face of this evidence, witness denials of an agreement are not credible.

Furthermore, whether Respondents entered into an "agreement," as defined by the Sherman Act and relevant case law, is a mixed question of law and fact based on the totality of

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[107] Benco Post-Tr. Br. at 7. Schein and Patterson present the same argument. Schein Post-Tr. Br. at 4; Patterson Post-Tr. Br. at 38-41.

[108] *In re Mcwane, Inc.*, Docket No. 9351, 2013 WL 8364918, at *265 (FTC May 1, 2013) (Initial Decision) ("There is no evidence showing what Mr. Tatman and Mr. Rybacki discussed . . . .").

[109] *McWane*, 2013 WL 8364918, at *267.

[110] CCFF ¶¶ 483-484, 489-490, 495-496, 500, 662-664, 1000-1001, 1004, 1011, 1036-1040. For example, a Schein executive testified: "I received a call from Pat Ryan at Benco Dental . . . he basically was making a statement . . . that they didn't like working with buying groups." CCFF ¶ 1011. Benco's Cohen testified, "Q. You did communicate Benco's no-buying group policy to Mr. Sullivan; correct? A. I believe I did. Yes." CCFF ¶ 662. Benco's Cohen testified: "Q. You've communicated Benco's no-buying group policy to Mr. Guggenheim? A. . . . [Y]es." CCFF ¶ 484. Patterson's Guggenheim testified: "It's fair to say that you viewed Benco's doing business with Atlantic Dental Care as a deviation from what Chuck Cohen had told you before about Benco's policy? A. Yes." CCFF ¶ 572; Guggenheim, Tr. 1628.

[111] CCFF ¶¶ 568-573, 995-997, 999-1004.

[112] CCFF ¶¶ 1022-1037.

[113] CCFF ¶¶ 527, 549, 603, 1103, 1183, 1190-1191, 1193-1195.

the evidence.[114] And because antitrust law "does not require the existence of an express agreement,"[115] witness denials of an agreement are given little weight when contemporaneous documents and other evidence show an agreement.[116] Contemporaneous documents represent the most reliable evidence,[117] in part because witness memories fade over time, as many witnesses' memories faded in this case.[118] Thus, in *Gainesville*, the Fifth Circuit found the existence of a *per se* unlawful agreement based on competitor communications of a refusal to serve certain customers, even though the executives denied the existence of an agreement.[119] The court noted that "where such testimony is in conflict with contemporaneous documents we can give it little weight."[120] The court did the same in *United States v. Capitol Service, Inc.*, which found an unlawful agreement even though the defendants denied the agreement, because it is "not necessary [] that the Government prove an express agreement."[121] Thus, even if the denials of an express agreement are credited, an unlawful conspiracy still exists under the

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[114] *United States v. General Motors Corp.*, 384 U.S. 127, 141 n.16 (1966) ("[T]he ultimate conclusion by the trial judge [of whether] the defendants' conduct . . . constitute[s] a combination or conspiracy in violation of the Sherman Act . . . is not one of 'fact,' but consists rather of the legal standard required to be applied to the undisputed facts of the case."); *Gainesville Utils. Dep't v. Fla. Power & Light Co.*, 573 F.2d 292, 301 n.14 (5th Cir. 1978).

[115] *Gainesville*, 573 F.2d at 300.

[116] *Gainesville*, 573 F.2d at 301 n.14.

[117] *United States v. Gen. Elec. Co.*, 82 F. Supp. 753, 844 (D.N.J. 1949) (The documents in the record "were never intended to meet the eyes of any one but the [executives] themselves, and were, as it were . . . cinematographic photographs of their purposes at the time when they were written. They have, therefore, the highest validity as evidence of intention," and should be afforded greater weight than witness denials of an agreement), *decision supplemented*, 115 F. Supp. 835 (D.N.J. 1953) ("[A]lthough in many instances [the witness] attempted to contradict [documents], his contradiction only served to affect the general credibility of his testimony."); *FTC v. Qualcomm, Inc.*, No. 17-CV-00220, 2019 WL 2206013, at *7 (N.D. Cal. May 21, 2019) ("The Court finds Qualcomm's internal, contemporaneous documents more persuasive than Qualcomm's trial testimony prepared specifically for this antitrust litigation.").

[118] Faded memories appear to plague this case. For example, Ryan testified that he did not remember discussing Smile Source with Foley (Ryan, Tr. 1101), but documentary evidence clearly shows that they did. CCFF ¶ 1014 (Statement of Ryan to his boss: "[Smile Source is] is [v]ery familiar. . . Randy [Foley] at Schein and I talked specifically about them. Buh-bye."); *see also* CCFF ¶¶ 1011, 1017. Additionally, Sullivan testified that he first heard about the Unified Smiles buying group from a message from Cohen, but later backtracked saying he had misremembered. CCRF (Benco) ¶ 564 (citing CX8025 (Sullivan, Dep. at 393 ("Have you ever heard of a group called Unified Smiles? A. Only through a message I got from Chuck")). Sullivan also testified three times at his investigational hearing that Cohen informed him that Benco would not bid on ADC (CCFF ¶¶ 1038-1040), but later changed his testimony again explaining that he had misremembered (CCFF ¶¶ 1041-1043).

[119] *Gainesville*, 573 F.2d at 301 n.14.

[120] *Gainesville*, 573 F.2d at 301 n.14 (citation omitted).

[121] *United States v. Capitol Serv., Inc.*, 568 F. Supp. 134, 144-45 (E.D. Wis. 1983).

antitrust laws if the Court finds Respondents engaged in communications and conduct that shows a "conscious commitment to a common scheme."[122] As the First Circuit found, "[i]t is to be expected that [Respondents'] witnesses would deny that there was an agreement," but that does not offset the "compelling documentary evidence of a planned common course of action or understanding."[123] Indeed, courts have regularly found the existence of an agreement despite the defendants' denials of any agreement.[124]

Additionally, while Benco claims 40 individuals denied the agreement, most of these individuals were not the ones responsible for forming and enforcing the agreement.[125] Aside from the executives who participated in the inter-firm communications about buying groups, or were forwarded such inter-firm communications, or otherwise referenced the Big Three's conspiracy, it is very likely that Respondents' employees who testified at trial or in a deposition

[122] *Monsanto Co. v. Spray-Rite Serv. Corp.*, 465 U.S. 752, 764 (1984) (quoting *Edward J. Sweeney & Sons, Inc. v. Texaco, Inc.*, 637 F.2d 105, 111 (3d Cir. 1980)); *see also Capitol Serv.*, 568 F. Supp. at 145.

[123] *Adver. Specialty Nat'l Ass'n v. FTC*, 238 F.2d 108, 116-17 (1st Cir. 1956) (upholding Commission's findings of an agreement where witnesses denied that an agreement took place and offered a different interpretation of the documentary evidence in the record).

[124] *See, e.g.*, *Gainesville*, 573 F.2d at 301 n.14 ("The officials of the power companies deny the existence of a territorial agreement, but where such testimony is in conflict with contemporaneous documents we can give it little weight.") (internal quotation omitted); *In re High Fructose Corn Syrup Antitrust Litig.*, 295 F.3d 651, 655 (7th Cir. 2002) (overturning summary judgment where plaintiff offered evidence of an agreement and noting that a reasonable trier of fact need not accept testimony "which is self-serving, uncorroborated, implausible [ ], and inconsistent with the overall evidence of conspiracy."); *United States v. Champion Int'l Corp.*, 557 F.2d 1270, 1273 (9th Cir. 1977) (upholding trial court finding of an agreement to eliminate competitive bidding for timber even though defendants asserted that meetings were innocent); *Vitagraph, Inc. v. Perelman*, 95 F.2d 142, 146 (3d Cir. 1936) (upholding the district court's conspiracy finding even though defendants' executive and manager witnesses testified "that there was no conspiracy or concerted action between the defendants"); *United States v. Beachner Constr. Co.*, 555 F. Supp. 1273, 1278-79 (D. Kan. 1983) ("Although witnesses denied any overall agreement or understanding or participation in a single conspiracy, there can be no doubt that bid rigging was a way of life in the industry in Kansas."), *aff'd*, 729 F.2d 1278 (10th Cir. 1984).

[125] Benco claims that Complaint Counsel identified these individuals as having knowledge of the alleged conspiracy. Benco Post-Tr. Br. at 8. Benco is incorrect. Complaint Counsel identified these individuals as having "knowledge of the facts supporting the allegations in Paragraphs 7, 8 and 36 and the finding of the agreement alleged in the Complaint." This includes witnesses with knowledge of any facts that go to the totality of the evidence of conspiracy, including Respondents' dealings with buying groups, motive to conspire, unilateral self-interest, and opportunity to conspire. Complaint Counsel's Response to Joint Proposed Finding ¶ 82 (citing RX2958 at 010-011).

would not have been informed of the agreement.[126] Indeed, it is well established that conspiracies tend to form in secret.[127] Thus, the testimony of the victims of the conspiracy—buying groups—and employees who were not informed about the agreement, is not evidence of the lack of a conspiracy. Certainly, the Court does not need to find these witnesses are lying in order to find a conspiracy—denials of an agreement from witnesses without knowledge of the agreement are irrelevant.

B. Additional Circumstantial Evidence Shows There Was an Agreement.

Benco likewise claims that Complaint Counsel failed to introduce any "circumstantial evidence"[128] of an agreement suggesting that the inter-firm communications among competitors regarding buying groups, and internal company documents evidencing coordination, constitute *neither* direct evidence *nor* circumstantial evidence of an agreement.[129] This simply ignores the majority of the record in this case.

Benco's effort to address what it characterizes as Complaint Counsel's circumstantial evidence, depends on three inapposite legal standards. The Court should reject each of Benco's suggestions, which are: (1) Respondents' collective refusal to do business with buying groups may be the result of oligopolistic interdependence (or conscious parallelism) rather than collusion; (2) *Matsushita* limits the range of permissible inferences in this case; and (3) Complaint Counsel must prove its case by applying the *Williamson Oil* test. None of these standards apply to this case.

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[126] The conspirators (Cohen, Sullivan, and Guggenheim) of course had knowledge of the agreement. *E.g.*, CCFF ¶¶ 483-484, 495-496, 570, 572, 575-577, 661-680, 958-972, 980-992, 996-997, 1029-1036, 1068-1069. There is also evidence that some individuals had knowledge of some of the underlying conduct that is the basis of the conspiracy. For example, Benco's Ryan (CCFF ¶¶ 958, 982, 527, 1191, 1193), Patterson's Misiak, Rogan, and McFadden (CCFF ¶¶ 491, 549, 1188, 1190, 657), and Schein's Foley (CCFF ¶¶ 1009-1017, 1194, 1195).

[127] *United States v. Apple Inc.*, 952 F. Supp. 2d 638, 689 (S.D.N.Y. 2013), *aff'd*, 791 F.3d 290 (2d Cir. 2015); *see also In re McWane*, Docket No. 9351, 2013 WL 8364918, at *258 (FTC May 1, 2013) (Initial Decision) ("[I]t is unlikely that the existence of any unlawful agreement . . . would be known below the executive level.").

[128] Benco Post-Tr. Br. at 8-23.

[129] *See* Benco Post-Tr. Br. at 6-23 (discussing the direct and circumstantial evidence in the case).

1. This is Not a Case of Oligopolistic Interdependence.

Benco argues that because Respondents operate in an oligopolistic market—in which the three of them collectively control more than 80% of the market[130]—collusion (which is illegal) may look the same as oligopolistic interdependence (which is legal).[131] But this is *not* a case where the Big Three reached a non-competitive state by sitting back and watching each other.[132] They communicated with each other about a refusal to discount to buying groups, as Complaint Counsel has shown through direct evidence. This fact definitively removes this case from oligopolistic interdependence. In *In re Text Messaging Antitrust Litigation*, a case cited by Benco, the Seventh Circuit explained lawful interdependence as follows: "If any of these reflections [to follow the industry leader] persuaded the other firms—***without any communication with the leader***—to raise their prices, there would be no conspiracy, but merely tacit collusion [or "conscious parallelism"]."[133] Indeed, the whole theory underlying oligopolistic interdependence is that inter-firm communications are not required for the oligopolists to act in parallel.[134] Here, the record contains the key evidence missing in the oligopolistic interdependence cases cited by Benco—competitor communications on the subject matter of the agreement. For example, *Valspar Corp. v. E.I. Du Pont De Nemours & Co.* is a conscious parallelism case in which the plaintiff relied solely on parallel behavior and

[130] CCFF ¶¶ 1458 (citing CX2742 at 032), 1450, 1455-1457.

[131] Benco Post-Tr. Br. at 8-9.

[132] Complaint Counsel's Response to Schein's Proposed Findings of Fact ("CCRF (Schein)") ¶¶ 1670-1674.

[133] *In re Text Messaging Antitrust Litig.*, 782 F.3d 867, 875 (7th Cir. 2015) (emphasis added). Benco also claims that this case stands for the proposition that internal discussions about what other competitors might be doing does not give rise to an inference of agreement. Benco Post-Tr. Br. at 9. The case holds nothing of the sort. Instead, the case simply states that, where the internal documents are literally discussing "follow[ing] the leader," that is not evidence of collusion. *Text Messaging*, 782 F.3d at 874-75. In short, the case stands for the unremarkable proposition that if internal documents reflect only oligopolistic interdependence, they are not evidence of collusion.

[134] *See Valspar Corp. v. EI Du Pont De Nemours and Co.*, 873 F.3d 185, 191 (3d Cir. 2017).

opportunity to collude evidence;[135] by contrast, there are *fifteen* instances of competitor communications about the subject matter of the conspiracy in this case.[136]

Moreover, the suggestion that each firm's refusal to discount to buying groups resulted from interdependence rather than an agreement is undermined by the fact that Schein began discounting to buying groups before entering into an agreement with Benco;[137] Patterson was close to finalizing a buying group arrangement before joining the agreement;[138] and all three firms realized it was in their self-interest to discount to buying groups after the conspiracy unraveled.[139] Indeed, Schein's Post-Trial Brief argues that it began discounting to buying groups in 2008 or earlier.[140] And Patterson concedes that all three Respondents are today doing business with buying groups.[141] Thus, the evidence conclusively shows that absent a conspiracy, Respondents would and now *do* discount to buying groups.[142]

2. *Matsushita* Does Not Apply Here, and in Any Event is Easily Satisfied.

Benco also argues that *Matsushita* limits the permissible inferences that may be drawn from Complaint Counsel's circumstantial evidence and requires that such evidence "must tend to

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[135] *Valspar*, 873 F.3d at 199 ("Valspar's argument essentially begins and ends with opportunity . . . . [t]here is no evidence that there was any discussion of prices during these meetings")). The other cases that Benco cites to argue oligopolistic interdependence, *Text Messaging* and *McWane*, are equally inapposite because they are also parallel conduct cases with no direct and unambiguous competitor communications about the subject matter of alleged conspiracy. *Text Messaging*, 782 F.3d at 878; *In re McWane*, Docket No. 9351, 2013 WL 8364918, at *253-54 (FTC May 1, 2013) (Initial Decision). *Anderson News* is also distinguishable because that case addressed efficiency-enhancing communications for which the defendants identified legitimate procompetitive justifications; thus, the meeting of the minds in that case, unlike here, was not to engage in an anticompetitive activity. *Anderson News L.L.C. v. Am. Media, Inc.*, 899 F.3d 87, 104-05 (2d Cir. 2018).

[136] *See supra* note 1.

[137] CCFF ¶¶ 432-453.

[138] CCFF ¶¶ 454-473.

[139] CCFF ¶¶ 1316-1387.

[140] Schein Post-Tr. Br. at 24 (doing business with Smile Source since 2008).

[141] Patterson Post-Tr. Br. at 62 ("The record likewise shows that Patterson, Schein, and Benco today work with buying groups.").

[142] Indeed, Patterson argues in its Post-Trial Brief that Respondents competed vigorously for the business of independent dentists and DSOs (Patterson Post-Tr. Br. at 10-15) which further undermines any notion that the lack of competition between Respondents for buying groups was based on oligopolistic interdependence. *See Petruzzi's IGA Supermkts. v. Darling-Del. Co.*, 998 F.2d 1224, 1244-46 (3d Cir. 1993) (rejecting defendants' oligopolistic interdependence argument for collective refusal to bid on each other's accounts where defendants' did not *also* refuse to bid for new accounts).

rule out the possibility of independent action."[143] This standard is easily satisfied here because Respondents' communicated directly about a refusal to do business with buying groups, which "rule[s] out the possibility of independent conduct." Indeed, liberal inferences of the circumstantial evidence are unnecessary in this case, as the most straightforward—and sometimes the *only*—reading of the evidence, consistent with the totality of the record, tends to exclude the possibility of independent conduct. Furthermore, the cautions of *Matsushita* have no application to this case because "the challenged activities could not reasonably be perceived as procompetitive."[144]

3. Complaint Counsel Does Not Need to Prove its Case By Applying the *Williamson Oil* Test.

Benco argues that absent direct evidence, the only way for Complaint Counsel to prevail is to meet the test articulated in *Williamson Oil Co. v. Philip Morris USA* (the "*Williamson Oil* test"), under which plaintiff must first prove parallel conduct and then plus factors to prevail.[145] As shown above, Complaint Counsel *has* adduced direct evidence of an unlawful agreement.[146] But even if the Court were to find that the evidence falls short of "direct evidence," this does not mean, as Benco claims, that the mountain of evidence described above vanishes and Complaint Counsel must resort to parallel conduct and plus factors to prove its case. "Parallel pricing is

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[143] Benco Post-Tr. Br. at 8 (citing *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 588 (1986).

[144] *In re Flat Glass Antitrust Litig.*, 385 F.3d 350, 358 (3d Cir. 2004) (citing *Petruzzi's IGA Supermkts.*, 998 F.2d at 1232); *accord In re Publ'n Paper Antitrust Litig.*, 690 F.3d 51, 63 (2d Cir. 2012) ("By contrast, broader inferences are permitted, and the 'tends to exclude' standard is more easily satisfied, when the conspiracy is economically sensible for the alleged conspirators to undertake and the 'challenged activities could not reasonably be perceived as procompetitive.'"). Further, the cautions of *Matsushita* do not apply where, as here, there is direct evidence of a conspiracy. *In re Publ'n Papers Antitrust Litig.*, 690 F.3d 51, 63 (2d Cir. 2012); *accord Toledo Mack Sales & Serv. v. Mack Trucks, Inc.*, 530 F.3d 204, 220 n.10 (3d Cir. 2008) ("[I]n direct evidence cases, the plaintiff need not adduce circumstantial evidence that tends to exclude the possibility that the alleged conspirators acted independently, and there need not be an inquiry into the plausibility of defendants' claim or the rationality of defendants' economic motives. This is because when the plaintiff has put forth direct evidence of conspiracy, the fact finder is not required to make inferences to establish facts, and therefore the Supreme Court's concerns over the reasonableness of inferences in antitrust cases evaporate.") (citation omitted); *see also* Complaint Counsel's Response to Joint Proposed Conclusions of Law ¶¶ 27-29.

[145] Benco Post-Tr. Br. at 9.

[146] *See supra* Section I.A ("Direct and Unambiguous Evidence Establishes Respondents' Unlawful Agreement"); *see also, e.g.*, CCFF ¶¶ 483, 495, 570, 575-576, 1103, 657.

merely 'one such form of circumstantial evidence.'"[147] Because parallel conduct standing alone falls short of establishing agreement,[148] plaintiffs pursuing this theory must also show plus factors.[149]

Where, as here, plaintiff's case is not centered on parallel conduct as the starting point, the *Williamson Oil* test has no application: the test only "applies to plaintiffs who 'rel[y] on *circumstantial evidence of conscious parallelism* to prove a § 1 claim.'"[150] In *Williamson Oil*, where plaintiff's price fixing case was premised on defendant's parallel movement in prices,[151] the court "fashioned a test under which price fixing plaintiffs must demonstrate the existence of 'plus factors' that remove their evidence from the realm of equipoise and render that evidence more probative of conspiracy than of conscious parallelism."[152] Of course, it is tautological that if a plaintiffs' theory of the case is based upon parallel conduct, then the plaintiff must first show parallel conduct.[153] As the court recognized in *Fleischman*, "Defendants cite to no case law that stands for the requirement that, to prevail, Plaintiffs must prove parallel pricing if they are not relying on conscious parallelism."[154] Indeed, courts have held that "Plaintiffs need *not* prove parallel pricing in order to prevail on per-se claim based on circumstantial evidence."[155] Nor are plaintiffs required to put forth plus factors to prevail, if the case is not premised on parallel conduct. "Courts devised the requirement of 'plus factors' in the context of offers of proof of an agreement that rest on parallel conduct."[156]

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[147] *Fleischman v. Albany Med. Ctr.*, 728 F. Supp. 2d 130, 158 (N.D.N.Y. 2010).
[148] *Fleischman*, 728 F. Supp. 2d at 158.
[149] *Williamson Oil Co. v. Philip Morris USA*, 346 F.3d 1287, 1301 (11th Cir. 2003).
[150] *Cason-Merenda v. Detroit Med. Ctr.*, 862 F. Supp. 2d 603, 627 (E.D. Mich. 2012) (citation omitted) (emphasis added).
[151] 346 F.3d 1287, 1294 (11th Cir. 2003).
[152] 346 F.3d 1287, 1301 (11th Cir. 2003).
[153] *Cason-Merenda v. Detroit Med. Ctr.*, 862 F. Supp. 2d 603, 627 (E.D. Mich. 2012); *Fleischman*, 728 F. Supp. 2d at 158.
[154] *Fleischman*, 728 F. Supp. 2d at 158.
[155] *Fleischman*, 728 F. Supp. 2d at 158 (emphasis added); *see also Interstate Circuit, Inc. v. United States*, 306 U.S. 208, 227 (1939) ("It is elementary that an unlawful conspiracy may be and often is formed without simultaneous action or agreement on the part of the conspirators.").
[156] *In re Ins. Brokerage Antitrust Litig.*, 618 F.3d 300, 324 n.23 (3d Cir. 2010).

Far from asking the Court to infer an agreement from parallel conduct (as in *Williamson Oil*), the record here contains direct evidence of competitor communications about a refusal to discount, contemporaneous documents recognizing a collective refusal to discount, internal documents evidencing a conscious commitment to that collective refusal, and direct evidence of communications about deviations from the collective refusal. Thus, the *Williamson Oil* test is not applicable to this case.

Nonetheless, the record in this case shows Respondents did act in parallel to carry out the agreement. And the record shows that plus factors further help support a finding of agreement.

4. The Evidence Shows Respondents Acted in Parallel to Carry Out the Agreement.

Benco claims there is no parallel conduct among the three Respondents, but even its co-respondent, Schein, concedes that at a minimum Benco and Patterson acted in parallel.[157] Schein admits that "Benco had a policy against doing business with buying groups, and systematically said no to each one" and "Patterson followed a practice of declining business with buying groups," and "summarily rejected many groups based on the fact that they were buying groups."[158] The only question that remains, then, is whether Schein also refused to do business with buying groups between 2011 and 2015. As detailed in Section II.A.1 below of Complaint Counsel's Reply to Schein's Post-Trial Brief, the record is replete with contemporaneous documents showing that Schein began implementing a no buying group strategy in 2011, continuing through 2015.[159]

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[157] Schein Post-Tr. Br. at 88. According to Schein, "Neither Benco nor Patterson made sales to buying groups during the alleged conspiracy." Schein Post-Tr. Br. at 88.

[158] Schein Post-Tr. Br. at 88; Schein Proposed Finding of Fact ("SF") ¶ 349.

[159] *See also* Complaint Counsel's Post-Tr. Br. at 26-29; Attachment C to Complaint Counsel's Post-Trial Brief. Benco attempts to argue that Schein worked with certain buying groups during the conspiracy (Benco Post-Tr. Br. at 11-14), but the contemporaneous documents show that Schein categorically rejected buying groups during the conspiracy as explained in Complaint Counsel's Reply to Schein Post-Tr. Br. § II.A.1 ("Schein's Contemporaneous Documents Show that During the Conspiracy Period Sullivan Began to Instruct Schein's Salesforce to Categorically Reject Buying Groups").

a. Respondents Instructed Their Sales Teams Not to Discount to Buying Groups.

The long record of evidence illustrates that Respondents acted in parallel to refuse to do business with buying groups by instructing their sales teams not to discount to buying groups:[160]

- Benco – September 11, 2011, Benco's SW/SE Director of Sales Mark Rowe to a field sales consultant ("FSC"): "Chuck has always been extremely opposed to any hint of a buying group."[161]

- Benco – November 7, 2011, Benco's McElaney to FSC Robert Kelly: "I spoke with Chuck over the weekend and he tells [me] this is a buying group which he opposes."[162]

- Schein – December 7, 2011, Schein's Sullivan to Steck and other employees: Schein did "NOT want to lead in getting [buying groups] started in dental."[163]

- Schein – December 22, 2011, Schein's Sullivan to Cavaretta, Steck, and Chatham: Sullivan did not want to "be the first company to open the floodgates to the dangerous world of GPOs."[164]

- Schein – December 21, 2011, Schein's Foley rejected buying group Unified Smiles, stating, "[U]nless you have some 'ownership' of your practices Henry Schein considers your business model as a Buying Group, and we no longer participate in Buying Groups."[165]

- Schein – January 26, 2012, Schein's Cavaretta wrote to sales representatives, "It is dangerously close but I told him we would not do business with a GPO."[166]

- Schein – February 20, 2012, Schein's Foley wrote to his direct report, Debbie Torgersen-Foster, "Honestly, within Schein we have a few buying groups (BG) that we wish we didn't have . . . So, this is a corporate decision, not to participate in

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[160] Benco spends much of its argument on parallel conduct misrepresenting Dr. Marshall's opinions. Benco Post-Tr. Br. at 12-14. Dr. Marshall does not assume parallel conduct on the part of Respondents. CCRF (Benco) ¶¶ 822-823. In any event, Complaint Counsel is not relying on Dr. Marshall to establish parallel conduct and instead, proved this through fact witnesses and contemporaneous documents at trial as described in this section and in Complaint Counsel's Post-Trial Brief at 15-16, 23-29. While Benco attempts to rely on Schein's expert, Dr. Carlton, for support, as described below in Complaint Counsel's Reply to Schein Post-Tr. Br. § II.D.1, Dr. Carlton's opinions regarding parallel conduct are fundamentally flawed.

[161] CCFF ¶ 401 (quoting CX1040 at 001).

[162] CCFF ¶ 401 (quoting CX1048 at 001).

[163] CCFF ¶ 709 (quoting CX2456 at 001).

[164] CCFF ¶ 713 (quoting CX2458 at 001).

[165] CCFF ¶ 719 (quoting CX2062 at 001).

[166] CCFF ¶ 750 (quoting CX0168 at 001).

these."[167]

- Schein – February 2, 2012, Schein's Sullivan asked his employees Steck, Foley, and others "what we can do to KILL the buying group model!!"[168]

- Schein – June 8, 2012, Schein's Hight wrote to her boss, Foley and Titus: "I explained that we do not accommodate GPOs . . . ."[169]

- Benco – July 9, 2012, Benco's Ryan email to Regional Managers reminding them what constitutes one customer for purposes of doing business with Benco, and adding, "If you aren't sure why buying groups/clubs are bad, call me."[170]

- Schein – July 17, 2012, Schein's Meadows to FSC Patty Delikat discussing a prior decision to work with a buying group: "I have to tell you Ron and Dan made a decision that is against what Tim Sullivan has directed us to do in regards to supporting Buying groups." [171]

- Benco – February 8, 2013, Benco's Cohen to Patterson's Guggenheim: "Our policy at Benco is that we do not recognize, work with, or offer discounts to buying groups . . . and our team understands that policy."[172]

- Patterson – February 27, 2013, Patterson's Misiak to a Regional Manager: "*Confidential and not for discussion . .our 2 largest competitors stay out of these as well. If you hear differently and have specific proof please send that to me.*"[173]

- Patterson – February 27, 2013, Patterson's Misiak to Guggenheim: "I've coached [Regional Manager Fruehauf] on how to stay out of this [buying group] with grace."[174]

- Benco – March 7, 2013, Benco's Ryan to Territory Manager and another employee: "Benco does not recognize 'buying groups.' Cannot open this account."[175]

- Benco – March 21, 2013, Benco's Ryan to an FSC: "We absolutely positively do NOT participate in GPOs. No if ands or buts."[176]

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[167] CCFF ¶ 754 (quoting CX0238 at 001).
[168] CCFF ¶ 729 (quoting CX0199 at 001). Sullivan claimed that he meant to write "KILL [their] buying group model," referring to the buying group Smile Source. (Sullivan, Tr. 4146.)
[169] CCFF ¶ 771 (quoting CX2423 at 004).
[170] CCFF ¶ 399 (quoting CX1146 at 001).
[171] CCFF ¶ 773 (quoting CX0170 at 001).
[172] CCFF ¶ 399 (quoting CX0090 at 001).
[173] CCFF ¶ 1187 (quoting CX0093 at 001) (bolded in original but not italicized).
[174] CCFF ¶ 1188 (quoting CX0092 at 001).
[175] CCFF ¶ 416 (quoting CX 1199 at 001).
[176] CCFF ¶ 417 (quoting CX1238 at 001).

- Schein – May 29, 2013, Schein's Cavaretta wrote to two Schein employees, "We try to avoid buying groups at all costs and therefore don't really recognize them."[177]

- Patterson – August 4, 2013, Patterson's Rogan to McFadden: "We don't need GPO's in the dental business. Schein, Benco, and Patterson have always said no. I believe it is our duty to uphold this and protect this great industry."[178]

- Patterson – September 3, 2013, Patterson's Misiak to CEO Scott Anderson and Guggenheim, describing the guidance he gave to Patterson sales representatives: "We have said no at every turn. . . . My guidance has been to politely say no [to buying groups] and w[ea]ther the storm with these."[179]

- Patterson – September 4, 2013, Patterson's McFadden in a memo to Patterson regional and branch managers, defining Special Markets to work with large buying groups, but "[t]his definition will not include group purchasing organizations (GPOs)." [180]

- Benco – September 21, 2013, Benco's Regional Manager Don Taylor to a vendor: "Chuck Cohen is adamantly against buying groups. He will not let us participate because he doesn't think everyone should get the same price. It's one of the only times I have seen him really get fired up."[181]

- Patterson – November 20, 2013, Patterson's Rogan to Patterson's Manager of Marketing Communications, Jennifer Hannon: "We don't sell to buying groups. Let's talk live."[182]

- Patterson – December 2, 2013, Patterson's McFadden to Patterson Account Specialist Shelly Beckler: "[A]s of now we are not working with GPOs."[183]

- Schein – December 20 2013, Schein's Foley told his counterpart at Colgate, one of Schein's manufacturer partners: "It's a buying group that we do not participate with, as with all buying groups."[184]

- Patterson – April 23, 2014, Patterson's Guggenheim to McFadden: "Typical approach of an upstart buying group. We pass on these as a matter of protecting our business model."[185]

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[177] CCFF ¶ 785 (quoting CX2509 at 001).
[178] CCFF ¶ 603 (quoting CX0106 at 001).
[179] CCFF ¶ 607 (quoting CX3116 at 001).
[180] CCFF ¶ 611 (quoting CX0158 at 002).
[181] CCFF ¶ 401 (quoting CX1234 at 001).
[182] CCFF ¶ 632 (quoting CX3168 at 001).
[183] CCFF ¶ 634 (quoting CX3010 at 001).
[184] CCFF ¶ 788 (quoting CX2073 at 001).
[185] CCFF ¶ 646 (quoting CX3080 at 001).

- Patterson – April 23, 2014, Patterson's McFadden to a Patterson branch manager: "[A]s of this moment I am sure we should pass on these [buying] groups."[186]

- Patterson – May 19, 2014, Patterson's McFadden to a Patterson Special Markets specialist: "For now – I am electing to not participate with these [buying] groups – we have said no to several already."[187]

- Benco – May 20, 2014, Benco's Cohen microblog to the Benco senior team: "Models Benco does NOT currently recognize as a single customer…1. A group of offices under management contract to a single entity, but the management group has no ownership whatsoever of anything in and of the offices. . . . 2. Any kind of GPO whether they provide additional services or not."[188]

- Benco – July 8, 2014, Benco's Ryan to Director of National Accounts, in response to a GPO request: "Be polite but tell them we don't participate."[189]

- Schein – July 16-17, 2014, Schein's Titus to Brady and Showgren: "Tim [Sullivan] was not in favor of" a buying group agreement.[190] "It went to Tim and he shot it down. I think the meta msg is officially, GPO's are not good for Schein."[191]

- Schein – July 18, 2014, Schein Zone Manager Kevin Upchurch to Cavaretta: "[F]rom Tim S, HSD does not want to enter the GPO world."[192]

- Benco – August 7, 2014, Benco's Director of Sales for the West, Brian Evans to FSC: "The Schulman Group is a buying group (of sorts) and we don't participate in that business."[193]

- Benco – August 7, 2014, Benco's Ryan to Evans: "Buying group. Don't put anything in front of them."[194]

- Schein – September 8, 2014, Schein's Sullivan to Muller and his boss, Breslawski: "I still believe [buying groups are a] slippery slope . . . and don't plan to take the lead role."[195]

- Schein – October 8, 2014, a Schein regional manager wrote to Titus: "I recently had a conversation with Kathleen regarding this group and they are nothing more than a

[186] CCFF ¶ 622 (quoting CX3016 at 001).
[187] CCFF ¶ 623 (quoting CX3004 at 001).
[188] CCFF ¶ 396 (quoting CX1372 at 002).
[189] CCFF ¶ 423 (quoting CX1205 at 001).
[190] CCFF ¶ 795 (quoting CX2219 at 001).
[191] CCFF ¶ 799 (quoting CX2235 at 001).
[192] CCFF ¶ 806 (quoting CX2211 at 002).
[193] CCFF ¶ 424 (quoting CX1206 at 001).
[194] CCFF ¶ 424 (quoting CX 1207 at 001).
[195] CCFF ¶ 809 (quoting CX2469 at 002).

GPO. It is my understanding that this violates our policy as we do not engage with GPOs."[196]

- Patterson – October 23, 2014, Patterson's McFadden wrote to another Patterson branch manager: "As a rule we are trying our best to steer clear of all buying groups."[197]

- Schein – November 5, 2014, Schein's Meadows wrote to a regional manager: "We do not currently participate with GPOs . . . ."[198]

- Schein – December 2014, Schein's Sullivan to Cavaretta, "The Dec 'offsite' last year I left with a goal to see if we could get Hal [Muller] to shut [Dental Gator] down . . . ."[199]

- Patterson – January 14, 2015, Patterson's McFadden to yet another Patterson's regional manager: "[D]oes he own all these offices—if not then he is a GPO—we don't deal with GPOs."[200]

- Patterson – July 26, 2015, Patterson territory manager Bill Neal to McFadden: "I want to make sure that GPO's are not something we as a company are choosing to partner with at this point. I know Dave [Misiak] has been clear about this in the past and I wanted to verify that this still is the case."[201]

- Schein – November 3, 2015, Schein's Meadows to Cavaretta: "[Tim Sullivan] was going off about how we do not have any buying group agreements and that we will not do them. Soap boxing about HSD and buying groups." [202]

While this list is not exhaustive, it more than evidences parallel conduct among Respondents issuing directives not to discount to buying groups. Pursuant to these directives, Respondents rejected numerous buying groups.[203]

[196] CCFF ¶ 812 (quoting CX0260 at 002).
[197] CCFF ¶ 650 (quoting CX3128 at 001).
[198] CCFF ¶ 828 (quoting CX2358 at 001).
[199] CCFF ¶ 836 (quoting CX0246 at 001). Dental Gator was a buying group created by one of Schein's largest DSO customers, even though Schein's contract with the DSO prohibited the latter from forming a buying group. CCFF ¶¶ 1769-1783.
[200] CCFF ¶ 648 (quoting CX3045 at 001).
[201] CCFF ¶ 635 (quoting CX3342 at 001).
[202] CCFF ¶ 850 (quoting CX0176 at 001).
[203] CCFF ¶¶ 404-425, 621-624, 637-652, 925-954.

b. Benco's Attempt to Re-Label its No Buying Group Policy as a No "Middleman" Policy is Irrelevant and Futile in Light of the Record.

Benco acknowledges that it followed its "longstanding policy . . . not to deal with buying groups" during the conspiracy.[204] But Benco now attempts to escape antitrust liability by calling it a "no middleman" policy.[205] Whether labeled as a "no middleman" policy or a "no buying group" policy, all parties agree that Benco instructed its sales team that Benco would not discount to buying groups as a matter of policy.

Benco's claim that its policy was a "no middleman" policy rather than a "no buying group" policy is nothing more than a *post-hoc* made-for-litigation tactic to confuse the issues. Benco does not cite a single document where it referred to the policy as a "no middleman" policy.[206] Instead, contemporaneous Benco documents are replete with references to its no buying group policy:

- "Our policy at Benco is that we do not recognize, work with, or offer discounts to buying groups."[207]
- "Benco does NOT currently recognize . . . [a]ny kind of GPO whether they provide additional services or not."[208]
- "[W]e don't offer discounts to buying groups or similar groups of dentists."[209]
- "We do not participate in buying groups. Ever."[210]
- "Benco doesn't recognize GPOs as a single customer."[211]
- "Benco does not participate in group purchasing organizations."[212]

[204] Benco Post-Tr. Br. at 10.
[205] Benco Post-Tr. Br. at 3-4.
[206] *See* Benco Proposed Finding of Fact ("BFF") ¶¶ 166-189 (citing one document, RX1143, which makes no mention of a no middleman policy). Rather, Benco's internal documents consistently refer to a no buying group policy. CCFF ¶¶ 396, 399, 404-406, 410, 416, 419.
[207] CCFF ¶ 399 (quoting CX0090 at 001).
[208] CCFF ¶ 396 (quoting CX1372 at 002).
[209] CCFF ¶ 404 (quoting CX1120 at 001).
[210] CCFF ¶ 406 (quoting CX1242 at 001).
[211] CCFF ¶ 410 (quoting CX1219 at 002).
[212] CCFF ¶ 410 (quoting CX1138 at 001).

- "Benco does not recognize 'buying groups'"[213]
- "Benco has a firm policy of non recognition of GPOs as a single customer."[214]

Likewise during discovery, Benco witnesses referred to a policy of not working with buying groups: "Our no buying group policy has been very consistent since 1996;"[215] "We have a policy that we don't do business – we don't recognize dental buying groups."[216] Similarly, during trial, Benco employees referred to a no buying group policy.[217] The evidence is clear: throughout the conspiracy period, Benco instructed its employees to refuse to discount to buying groups.[218]

5. Further Circumstantial Evidence Shows the Existence of an Agreement.

While Benco claims that Complaint Counsel failed to introduce "circumstantial evidence,"[219] Complaint Counsel introduced "plus factor" evidence, in addition to the direct and unambiguous evidence discussed previously, that tends to prove Respondents agreed not to discount to buying groups.[220] Complaint Counsel introduced evidence establishing that Respondents acted against their unilateral self-interest and changed their conduct, as discussed *infra* Sections I.B.8 ("Complaint Counsel Established Respondents' Change in Conduct") and I.D.2 ("The Factual Record Shows That Benco Acted Against Its Self-Interest"). This evidence

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[213] CCFF ¶ 416 (quoting CX1199 at 001).

[214] CCFF ¶ 419 (quoting CX1226 at 001).

[215] CCRF (Benco) ¶ 166 (CX8015 (Cohen, Dep. at 341)).

[216] CCRF (Benco) ¶ 166 (CX8015 (Cohen, Dep. at 243)).

[217] CCFF ¶¶ 395, 484, 662; *see also* CCRF (Benco) ¶ 166 (Cohen, Tr. 870 (Benco counsel: "Q. . . .And that was consistent with your no-buying group policy? A: Yes.")); CCFF ¶ 399 (citing Ryan, Tr. 1032 ("And is it right that the no-buying group policy was communicated up and down the company? A. Yes.")); CCRF (Benco) ¶ 166 (Ryan, Tr. 1027 ("Q. Benco has had a policy of not selling to buying groups; right? A. Yes.")). Ryan did not mention a "no middleman" policy during his entire trial examination. CCRF (Benco) ¶ 166.

[218] CCFF ¶¶ 395-425.

[219] Benco Post-Tr. Br. at 8-23.

[220] Even if the Court were to find that the evidence discussed in Section I.A ("Direct and Unambiguous Evidence Establishes Respondents' Unlawful Agreement") above falls short of direct and unambiguous evidence, it is at a minimum circumstantial evidence that, together with the totality of the evidence, shows by a preponderance the existence of an agreement.

constitutes circumstantial evidence supporting the otherwise unambiguous evidence of concerted action.[221]

In addition, it is well documented that each of Respondents feared the rise of buying groups out of concern that buying groups would lead to a price war and drive down margins across the entire industry.[222] This fear led Benco to communicate with Schein, Patterson, and Burkhart about not working with buying groups.[223] Benco believed that working alone, it would be impossible to prevent the rise of the buying group threat, but together, Respondents could keep the tide of buying groups at bay.[224] This motive to conspire is another "plus factor" supporting the inference of an agreement.[225]

Evidence of Respondents' opportunity to collude is also probative of the finding of collusive behavior.[226] Here, the evidence shows that Respondents regularly communicated with one another in private telephone calls and text messages,[227] and attended industry events together multiple times per year.[228]

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[221] *In re Pool Prods. Distribution Mkt. Antitrust Litig.*, 988 F. Supp. 2d 696, 711 (E.D. La. 2013) (discussing "plus factors," including actions against self-interest).

[222] CCFF ¶¶ 196-216; *see also* Complaint Counsel's Post-Tr. Br. at 12-14.

[223] *E.g.*, CCFF ¶¶ 483-484, 661-663, 958-968, 997, 1007-1017, 1208-1214, 1221-1223, 1225-1228.

[224] *See, e.g.*, CCFF ¶¶ 198-199 (citing CX1149 at 002); CCFF ¶ 261 (citing CX0016 at 002).

[225] *See, e.g.*, *United States v. Apple Inc.*, 952 F. Supp. 2d 638, 690 (S.D.N.Y. 2013), *aff'd*, 791 F.3d 290 (2d Cir. 2015) (identifying common motive as plus factor evidence); *Toys "R" Us, Inc. v. FTC*, 221 F.3d 928, 931-32, 935-36 (7th Cir. 2000) (affirming Commission's findings of horizontal agreement where evidence of manufacturers' common motive to join boycott of warehouse clubs was fear that "rivals who broke ranks and sold to the clubs might gain sales as their expense, given the widespread and increasing popularity of the club format").

[226] *See, e.g.*, *C-O-Two Fire Equip. Co. v. United States*, 197 F.2d 489, 493 (9th Cir. 1952) (finding evidence of defendants' membership in same association and resulting opportunity for meeting, without evidence of what occurred at meeting, contributed to evaluation of plus factors leading to conclusion of conspiracy).

[227] CCFF ¶¶ 327-354.

[228] CCFF ¶¶ 355-393; *see also* Attachment B to Complaint Counsel's Post-Trial Brief.

6. The Evidence Shows that Benco and Schein Entered into the Agreement in 2011, and Patterson Joined in 2013.

Benco argues that Complaint Counsel has not met its burden of establishing an agreement because it offered no evidence of precisely when the conspiracy formed.[229] Benco does not cite a single case supporting the proposition that Complaint Counsel is required to present evidence of the precise start of the conspiracy,[230] and there is no such requirement under the law.[231] Nevertheless, Complaint Counsel has established that Benco and Schein entered into an agreement in 2011, and Patterson joined in 2013.[232]

The weight of the evidence shows that Benco's agreement with Schein began in 2011. While Benco "had no doubt" that Schein was working with buying groups as of September 2011 based on market intelligence,[233] after that point, Benco gained the understanding that Schein had a policy *against* doing business with buying groups.[234] Thus, despite market rumors that Schein was working with buying groups, Benco understood in 2012, 2013, 2014, and 2015 that Schein (like Benco) did *not* do business with these customers.[235] As Benco's Chuck Cohen testified, during this time frame, he "understood that Schein, Patterson and Benco all had a similar policy with respect to buying groups."[236]

Consistent with Cohen's knowledge, 2011 was the year that Schein, at the direction of Tim Sullivan, changed its buying group strategy. While Schein had discounted to buying groups

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[229] Benco Post-Tr. Br. at 14-16. Benco also claims that Complaint Counsel "changed tracks" during the trial because Complaint Counsel showed that the conspiracy between Benco and Schein began in 2011 whereas the Complaint alleged that the conspiracy began between Benco and Schein no later than July 2012. (Benco Post-Tr. Br. at 14-15). Complaint Counsel's allegation in the Complaint and proof at trial are entirely consistent with each other: the evidence showed the agreement began in 2011 which is, by definition, "no later than July 2012."

[230] *See* Benco Post-Tr. Br. at 14-16 (arguing that Complaint Counsel could not establish the start of the alleged agreement but citing no cases requiring such evidence).

[231] *United States v. Consol. Packaging Corp.*, 575 F.2d 117, 126 (7th Cir. 1978) (evidence sufficient to find a conspiracy where no evidence in the record of the "specific agreement, its embryo or history of its development," noting "[t]he form or manner of making the agreement are not crucial.").

[232] CCFF ¶¶ 483, 495, 661-684, 687-732, 958-968. Benco does not appear to dispute the date on which Patterson joined the conspiracy. *See* Benco Post-Tr. Br. at 14-16.

[233] CCFF ¶ 673; *see also* CCFF ¶¶ 665-672.

[234] CCFF ¶¶ 665-684.

[235] CCFF ¶¶ 665-684, 527, 1191, 1193.

[236] CCFF ¶ 677 (quoting Cohen, Tr. 590).

historically and profited from such arrangements,[237] by late 2011, Sullivan informed his employees that he did "NOT want to lead in getting" the buying group initiative started in dental[238] and did not "want to be the first company to open the floodgates to the dangerous world" of buying groups.[239]

Further, it is undisputed that Benco's Cohen and Schein's Sullivan communicated on multiple occasions throughout 2011. Between March and December 2011 alone—the period during which Sullivan's buying group strategy shifted—Cohen and Sullivan called each other at least 13 times.[240] The total duration of those calls was 50 minutes and 14 seconds.[241] Cohen and Sullivan texted each other 89 times in 2011 (for 23 of which Respondents failed to produce the content).[242] Cohen and Sullivan also attended at least six industry and private events together in 2011, including a "Confidential Breakfast."[243] Benco tries to hide from these facts by arguing that Cohen and Sullivan communicated about a no-poach agreement.[244] But even if the two executives did discuss the no-poach agreement, that does nothing to prove that these discussions

[237] CCFF ¶¶ 432-453, 687-696.

[238] CCFF ¶ 709 (quoting CX2456 at 001).

[239] CCFF ¶¶ 712-714; *see also* CCFF ¶¶ 715-716.

[240] CCFF ¶ 347. Cohen and Sullivan called each other 23 times and spoke for one hour and 10 minutes in 2011. CCFF ¶ 348. Benco argues that there were legitimate reasons for Benco and Schein to communicate in 2011, stating that "in late October, 2011, Benco recruited four or five Schein employees . . . and resulted in Benco and Schein renegotiating the terms" of a no-poach agreement between the two companies. (Benco Post-Tr. Br. at 15-16). There is no basis to believe that Cohen and Sullivan could not have discussed *both* a no-poach agreement and a no buying group agreement during these numerous conversations in 2011.

[241] CCFF ¶ 347.

[242] CCFF ¶ 350.

[243] The evidence shows Cohen and Sullivan attended: (1) the Chicago Dental Society Midwinter Meeting held February 24-26, 2011 (CCFF ¶ 358); (2) the American Dental Association Annual Session held October 10-13, 2011 (CCFF ¶ 380); (3) the Dental Trade Alliance Foundation Board Meeting held on October 10, 2011 (CCFF ¶ 379); (4) the "GC" party held on October 11, 2011 (CCFF ¶ 381); (5) the Dental Trade Alliance meeting held on November 1-3, 2011 (CCFF ¶ 363); and (6) a "Confidential Breakfast" between Schein and Benco executives on November 29, 2011 (CCFF ¶ 383).

[244] Benco Post-Tr. Br. at 16. Benco refers to this no-poach agreement as a "Competitive Hiring Agreement." While Benco now calls this hiring agreement "competitive," the facts show that the agreement *limited* the number of employees that could move between the two companies and increased the non-compete periods for some employees. CCRF (Benco) ¶¶ 549, 551. Such an agreement raises its own anticompetitive concerns. *See, e.g., Deslandes v. McDonald's USA*, No. 17 C 4857, 2018 WL 3105955, at *6 (N.D. Ill. June 25, 2018) (finding that a naked horizontal agreement not to hire competitors' employees is a *per se* violation of the antitrust laws).

did not also relate to buying groups, particularly in light of Cohen's repeated testimony that he discussed a no buying group policy with Sullivan.[245]

Further placing the start of the conspiracy in 2011, it is established that by January 2012, Benco began enforcing the agreement by confronting Schein with market intelligence that Schein was discounting to buying groups.[246] Benco argues that there was no such enforcement in January 2012.[247] It is undisputed, however, that in January 2012, Benco's Ryan forwarded to Cohen field intelligence about Schein working with a buying group Unified Smiles, specifically "for Timmy conversation," referring to Tim Sullivan of Schein.[248] Cohen responded, "Talking this AM," and then spoke to Sullivan for 11 minutes and 34 seconds.[249] Notably, Cohen did not inform Ryan that he would not talk to Sullivan about the buying group, or otherwise express any confusion regarding the meaning of Ryan's email.[250] Instead, after Cohen received Ryan's email, he texted Sullivan asking for a conversation, and then in fact had a conversation with Sullivan, just as Ryan had suggested.[251] Cohen also admitted that just before his call with Sullivan, he "had buying groups on his mind" and sent an email to his team reinforcing Benco's no buying group policy.[252] These undisputed facts show that Cohen and Sullivan discussed Unified Smiles on the January 2012 call.[253]

While Benco argues that the January 2012 call was *not* about buying groups, but about the companies' no-poach agreement,[254] no evidence supports this suggestion. As established at

[245] CCFF ¶¶ 662-664.
[246] CCFF ¶¶ 955-972. Notably, this market intelligence was inaccurate as Schein had turned down Unified Smiles in December 2011 pursuant to the agreement. CCFF ¶ 719.
[247] Benco Post-Tr. Br. at 16.
[248] CCFF ¶¶ 955-963.
[249] CCFF ¶¶ 967-968.
[250] CCFF ¶ 962.
[251] CCFF ¶¶ 958-969.
[252] CCFF ¶¶ 971-972.
[253] CCFF ¶¶ 955-972.
[254] Benco Post-Tr. Br. at 16.

trial, neither Cohen[255] nor Sullivan[256] has any independent recollection of what was discussed on that January 13, 2012 call. In the absence of witness memories of the substance of the call, the contemporaneous documents about this call are the *only* evidence in the record of what transpired—and those documents show that Cohen had scheduled the call with Sullivan specifically to discuss Schein doing business with a buying group.[257] Benco has no answer for these contemporaneous records, so it asks the Court to disregard this unambiguous evidence in favor of pure speculation.[258] Indeed, these documents defeat Benco's unsuccessful attempt to rely on *McWane*: where the contemporaneous documents explicitly reference a call with Sullivan to discuss a buying group and neither participant recalls the conversation, it is inappropriate speculation to assume that competitors did not discuss buying groups.[259] Further, even if the

[255] Cohen testified that he did not "recall the contents" of the January 13, 2012 call (CCFF ¶ 970 (Cohen, Tr. 973); and he did not "have an independent recollection of" the January 13, 2012 call (CCFF ¶ 970). *See also* CCRF (Benco) ¶ 564. This trial testimony is corroborated by deposition testimony, where Cohen testified, "I don't know what we talked about or didn't talk about." CCRF (Benco) ¶¶ 564, 587 (quoting CX8015 (Cohen, Dep. at 211)). And he testified, "I do not recall what I spoke with Mr. Sullivan about." CCRF (Benco) ¶ 564 (quoting CX8015 (Cohen, Dep. at 224)). Benco cites to testimony from Cohen that he "can say with confidence" that he and Sullivan were discussing employee issues. BFF ¶ 588. Benco ignores that Cohen testified that he simply "assumed" the call was about an employment issue (CCRF (Benco) ¶ 588 (Cohen, Tr. 973)) and repeatedly testified that he did not recall the contents of the call (CCFF ¶ 970; CCRF (Benco) ¶ 564).

[256] Sullivan also testified that he did not recall the contents of the January 13, 2012 call. CCRF (Benco) ¶ 564. Indeed, Schein and Benco both acknowledge that Sullivan does not remember the call in their Post-Trial papers. BFF ¶ 592; Schein Post-Tr. Br. at 66. Benco argues that Sullivan testified that he was certain that Unified Smiles was not discussed on the call. Benco Post-Tr. Br. at 16. This testimony is contradicted by Sullivan's own trial testimony that he does not recall what he discussed with Cohen. (Sullivan, Tr. 4218 ("Q. Do you recall what you talked about? A. I don't. . . .")). Sullivan also admits that he "assumed" that it related to merger or employment issues. CCRF (Benco) ¶ 592; Sullivan, Tr. 4218-4220. Notably, Sullivan's testimony is contrary to prior testimony in which he testified that he heard of Unified Smiles through a message from Cohen. CCRF (Benco) ¶ 592 (CX8025 (Sullivan, Dep. at 393 ("Have you ever heard of a group called Unified Smiles? A. Only through a message I got from Chuck"); *see also* Sullivan, Tr. 4346). Sullivan later recanted his testimony. CCRF (Benco) ¶ 592. *See also* Complaint Counsel's Reply to Schein Post-Tr. Br. § III.A.1.

[257] CCFF ¶¶ 955-968.

[258] Benco argues the call *must have been* about the company's no-poach agreement simply because Cohen called his employment attorney before and after speaking with Sullivan. But Cohen does not remember the calls with his attorneys. CCRF (Benco) ¶ 588 (Cohen, Tr. 974; CX8015 (Cohen, Dep. at 227-228)). There is no evidence that Cohen scheduled the call with Sullivan in response to anything related to the no-poach agreement, nor did he schedule the call after speaking with his employment attorney. CCRF (Benco) ¶¶ 588-589.

[259] Benco Post-Tr. Br. at 16 (citing *In re McWane*). Here, unlike in *McWane*, there is evidence showing that Cohen scheduled a call with Sullivan specifically to discuss a buying group. *In re McWane, Inc.*, Docket No. 9351, 2013 WL 8364918, at *265 (FTC May 1, 2013) (Initial Decision) ("[T]here is no evidence showing what Mr. Tatman and Mr. Rybacki discussed. . . .").

Court were to credit Benco's speculation that the executives discussed a no-poach agreement during the call, this does not establish that they did not *also* discuss buying groups. A no-poach agreement neither erases nor explains the contemporaneous records indicating that Benco planned to confront Schein regarding buying groups.[260] And absent a prior agreement, Ryan's email and Cohen's plan to confront Schein make no sense.

7. Complaint Counsel Established that Benco Began Working With a Buying Group After the Agreement Began to Fall Apart.

Benco also argues that Complaint Counsel has not proven its case because it did not establish the end of the conspiracy.[261] But the lack of evidence that an agreement ended is certainly not evidence of the lack of an agreement. As far as the record shows, there was no formal cessation of the agreement—Respondents themselves never affirmatively nullified the agreement. That is, in part, the reason Complaint Counsel is seeking an injunction in this case.[262]

Instead, Complaint Counsel established that Benco, just like Schein and ultimately Patterson, started discounting to a buying group in late 2015 or early 2016.[263] Benco's decision to discount to the buying group (Elite Dental Alliance or "EDA") was made *after* Benco settled the Texas Attorney General's antitrust investigation into Benco's response to the TDA buying group, and was thereafter required to log all of its communications with Schein and Patterson. [264] That logging requirement made the conspiracy difficult to maintain.[265]

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[260] Whether or not Sullivan and Cohen actually spoke regarding a buying group on the January 13, 2012 call, the contemporaneous evidence undeniably shows that Benco was *planning* to confront Schein about discounting to a buying group. Benco offered no explanation as to why Ryan sent Cohen information about Schein discounting to a buying group for the stated purpose of a conversation with Sullivan. CCFF ¶ 963; *see also* CCRF (Benco) ¶ 565 (CX8037 (Ryan Dep, at 100 ("Q. Sitting here today, can you think of any reason why you said: "For Timmy conversation?" A. No.")). Absent a prior agreement, Ryan's email and Cohen's response of assent, are simply illogical.

[261] Benco Post-Tr. Br. at 17-19.

[262] *See* Complaint Counsel's Reply to Patterson Post-Tr. Br. § IV ("Basis for Injunctive Relief") for further discussion of the need for an injunction and other remedies.

[263] CCFF ¶¶ 1367-1369, 1406; BFF ¶ 251.

[264] CCFF ¶¶ 1159-1161.

[265] *See* CCFF ¶¶ 1159-1164.

Benco does not dispute that it began discounting to EDA in late 2015 or early 2016. Instead, Benco argues that EDA is more like a DSO[266] than a buying group,[267] but this statement lacks factual support. Indeed, Benco's own findings state that EDA is closer to a GPO.[268] And Benco's assertion that EDA is not a buying group is contradicted by contemporaneous documents, as well as the testimony of its own witnesses:

- Cohen admitted at trial that Benco changed its no buying group policy to accommodate EDA.[269]
- Cohen identified EDA as an example of a buying group in the dental industry in prior testimony.[270]
- Ryan also identified EDA as an example of an exception to Benco's no buying group policy in prior testimony.[271]
- Benco's December 2015 Case Study refers to EDA as a "GPO founded by Cain Watters."[272] That document specified that the terms GPO and buying group were interchangeable.[273]

Likewise, Benco's post-trial brief admits that EDA is a buying group.[274] Patterson also acknowledges that Benco is working with a buying group (EDA) today.[275]

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[266] DSOs are large group practices that have multiple locations combined under a single ownership structure or management organization. CCFF ¶ 60.

[267] Benco Post-Tr. Br. at 18.

[268] BFF ¶ 261; *see also* Respondents' Joint Proposed Conclusion of Law ¶ 162 ("And since 2015, it has offered discounts to a buying group on only one occasion – the Elite Dental Alliance."). The terms GPO and buying group are used interchangeably. CCFF ¶¶ 70-71; *see also* CCRF (Benco) ¶ 261.

[269] CCFF ¶ 1370 (citing Cohen, Tr. 451).

[270] CCRF (Benco) ¶ 261 (citing Cohen, Tr. 448; CX0301 (Cohen, IHT at 107) ("Q. As you sit here today, can you name any buying groups in the dental industry? A. Elite Dental Alliance . . . .")).

[271] CCRF (Benco) ¶ 261 (citing CX0304 (Ryan, IHT at 117-118 ("Q. Is the no-GPO policy still in effect today? A. Yes, with two exceptions. Q. And what are the two exceptions? A. The Elite Dental Alliance . . ."); CX0304 (Ryan, IHT at 256 ("Is EDA a group purchasing organization? A. I would consider it one.")).

[272] CCFF ¶ 1372; CCRF (Benco) ¶ 261 (CX1084 at 001 ("Elite Dental Alliance (EDA): A GPO founded by Cain Watters . . . .")).

[273] CCRF (Benco) ¶ 261 (citing CX1084 at 001; Cohen, Tr. 458).

[274] Benco Post-Tr. Br. at 11 n.4 (only exception to Benco's no buying group policy was EDA).

[275] Patterson Post-Tr. Br. at 32.

In any event, Benco's attempt to distinguish EDA from other buying groups is irrelevant and superficial. EDA is significant because (1) throughout the conspiracy period, Benco rejected all buying groups as a matter of policy, regardless of whether any buying group had "unique" characteristics;[276] then (2) in late 2015, for the first time, Benco evaluated the individual characteristics of the EDA buying group, and entered into a discounting arrangement.[277] Further, Benco's contemporaneous analysis refers to EDA as a GPO and does not identify EDA as being closer to a DSO or having "unique" characteristics as Benco's Post-Trial Brief now claims.[278] Benco also admits that EDA does not own the practices,[279] meaning it fits squarely within Benco's definition of a buying group.[280] In fact, EDA had the precise characteristic that Benco now claims was the reason it stayed away from buying groups—the buying group customers were not required contractually to purchase from Benco;[281] and discounting to this buying group risked cannibalization (*i.e.*, selling to the same customers at lower margins) and that customers would sign up for EDA but then simply use the arrangement to negotiate a similar deal with their incumbent supplier and then stay with the incumbent.[282]

8. Complaint Counsel Established Respondents' Change in Conduct.

Benco next argues that Complaint Counsel improperly used its economic expert, Dr. Marshall's "structural breaks" (or change in conduct) analysis to prove its case.[283] Contrary to Benco's claim, however, Complaint Counsel has established a change in conduct based on the

[276] CCFF ¶¶ 395-396, 404; *see also* CCRF ¶¶ 246, 262 (citing Ryan, Tr. 1028-1029).
[277] CCFF ¶¶ 1367-1384.
[278] CCRF (Benco) ¶ 246 (CX1084 at 001, 003, 005-006 (EDA Case Study referring to EDA as a GPO and similar to Kois)).
[279] Benco Post-Tr. Br. at 18; BFF ¶ 245 (acknowledging EDA has no common ownership).
[280] CCFF ¶ 404 (citing CX1372 at 002 ("Benco does NOT currently recognize as a single customer . . . Any kind of GPO whether they provide additional services or not."); CCFF ¶ 413 (citing CX1198 at 001 ("to recognize a group as a single customer, they must meet one of the following ownership definitions.").
[281] CCFF ¶ 1381.
[282] CCFF ¶ 1382 (quoting CX1084 (Cohen recognizing the risk that "Customers sign up for EDA, and then go back to their incumbent supplier and negotiate a similar deal, and stay with the incumbent.")).
[283] Benco Post-Tr. Br. at 19-21.

facts in the record, not based on Dr. Marshall's expert opinion.[284] While evidence of changed conduct is not required here because the evidence goes beyond mere parallel conduct,[285] the changes are an additional "plus factor" in favor of an agreement.[286]

In fact, Benco made the most drastic change of all—after years of strictly enforcing its no buying group policy, in late 2015 it began discounting to the buying group EDA out of fear that the buying group would sign up with Patterson and Schein.[287]

The evidence shows that Patterson, too, changed its conduct pursuant to the conspiracy. Within just three days of joining the conspiracy in February 2013, Patterson did an about-face and reneged on its discount arrangement with the NMDC buying group.[288] Similarly, while Patterson "steer[ed] clear of all buying groups" "[a]s a rule,"[289] and did not pursue a single buying group during the conspiracy, its conduct changed in late 2015. Patterson admits in its Proposed Findings of Fact that it "hired a business development director . . . in late 2015 with the instruction to explore working with buying groups."[290] Further, Patterson hired a consulting firm

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[284] *See* Complaint Counsel's Post-Tr. Br. at 64-66. Further, Benco misrepresents the purpose of Dr. Marshall's expert opinions related to structural breaks. Dr. Marshall looked at observed structural breaks for purposes of determining whether the time period for the alleged conspiracy was reasonable. CCRF (Benco) ¶¶ 1243-1248, 1251-1253 (Marshall, Tr. 2889-2890 (looking at structural breaks to determine reasonableness of the start and end of conspiracy)). In addition, Dr. Marshall examined structural break evidence as one indicator supporting collusive behavior rather than oligopolistic interdependence. CCFF ¶ 1625 (citing CX7100 at 190 (¶ 427) (Marshall Expert Report); CCRF (Benco) ¶¶ 1243-1248).

[285] *Bell Atl. Corp. v. Twombly*, 550 U.S. 544, 556 n.4 (2007); *United States v. N.D. Hosp. Ass'n*, 640 F. Supp. 1028, 1036-37 (D.N.D. 1986) (Even though the defendants did not change their preexisting policies after entering into the agreement, the court nonetheless found the existence of an agreement and a meeting of the minds.); *United States v. Champion Int'l Corp.*, 557 F.2d 1270, 1272-73 (9th Cir. 1977) ("[D]espite the innocent beginnings of the noncompetitive bidding, the trial court found collusion in its continuation."). *Cf. In re Graphics Processing Units Antitrust Litig.*, 540 F. Supp. 2d 1085, 1092-95 (N.D. Cal. 2007) (finding that when allegations of parallel conduct are the basis of a Section 1 claim, plaintiff must allege facts to suggest preceding agreement, such as unprecedented change in behavior).

[286] *B&R Supermarket, Inc. v. Visa, Inc.*, No. C 16-01150 WHA, 2016 WL 5725010, at *7 (N.D. Cal. Sept. 30, 2016) (Defendants' coordinated, rather than staggered, roll-out of term regarding chargebacks was deemed a "deviation from prior rollouts [which] points a finger of plausible suspicion, and tends to show that the lock-step rollout in the United States flowed from conspiracy, not parallel conduct."); *In re Domestic Drywall Antitrust Litig.*, 163 F. Supp. 3d 175, 255-56 (E.D. Pa. 2016) (finding defendants' decision to eliminate job quotes, a feature in the drywall industry for decades, was shift in behavior sufficient to qualify as "traditional conspiracy evidence" pointing towards an agreement).

[287] CCFF ¶¶ 1379-1380; *see also* 1366-1378, 1381-1384, 1406.

[288] CCFF ¶ 503-506.

[289] CCFF ¶ 650 (quoting CX3128 at 001).

[290] Patterson Proposed Finding of Fact ("PFF") ¶ 760; *see also* CCFF ¶¶ 1343-1345.

to do a "deep dive" into the buying group market segment at around the same time frame.[291] Moreover, Patterson admits that it entered into contracts with two buying groups in May 2018.[292] In addition, Patterson bid for the business of Smile Source in 2017, which it refused to do during the conspiracy.[293] Smile Source's business model was the exact same during the conspiracy when Patterson refused it, and after the conspiracy when Patterson changed course.[294]

Finally, Schein worked with several buying groups prior to the conspiracy, but that practice ended during the conspiracy due to Sullivan's instruction to his employees. In late 2011 and early 2012, Sullivan instructed his employees that he did not want to "lead" in getting buying groups started, did not want to be the first company to "open the floodgates" to buying groups, and wanted to "KILL" the buying group model.[295] Following these statements, Sullivan's employees understood that Schein did not work with buying groups.[296] Employees at all levels of the sales chain repeatedly stated in contemporaneous documents that Schein did not work with buying groups during the conspiracy period.[297] Following the end of the conspiracy, Schein began working with buying groups again, including resuming work with the valuable Smile Source account.[298]

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[291] CCFF ¶¶ 1327-1342.

[292] PFF ¶ 761; *see also* CCFF ¶ 1364.

[293] CCFF ¶¶ 1347-1350.

[294] CCFF ¶¶ 1347-1351, 1353-1357, 1717-1721.

[295] CCFF ¶ 709 (quoting CX2456 at 001); CCFF ¶ 713 (quoting CX2458 at 001); CCFF ¶ 729 (quoting CX0199 at 001 (emphasis in original)).

[296] CCFF ¶¶ 709-716, 734, 743-860; *see also* Attachment C to Complaint Counsel's Post-Trial Brief.

[297] CCFF ¶¶ 743-860; *see also* Attachment C to Complaint Counsel's Post-Trial Brief. Benco alleges that [redacted] and submitted a bid to Smile Source during the conspiracy. Benco Post-Tr. Br. at 20. As discussed in more detail in the Schein portion of this brief, *supra* Complaint Counsel's Reply to Schein Post-Tr. Br. § III.B.1, imperfect compliance does not negate the existence of a conspiracy (*Beaver*, 515 F.3d at 739 (government from proving a conspiracy."), and in any event, Sullivan instructed his team against a relationship with [redacted] (CCFF ¶¶ 712-714). *See also* Complaint Counsel's Reply to Schein Post-Tr. Br. § II.B.2.d.

[298] CCFF ¶¶ 1317-1320, 1681, 1710-1712, 1722-1725.

9. Benco Misconstrues Dr. Marshall's Opinions Regarding Market Structure.

Benco next claims that the court should not infer collusion based on Dr. Marshall's opinions regarding market structure.[299] Benco misconstrues the purpose of Dr. Marshall's opinions on market structure. Complaint Counsel is not relying on market structure to establish the conspiracy.[300] Benco also misconstrues the substance of Dr. Marshall's opinion. Dr. Marshall did not opine that a conspiracy can be inferred from industry characteristics alone. Rather, he opined that the industry was "conducive to effective collusion."[301] Dr. Marshall's opinions are consistent with that of Patterson's expert, Dr. Wu, who described the industry structure in this case as having "the potential for strategic interaction."[302] Moreover, Dr. Marshall's opinion is well supported.[303]

[299] Benco Post-Tr. Br. at 21-23.

[300] While courts sometimes look to evidence of a market concentration as one of many relevant pieces of evidence to finding a conspiracy (*Gainesville Utils. Dep't v. Fla. Power & Light Co.*, 573 F.2d 292, 303 (5th Cir. 1978) ("Economists recognize that when a market is concentrated it is easier to coordinate collusive behavior."); *HM Compounding Servs., Inc. v. Express Scripts, Inc.*, No. 4:14–CV–1858 JAR, 2015 WL 4162762, at *5 (E.D. Mo. July 9, 2015) (the highly concentrated nature of the PBM industry supports an inference of conspiracy); *Todd v. Exxon Corp.*, 275 F.3d 191, 208 (2d Cir. 2001) ("Generally speaking, the possibility of anticompetitive collusive practices is most realistic in concentrated industries.")), this evidence is certainly not the basis for this case.

[301] CCFF ¶ 1601 (citing CX7100 at 011 (¶ 12) (Marshall Expert Report)).

[302] CCRF (Benco) ¶¶ 787-788, 820-821 (citing RX2833 at 017 (¶ 27) (Wu Expert Report)). Benco also claims that the same set of characteristics that Dr. Marshall cites as conducive to collusion would undermine the ability of a cartel to form at all, relying on testimony from Dr. Johnson. CCRF ¶ 791. Dr. Johnson did not opine about the characteristics conducive to collusion, however, and his testimony at trial about the characteristics undermining the ability of the cartel to form are beyond the scope of Dr. Johnson's expert report in this matter. CCRF ¶ 791.

[303] Dr. Marshall identified the following factors as relevant to his conclusion that the market structure was conducive to collusion: (1) high market concentration, (2) the low price elasticity of independent dentists' demand, (3) barriers to entry in full-service distribution, (4) low bargaining power of individual independent dentist buyers, and (5) manufacturers' low bargaining power. CCFF ¶¶ 1601-1623. Further bolstering Marshall's opinions, Respondents' own executives admit to their high market share. CCFF ¶¶ 1450, 1455-1458. Complaint Counsel has responded in more detail to Benco's unfounded criticisms of Dr. Marshall's analysis in CCRF (Benco) ¶¶ 787-821.

C. Inter-firm Communications Establish That Benco Exchanged Assurances With Both Schein and Patterson That Respondents Would Not Discount to Buying Groups.

Benco argues that "[t]he limited communications concerning buying groups are insufficient to find an agreement among Respondents."[304] Yet, Benco's arguments further help to *prove* Complaint Counsel's case.

1. February 2013 Email Exchange Between Cohen and Guggenheim Constitutes an Exchange of Assurances.

In an attempt to explain away Cohen and Guggenheim's February 2013 exchange, Benco argues that when one of its regional managers discovered that Patterson had entered into a discounting arrangement with the NMDC buying group, he sent the information to Benco's Chuck Cohen "for help on what to do to *compete*" against this new market development.[305] But instead of telling his team how to *compete*, Cohen assured his team that he would contact his "counterpart at Patterson to let him know what's going on in NM."[306] This is precisely the type of conduct the antitrust laws were enacted to squelch—competitors communicating directly through private means in order to avoid competition in the marketplace. It is undisputed that Cohen then contacted Guggenheim letting him know about the "noise" he picked up in New Mexico, and assured Guggenheim that Benco abided by a no buying group policy.[307] And it is further undisputed that Guggenheim responded that he would investigate the New Mexico situation and that Patterson "feel[s] the same way" about a no buying group policy.[308] As a result, neither Benco nor Patterson worked with NMDC.[309] As discussed *supra* Section I.A.1, this is direct evidence of an exchange of assurances between competitors that they will not compete.

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[304] Benco Post-Tr. Br. at 23.
[305] Benco Post-Tr. Br. at 24.
[306] CCFF ¶ 479 (quoting CX0055 at 001); *see also* CCFF ¶ 478.
[307] CCFF ¶¶ 483-484.
[308] CCFF ¶¶ 495-496.
[309] CCFF ¶¶ 414, 503-506.

Benco argues that this evidence is not indicative of agreement because Benco's no buying group policy was "widely known" and not confidential.[310] Guggenheim, however, testified that he was *not* previously aware that Benco had a policy against discounting to buying groups; and Guggenheim did *not* believe this was public information.[311] And if Benco's policy was actually a matter of public knowledge, it would have been unnecessary to communicate this policy to Guggenheim.

More importantly, Benco errs in suggesting that an exchange of publicly known information cannot evidence a meeting of the minds. In *United States v. FMC Corp.*, the court found a horizontal agreement to refuse to recognize a certain city as a basing point, even though the information exchanged by the competitors "was a matter of public knowledge."[312] The court rejected the defendant's argument that it informed competitors of its refusal to recognize the city, "not to exchange assurances of joint conduct," but simply to share information.[313] The court reasoned that the public nature of the information was indicative of an agreement because "it should have been unnecessary to communicate an obvious fact."[314] The court found that the competitor communications showed that "[w]hat was important was for [defendant] to receive assurances that [its] competitors would not recognize Linden, and for each of them to recognize that others likewise would not recognize Linden."[315] Just as in *FMC*, what Benco sought was an assurance from Patterson that they would similarly follow a no buying group policy. Indeed, but for this purpose, it would have been against Benco's unilateral self-interest to share its policy, which dictated its future bidding behavior, with its top competitor.

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[310] Benco Post-Tr. Br. at 25.
[311] CCFF ¶¶ 489-490.
[312] 306 F. Supp. 1106, 1150 (E.D. Penn. 1969).
[313] *FMC*, 306 F. Supp. at 1131, 1150.
[314] *FMC*, 306 F. Supp. at 1150.
[315] *FMC*, 306 F. Supp. at 1150; *see also United States v. Champion Int'l Corp.*, 557 F.2d 1270, 1273 (9th Cir. 1977) (affirming a bid-rigging conspiracy even though the information exchanged "could have been predicted by anyone," yet "the defendants did not leave the exchange of this information to chance").

Next, Benco argues that the competitor communications are not probative of conspiracy because Benco did not ask Patterson to do anything, but simply announced its own policy.[316] Courts have routinely rejected this defense.[317] For example, in *Esco Corp. v. United States*, the Ninth Circuit refused to overturn a price fixing conviction based on appellant's argument that the competitor "called the meeting 'not to ask for agreement, but simply to announce' its own pricing plans."[318] The court noted, "Were we triers of fact, we might well ask if this were so, what purpose was to be served by a meeting of competitors."[319] Tellingly, here, Benco cannot explain why it informed its top competitor of a policy against competing by discounting to buying groups:[320]

> Q. So just to be clear, is it your testimony that you cannot think of any business reasons for you to tell Mr. Guggenheim Benco's no-GPO policy, as you sit here today?
>
> A. Yes.[321]

Benco suggests that the Court can ignore Benco and Patterson's emails surrounding the NMDC buying group absent evidence that the exchange had any impact on Patterson's conduct.[322] But this argument fails, because just three days after this exchange, Patterson ended its close-to-final discounting arrangement with NMDC.[323] Moreover, following this exchange of

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[316] Benco Post-Tr. Br. at 25.

[317] *United States v. Foley*, 598 F.2d 1323, 1332 (4th Cir. 1979) (affirming a price-fixing conviction based on competitor communications about a commission rate increase, even though the defendant explicitly said to his competitors "that he did not care what others did."); *FMC*, 306 F. Supp. at 1150 (rejecting defendant's argument that sales manager's "purpose in meeting with each of his competitors was not to exchange assurances of joint conduct, but was done only for the purpose of informing them" of publicly available information).

[318] 340 F.2d 1000, 1006 (9th Cir. 1965).

[319] *Esco*, 340 F.2d at 1006.

[320] Benco Post-Tr. Br. at 25 ("Mr. Cohen did not recall why he included an FYI about Benco's policy in his email . . . .").

[321] CCFF ¶ 488; CCRF (Benco) ¶ 419 (citing CX0301 (Cohen, IHT at 243)).

[322] Benco Post-Tr. Br. at 25.

[323] CCFF ¶¶ 503-505. When Cohen alerted Guggenheim to Patterson's discounting arrangement with NMDC, Guggenheim informed Cohen that he would "investigate the situation." CCFF ¶ 495. In other instances where Cohen asked Guggenheim to investigate a matter of mutual interest, Guggenheim complied. CCFF ¶¶ 298, 307.

assurances, Patterson began to implement a no buying group policy, whereby it instructed its employees not to discount to buying groups.[324]

Next, Benco argues that the February 2013 exchanges are simply evidence of competitors monitoring one another, which "is common and to be expected in competitive markets."[325] But the evidence in this case does not reflect mere "monitoring." The February 2013 exchange is not an internal company document tracking a competitor's behavior; rather, it is a direct communication between the top executives assuring each other of a no buying group policy. And as explained earlier, Guggenheim subsequently confronted Cohen about deviating from a no buying group policy. The facts in the cases Benco cites in support of its argument are easily differentiated from this case. There was no evidence that the competitors communicated at all about the topic of the alleged conspiracy in *In re Text Messaging Antitrust Litigation*,[326] and there was no evidence of an exchange of assurances or confrontations of cheating by high-level executives in *In re Baby Food Antitrust Litigation*.[327] Indeed, in contrast to the exchange of policies by the Presidents and CEO of rivals in this case, *Baby Food* involved only "chit-chat during chance encounters in the field" by local sales people without pricing authority.[328] Courts have held that it is a "far different situation where upper level executives have secret conversations about price."[329]

Finally, Benco claims that the antitrust laws permit competing firms to exchange information of common interest.[330] But each of the cases that Benco cites are limited to competitor communications that served a *procompetitive* end—something wholly absent in this

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[324] CCFF ¶¶ 534-563, 611, 621-652. Benco also cites evidence that Dr. Mason was a member of the Dental Cooperative in Utah, but that does not refute the fact that Patterson refused to offer discounts to the NMDC buying group. Dr. Mason's NMDC never got off the ground because Schein, Patterson, and Benco would not supply it. CCFF ¶¶ 505-506 (Patterson refused to supply NMDC); CCFF ¶ 509 (Schein refused to supply NMDC); CCFF ¶¶ 414, 510 (Benco refused to supply NMDC); CCFF ¶¶ 511-512.

[325] Benco Post-Tr. Br. at 26.

[326] 782 F.3d 867, 878 (7th Cir. 2015).

[327] 166 F.3d 112, 126 (3d Cir. 1999).

[328] 166 F.3d at 125-26.

[329] *In re Polyurethane Foam Antitrust Litig.*, 152 F. Supp. 3d 968, 983 (N.D. Ohio 2015).

[330] Benco Post-Tr. Br. at 26.

case. *Michelman v. Clark-Schwebel Fiber Glass Corp.* held that, absent an agreement, competitors exchanging information concerning the "credit-worthiness of customers" did not violate antitrust laws because such exchanges provide the procompetitive benefit of allowing companies to protect themselves against insolvent customers.[331] In fact, *Micheleman* expressly distinguished information exchange concerning credit-worthiness of customers from exchanges on prices, which "usually serve no purpose other than to suppress competition."[332] Similarly, *Interborough News Co. v. Curtis Publishing Co.* found no antitrust violation where a company encouraged its competitors to sell through a new wholesaler to *compete* with an existing wholesaler.[333] In that case, liability did not turn on whether rivals had formed an agreement, but instead on whether the agreement was an output-enhancing cooperative effort to foster a new wholesaler, which might otherwise lack the scale to effectively enter the market.[334]

2. Communications Regarding Atlantic Dental Care ("ADC") Evidence an Agreement Among the Big Three.

Benco argues—in five pages of its brief devoid of any legal citation—that the Big Three's communications surrounding the customer Atlantic Dental Care ("ADC") do not show an agreement. Yet, Benco's arguments again help *prove* the existence of the conspiracy.

Benco argues that Cohen contacted Sullivan about ADC "to gather facts that might help Benco make its own independent evaluation of ADC."[335] But the evidence indicates otherwise. When ADC requested a bid from Benco, Patterson, and Schein in February 2013, all three

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[331] 534 F.2d 1036, 1048 (2d Cir. 1976).

[332] *Michelman*, 534 F.2d at 1048.

[333] 225 F.2d 289, 293 (2d Cir. 1955).

[334] *Interborough News*, 225 F.2d at 293. Benco also cites *Ross v. Citigroup, Inc.*, but that case simply held an agreement could not be inferred from the mere fact that there was an opportunity to collude based on a high level of inter-firm communications. 630 Fed. Appx. 79, 82 (2d Cir. 2015); *see also Ross v. American Exp. Co.*, 35 F. Supp. 3d 407, (S.D.N.Y. 2014) (District court in same case held that "[w]hile a private meeting among competing banks provided an opportunity to conspire, there is no evidence to suggest that a meeting of the minds to implement and maintain arbitration clauses actually took place."), *aff'd sub nom. Ross v. Citigroup, Inc.*, 630 Fed. Appx. 79 (2d Cir. 2015).

[335] Benco Post-Tr. Br. at 28. Cohen admitted at trial he was seeking "facts, knowledge, conjecture" from Sullivan to "help us form an opinion and a ruling on how we would handle that account." CCFF ¶ 1037; CCRF (Benco) ¶ 492 (citing Cohen, Tr. 720).

initially reacted in exactly the same way—they refused to bid because they believed ADC was a buying group.[336] Despite Benco's initial reaction, ADC "was adamant that they [were] not a buying group," but a DSO.[337] Uncertain whether Benco could bid on this customer under the no buying group agreement, Cohen contacted Sullivan to discuss ADC.[338] The admission that Cohen contacted Sullivan for "help" to decide whether it could bid on ADC proves that the conduct here was *not* "independent."[339]

Benco also admits that after Cohen and Sullivan communicated by phone and text messages about whether ADC qualified as a buying group, Cohen then revealed his future bidding plan to his competitor—Cohen sent another text message to inform Sullivan that, upon further research, ADC was not a buying group, but a corporate customer, and thus, Benco was going to bid.[340] It is immaterial that Cohen did not explicitly refer to a "pre-existing agreement" in this message, as the purpose of the message was abundantly clear: Cohen was informing Sullivan that ADC was fair game for competition because it was not a buying group, and Benco's plan to bid on ADC would not violate the conspiracy.

Benco fares no better in its attempt to explain away its communications with Patterson about ADC. Patterson had refused to bid on ADC with the understanding that Schein and Benco would act similarly,[341] but Guggenheim learned that Benco bid on and won the ADC account.[342] Guggenheim testified that he viewed Benco's bid on ADC as a deviation from the prior assurance of a no buying group policy,[343] and thus, asked Cohen for *re*assurance that it would

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[336] CCFF ¶¶ 1022-1024 (CX0021 at 002 (Benco's initial response to ADC: "We're out")); CCFF ¶¶ 534-549 (CX0092 at 001 (Patterson's initial response to ADC: "I've coached Anthony on how to stay out of this with grace")); CCFF ¶ 1097 (CX2021 at 013 (Schein: "Our first reaction to this was it was simply a buying group and we were going to walk away."); CCRF (Benco) ¶ 477 (citing Ryan, Tr. 1093-1094 (middle of day on March 25, 2013, Ryan concluded that ADC was a buying group)).

[337] CCRF (Benco) ¶ 477 (citing CX0021 at 001 (He Zhao told Patrick Ryan that ADC "is adamant that they are not a buying group and that ADC owns all the practices involved.")).

[338] CCFF ¶¶ 1028-1037.

[339] "Independent" means "*not* looking to others for one's opinion or for guidance on conduct." Merriam-Webster Dictionary, https://www.merriam-webster.com/dictionary/independent (emphasis added).

[340] Benco Post-Tr. Br. at 29-30.

[341] CCFF ¶¶ 548-552, 1187-1189 (citing CX0092 and CX0093).

[342] CCFF ¶¶ 565, 567.

[343] CCFF ¶ 572.

abide by the policy: "I'm wondering if your position on buying groups is still as you articulated back in February?"[344] Absent a prior understanding between Guggenheim and Cohen, there is no conceivable reason for this exchange. Guggenheim even admitted he could think of no legitimate business reason for him to ask about Benco's policy.[345] Nor was there any legitimate business reason for Cohen's elaborate response to Guggenheim, explaining exactly why ADC was not a buying group and reassuring his competitor of Benco's commitment to the no buying group policy. Benco argues, however, that Guggenheim contacted Cohen simply to "gain information that would *allow* [Patterson] to compete for this business."[346] Here, again, Benco's argument proves coordination. If Patterson were acting independently, there would have been no need to check with Benco before competing for ADC. Indeed, immediately after Cohen informed Guggenheim that ADC was not an entity subject to the no buying group agreement, Guggenheim directed his team to "aggressively get after [ADC's] business and compete."[347]

Competitors communicating to determine whether each is free to bid on a customer is the antithesis of independent conduct.

3. Benco Misrepresents the Number of Competitor Communications about Buying Groups.

Benco blatantly misrepresents facts by stating "the only communications that Chuck Cohen has ever even had with anyone at Schein about buying groups is limited to the one exchange with Tim Sullivan regarding Atlantic Dental Care."[348] Benco claims that Cohen's communications with Sullivan about ADC did *not* contain a discussion of Benco's no buying group policy.[349] And yet Cohen testified repeatedly that he "communicate[d] Benco's no-buying

[344] CCFF ¶ 570 (quoting CX0095).
[345] CCFF ¶ 1169; CCRF (Benco) ¶ 535 (CX0314 (Guggenheim, IHT at 299 ("Q. Can you think of any reason why you would want to know whether Benco . . . still had a policy against selling to buying groups? . . . A. No.")).
[346] Benco Post-Tr. Br. at 31.
[347] CCFF ¶ 586.
[348] Benco Post-Tr. Br. at 31.
[349] Benco Post-Tr. Br. at 29.

group policy to Mr. Sullivan,"[350] which demonstrates that there was at least one other discussion during which Cohen shared Benco's policy with Sullivan. Benco also inexplicably omits Cohen's messages to Sullivan about the buying groups Dental Alliance (where he confronted Sullivan about market intelligence that Schein was discounting to this buying group, and assured Sullivan that Benco had rejected this customer)[351] and TDA Perks (where he shared information about the development of this new buying group with Sullivan and Guggenheim).[352] Nor does Benco even mention that Cohen assured his team that he would send Tim Sullivan a note about market intelligence that Schein was discounting to the buying group Smile Source.[353] Benco also fails to account for the fact that Benco's Director of Sales, Patrick Ryan, called his counterpart at Schein to share Benco's refusal to bid on Smile Source and to ask whether Schein was planning to bid on this buying group.[354]

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[350] CCFF ¶¶ 662-664.

[351] CCFF ¶¶ 996-997. Though Cohen contacted Sullivan about discounting to a buying group, Cohen acknowledges that he would have no business reason to contact his competitors on matters related to other clients like corporate accounts. CCRF (Benco) ¶ 548 (citing CX0301 (Cohen, IHT at 105 ("Have you ever contacted Mr. Sullivan after learning that Schein may be bidding on a corporate account? I can't recall a specific instance. Q. Can you think of any business reason for you to contact Mr. Sullivan after learning that Schein was going to bid on a corporate account? A. No. Q. Same question for Mr. Guggenheim. Can you think of any business reason for you to contact Mr. Guggenheim after learning that Patterson was going to bid on a corporate account? A. No.")).

[352] CCFF ¶¶ 1133-1134; *see also* CCFF ¶¶ 1135-1137.

[353] CCFF ¶ 990. While Benco's brief ignores this document, its proposed findings point to Cohen's testimony that he did not *recall* sending the note in the mail (BFF ¶ 403); but Cohen did not testify that he did *not* do so. CCRF (Benco) ¶ 403 (Cohen, Tr. 838, 886). Cohen's failure to recall whether he sent the note does not establish he did not send it. Cohen admits that he planned to send the note; and both Sullivan and Cohen admit that Cohen sent notes to Sullivan in the mail on other occasions. CCFF ¶¶ 991-992; CCRF (Benco) ¶ 403. Nor does the lack of a note in the record establish that it was not sent because Sullivan admitted that he did not save the notes that he received from Cohen. CCRF (Benco) ¶ 403 (citing Sullivan, Tr. 4253). Finally, Benco's proposed findings argue that Ryan never re-forwarded his email to Cohen. BFF ¶ 402. Not true; Ryan complied with Cohen's instruction and re-forwarded his email one minute later. CCRF (Benco) ¶ 402.

[354] CCFF ¶¶ 1006-1017. Again, Benco's brief ignores this communication, but its proposed findings argue that Ryan does not recall discussing Smile Source or buying groups during the call. BFF ¶ 409. Ryan's own emails and other documentary evidence clearly shows that they did. CCFF ¶ 1014 (Statement of Ryan to his boss: "[Smile Source is] is [v]ery familiar. . . Randy [Foley] at Schein and I talked specifically about them. Buh-bye."); CCFF ¶ 1017; *see also* CCFF ¶¶ 1011-1013.

D. Complaint Counsel Established Actions Against Self-Interest.

While evidence of action against self-interest is not required where, as here, the evidence goes beyond parallel conduct,[355] Benco acted against its self-interest by (1) communicating their internal company policies and future bidding plans with its competitors, and (2) passing up the opportunity to gain incremental profits by doing business with buying groups.[356] Benco has no answer to the first point—it has no explanation for the repeated competitor communications about their policies against bidding on buying groups. Cohen himself acknowledged that informing competitors of its bidding position was against his business interests and "more . . . than a rational business owner would give."[357] On this basis alone, Complaint Counsel has shown conduct against self-interest.[358] As to the second point, Benco argues that it could not have been against Benco's self-interest to reject buying groups because it independently decided to do just that before the conspiracy started.[359] Benco further argues Complaint Counsel failed to show conduct against self-interest because its economic expert's data analysis is flawed. Neither argument withstands scrutiny.

1. Benco's Pre-Existing No Buying Group Policy Does Not Refute Existence of a Conspiracy.

Benco first claims that because it decided not to work with buying groups before the conspiracy started, it could not have entered into an agreement with its largest rivals that they would all take the same approach.[360] This is contrary to the law and common sense. Courts have repeatedly found a conspiracy where a defendant acted the same before and after joining the

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[355] *See United States v. Apple Inc.*, 952 F. Supp. 2d 638, 690 (S.D.N.Y. 2013), *aff'd*, 791 F.3d 290 (2d Cir. 2015) (explaining that plus factor evidence, including that of common motive, acts against economic self-interest, inter-firm communications, and change in conduct, is necessary if alleging parallel conduct); *In re Ins. Brokerage Antitrust Litig.*, 618 F.3d 300, 323 (3d Cir. 2010) ("[P]lus factors need be pled only when a plaintiff's claims of conspiracy rest on parallel conduct.").

[356] Complaint Counsel's Post-Tr. Br. at 62-64.

[357] CCFF ¶ 1074.

[358] Complaint Counsel's Post-Tr. Br. at 62-64.

[359] Benco Post-Tr. Br. at 32.

[360] Benco Post-Tr. Br. at 31-32.

conspiracy.[361] In *United States v. North Dakota Hospital Association*, the court found an unlawful agreement among hospitals not to grant discounts to Indian Health Services and "to adhere to [the hospitals'] existing independent policies against voluntarily giving discounts."[362] The court rejected defendant's argument—identical to Benco's argument here—that there was no agreement because the evidence showed they "merely contemporaneously expressed their preexisting, independently developed policies."[363] Similarly, in *Advertising Specialty National Association v. FTC*, the First Circuit rejected the argument that the policy of "list pricing" was not unlawful because it was used in the industry long prior to the period covered by the complaint.[364] "[E]ven if the practice of list pricing started legally, it could nevertheless have become the subject of a conspiracy if . . . there was an improper agreement to keep prices at an elevated level."[365]

2. The Factual Record Shows That Benco Acted Against Its Self-Interest.

The factual record shows that Benco's no buying group policy deprived Benco of profitable sales opportunities and risked losing market share to its rivals, thus establishing the plus factor of actions against self-interest.[366] And as noted above, Benco cannot cast these profit sacrifices as strategic oligopolistic interdependence, because it communicated directly with its competitors. Benco's post-trial brief does not seriously engage with the factual record that

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[361] *Advert. Specialty Nat. Ass'n v. FTC*, 238 F.2d 108, 117 (1st Cir. 1956)*; United States v. N.D. Hosp. Ass'n*, 640 F. Supp. 1028, 1036-37 (D.N.D. 1986); *United States v. Champion Int'l Corp.*, 557 F.2d 1270, 1274 (9th Cir. 1977).

[362] 640 F. Supp. 1028, 1036-37 (D.N.D. 1986).

[363] *N.D. Hosp.*, 640 F. Supp. at 1036.

[364] *Advert. Specialty Nat. Ass'n v. FTC*, 238 F.2d 108, 117 (1st Cir. 1956).

[365] *Advert. Specialty Nat. Ass'n*, 238 F.2d at 117; *see also United States v. Champion Int'l Corp.*, 557 F.2d 1270, 1273 (9th Cir. 1977) ("[A] new bidding pattern had thus developed by 'normal economic forces', presumably in a noncollusive evolution . . . . But despite the innocent beginnings of the noncompetitive bidding, the trial court found collusion in its continuation.").

[366] *See Re/Max Int'l, Inc. v. Realty One, Inc.*, 173 F.3d 995, 1009 (6th Cir. 1999); *see also In re Pool Prods. Distribution Mkt. Antitrust Litig.*, 988 F. Supp. 2d 696, 713 (E.D. La. 2013) (finding that evidence of acts that "risk a loss of market share to the other manufacturers" are acts against economic self-interest supporting claim of conspiracy); *Toys "R" Us, Inc. v. FTC*, 221 F.3d 928, 935 (7th Cir. 2000) (noting that an act that "deprive[s] itself of a profitable sales outlet" is evidence supporting a conspiracy).

shows Benco acted against self-interest, instead it attacks Dr. Marshall's profitability analysis. But Benco's tactic fails, as the factual record standing alone is sufficient to establish this plus factor; Dr. Marshall's analyses merely corroborate the factual record.

The fact that Benco began working with the buying group, EDA, after the conspiracy began to fall apart establishes that Benco acted against its self-interest during the conspiracy.[367] Benco believed that EDA could bring Benco more than 250 customers and gain more than $25 million in sales,[368] and EDA has in fact delivered by providing new customers and new sales.[369] The evidence also shows that before and after the conspiracy, Schein and Patterson profited by discounting to buying groups.[370] Indeed, Patterson's post-trial brief concedes that "Patterson is today indisputably working with buying groups, as are Schein and Benco."[371] These indisputable market facts belie Benco claims that its policy made business sense because buying groups do not lead to incremental sales.[372]

Moreover, the factual record shows that buying groups *do* drive new business to a distributor.[373] For example, [redacted].[374] Similarly, other full-service distributors like Nashville Dental and [redacted] gained sales by partnering with buying groups.[375] [redacted].[376] During the conspiracy, Benco knew

[367] CCFF ¶¶ 1367-1370.
[368] CCFF ¶¶ 1376-1377.
[369] CCFF ¶¶ 1385-1386.
[370] CCFF ¶¶ 446-453, 894, 1260-1266, 1316, 1319-1321, 1347-1349, 1364, 1700, 1722-1724; *see also* PFF ¶ 761.
[371] Patterson Post-Tr. Br. at 32.
[372] Benco Post-Tr. Br. at 32.
[373] CCFF ¶¶ 1297-1299, 1301, 1306, 1313-1312, 1685-1687, 1689, 1694-1697, 1700, 1718, 1723-1725, 1730; *see also* 1652-1654, 1656, 1644, 1666, 1673, 1681, 1727, 1729.
[374] CCFF ¶¶ 1306, 1301, 1653, 1664, 1695.
[375] CCFF ¶¶ 1312-1313, 1672-1673.
[376] CCFF ¶¶ 1314-1315.

that, due to its no buying group policy, it was losing customers who switched to competitors supplying buying groups.[377] Courts have found such facts to be evidence of collusion.[378]

Tellingly, Benco's sales representatives viewed buying groups as a profitable sales channel and sought to do business with them.[379] In fact, the incentive to do business with buying groups was so strong that Respondents' senior management had to instruct its sales team repeatedly against such actions.[380] For example, when a regional manager advocated working with a group, noting "[t]hat's a total of 5 to 8 million dollars in merch business that his clients will buy from us that currently are buying from [S]chein and [P]atterson," Benco's Cohen responded: "we don't offer discounts to buying groups."[381] Another Benco regional manager noted that discounting to a buying group "would be a great opportunity to win some business from Schein," to which Benco's Ryan responded: "We do not participate in buying groups."[382] Similarly, when Schein's upper management learned that its team was "putting a buying group together," it sent the message that such deals were "against what Tim Sullivan has directed us to do."[383]

Further, the contemporaneous documents and testimony show that each Respondent was concerned about its rivals discounting to buying groups—evidence that is utterly at odds with Respondents' claim that no distributor had a unilateral incentive to discount to buying groups.[384]

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[377] CCFF ¶ 53; CCRF (Benco) ¶ 414 (citing Ryan, Tr. 1129-1130, CX0013 at 001). *See also* CCFF ¶¶ 1294-1295, 1655, 1658-1661, 1665, 1667, 1674, 1678-1679.

[378] *In re Text Messaging Antitrust Litig.*, 782 F.3d 867, 876 (7th Cir. 2015) ("Circumstantial evidence of such collusion might be a decline in the market shares of the leading firms in a market, for their agreeing among themselves to charge a high fixed price might have caused fringe firms and new entrants to . . . take sales from the leading firms.").

[379] CCFF ¶¶ 1291-1294.

[380] CCFF ¶¶ 404, 406, 773, 1293; CCRF (Benco) ¶ 414 (citing CX1120, CX1242, CX0170).

[381] CCFF ¶ 404 (quoting CX1120 at 001); CCRF (Benco) ¶ 414.

[382] CCFF ¶ 406 (quoting CX1242 at 001-002); CCFF ¶ 1293.

[383] CCFF ¶ 773 (quoting CX0170 at 001); *see also* CCFF ¶¶ 776-777.

[384] CCFF ¶ 217 (Cohen, Tr. 470 ("A. I'm concerned with any change in the strategy at Schein and Patterson. Q. Including patnering with a buying group? A. Yes.")); CCFF ¶ 253 (CX0314 (Guggenheim, IHT at 266 ("Q. And what's the concern if Schein and Benco bid on this group? A. The potential that we could lose the business.")); CCFF ¶ 240 (Sullivan, Tr. 3912 ("Q. If Schein does not work with a buying group . . . there's a potential that the buying group could shift Schein's customers to a competitor, right? A. Correct. Q. That would be a risk to Schein's business? A. That is correct.")).

Patterson's contemporaneous SWOT analysis identified the threat of "Emergence of GPOs and *our competitors* [*sic*] willingness to negotiate with these groups";[385] [redacted];[386] and Schein's internal analysis tried to determine if buying groups would "be successful in *baiting a Dental company* into working with them."[387] In addition, Respondents' executives expressed the same concerns in contemporaneous emails, with statements such as "I'm concerned that Schein and Benco sneak into these [buying group] bids and deny it"[388] and "Better tell your buddy Tim to knock this shit off."[389] These documents only make sense if Respondents believed that they each had an incentive to discount to buying groups.[390] Further, if buying groups stood for nothing but a losing proposition, Respondents would not have been concerned about competitors doing business with these entities (indeed, they should have been happy to let their competitors enter into unprofitable arrangements), and would certainly have had no incentive to alert the competitors to market intelligence that the competitors were discounting to buying groups.

Even if it were within Benco's unilateral self-interest to refrain from discounting to buying groups until Schein and/or Patterson sufficiently "open[ed] this door," the evidence shows that Benco believed it would have been forced to discount to buying groups as its largest rivals began discounting to buying groups:

- "If this door is ever opened in dental, it['s] all over for all of us. . . . [P]icture a day when every single customer of yours is in some kind of buying club and all margins are now 12% over cost and it['s] a race to the bottom."[391]

[385] CCFF ¶ 227 (quoting CX3283 at 010) (emphasis added).
[386] CCFF ¶ 232 [redacted].
[387] CCFF ¶ 242 (quoting CX0193 at 014) (emphasis added).
[388] CCFF ¶¶ 540, 1188 (quoting CX0092 at 001).
[389] CCFF ¶ 982 (quoting CX0018).
[390] *See In re Benco Dental Supply Co.*, Docket No. 9379, 2018 WL 6338485, at *10 n.10 (FTC Nov. 26, 2018) (finding that Patterson VP of Sales, Misiak's email stating "I'm concerned that Schein and Benco sneak into these co-op bids and deny it" "makes sense only if he believed that Schein and Benco had an incentive to sell to buying groups").
[391] CCFF ¶ 527 (quoting CX1149 at 002).

- "Once a national dealer opens this door [to buying groups], in less than 5 years, we will turn into medical and be working for 10 percent over cost."[392]

These documents show that even though Benco maintained a no buying group policy, it was concerned that it would need to lower its prices as its competitors increased their discounting to buying groups.[393] Again this contradicts Benco's argument that buying groups did not lead to incremental sales. If that were true, it would never have feared that it would need to lower prices if a competitor worked with a buying group.

3. Dr. Marshall's Profitability Analysis Is Well Supported.

While the documentary evidence alone establishes Respondents acted against their self-interest in agreeing to a no-buying group policy, *supra* Section I.D.2, Dr. Marshall's profitability analysis further corroborates that Respondents' policies against discounting to buying groups were contrary to their unilateral economic interest.[394] Benco's critiques of Dr. Marshall's analysis do nothing to undermine the otherwise convincing evidence of conduct against self-interest, explained above.

[392] CCFF ¶ 266 (quoting CX0016 at 002).

[393] While Benco's conduct during the conspiracy was against its unilateral self-interest, that same conduct prior to the conspiracy was not necessarily contrary to its unilateral self-interest. Oligopolistic interdependence explains Benco's pre-conspiracy conduct. Once Benco's biggest competitors, Patterson and Schein, began pursuing buying groups, Benco's refusal to bid became an action against self-interest, and this is precisely what motivated Benco to organize the conspiracy in the first place.

[394] To the extent Dr. Marshall considered the factual record in preparing his report, it was appropriate to do so. "It is consistent with sound economic practice to review the factual record and formulate a hypothesis that can then be tested using economic theory—the examination of the factual record is necessary to determine which tests to run and to confirm that the stories drawn from the data and from the factual record are consistent." *In re Processed Egg Products Antitrust Litigation*, 81 F. Supp. 3d 412, 424 (E.D. Pa. 2015).

Benco first criticizes Dr. Marshall for analyzing only two buying groups, Kois and Smile Source, and not studying 36 others.[395] *First*, Benco is incorrect that Dr. Marshall only offered an opinion with respect to two buying groups.[396] On the contrary, Dr. Marshall testified at trial that it was against Respondents' self-interest to "make[] a blanket statement []: We don't do business with buying groups."[397] *Second*, Dr. Marshall reviewed Kois and Smile Source because they were representative of the market in that they covered a broad geography of the country, a broad time span from 2012 through 2017, and they were varied in terms of size and stage of existence.[398] Like all buying groups, Kois and [redacted][399] This characteristic was important because Respondents claim it was against their self-interest to discount to buying groups because buying groups do not drive compliance and thus, cannot lead to incremental profits.[400] Dr. Marshall's profitability analyses showed that Kois and Smile Source [redacted].[401] That Dr. Marshall did not study 36 other buying groups does not diminish his results from the Smile Source and Kois natural experiments.[402] Many of these groups were never fully formed because they could not secure supply discounts from Respondents, precluding any data analysis.[403]

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[395] Benco Post-Tr. Br. at 36. *See also* Patterson Post-Tr. Br. at 59; Schein Post-Tr. Br. at 78.

[396] Benco Post-Tr. Br. at 36.

[397] CCRF (Benco) ¶¶ 1038-1039; *see also* Complaint Counsel's Response to Patterson's Proposed Findings of Fact ("CCRF (Patterson)") ¶¶ 713-714; CCRF (Schein) ¶¶ 1689-1690, 1695.

[398] CCFF ¶¶ 1642-1643; CCRF (Benco) ¶ 1038-1041; CCRF (Patterson) ¶ 716; CCRF (Schein) ¶¶ 1689-1690.

[399] CCRF (Benco) ¶ 1040 (Kois, Sr., Tr. 181 ("[T]hey're free to purchase from whoever they want to."); [redacted]; *see also* CCRF (Benco) ¶¶ 1039-1042, 1044-1046, 1049, 1060; CCRF (Patterson) ¶ 716; CCRF (Schein) ¶¶ 1689-1690.

[400] *See* Benco Post-Tr. Br. at 33 (arguing that buying groups cannot guarantee volume).

[401] CCFF ¶¶ 1647-1684.

[402] Tellingly, Respondents do not argue that Dr. Marshall's numbers are wrong, nor do their own experts calculate lost sales and profits from any of the 36 other buying groups. As discussed, *infra* Section I.D.3, studying natural experiments is a widely accepted method of analysis in antitrust cases. *See, e.g.*, *In re NCAA Athletic Grant-in-Aid Cap Antitrust Litig.*, No. 14-md-02541 CW, 2019 WL 1747780, at *13 (N.D. Cal. Mar. 8, 2019) (expert analysis based on natural experiments "reliable and persuasive").

[403] CCRF (Benco) ¶ 997 (citing CX7101 at 064 (¶ 163) (Marshall Expert Rebuttal Report)); *see also* CCRF (Patterson) ¶ 713; CCRF (Schein) ¶¶ 1689-1690.

Nor is Dr. Marshall's analysis unreliable as applied to Benco [redacted].[404] The purpose of Dr. Marshall's profitability studies was to assess whether buying groups drive incremental business to the contracted distributor, and thus, whether it was against Benco's self-interest to implement an across-the-board no buying group policy.[405] In other words, Dr. Marshall's studies analyze the switching behavior of *independent dentists* upon joining a buying group. It is irrelevant that the studies analyzed data of other *distributors*, since all the distributors sell to the same customer base.[406] Moreover, Dr. Marshall's analysis studied the effects of cannibalization and showed that, even in a market in which it enjoyed a high market share, Burkhart benefitted incrementally by discounting to buying groups.[407] [redacted].[408]

Benco next claims Dr. Marshall's analysis proves too much by demonstrating that Benco acted contrary to its self-interest before joining the conspiracy and after the conspiracy fell apart.[409] Benco attempts to put the onus on Dr. Marshall's profitability analyses to prove all aspects of Complaint Counsel's case. The analyses do no more than corroborate that buying

[404] Benco Post-Tr. Br. at 37; CCRF (Benco) ¶¶ 1063-1065.

[405] CCRF (Benco) ¶¶ 1002, 1063-1064.

[406] Indeed, it was impossible to analyze Benco's sales to buying groups during the conspiracy period because of the conspiracy. CCRF (Benco) ¶ 1064 (citing Marshall, Tr. 3373 (Dr. Marshall explaining that he could not specifically study Benco's relationship with Kois because "Benco was not a supplier to Kois buying group.")).

[407] CCRF (Benco) ¶¶ 1074-1075; *see also* CCRF (Patterson) ¶¶ 696-697; CCRF (Schein) ¶¶ 1748-1752.

[408] CCRF (Benco) ¶¶ 1074-1075. [redacted]. CCFF ¶ 1996; *see also* CCRF (Benco) ¶¶ 1190-1193.

[409] Benco Post-Tr. Br. at 34-35. Patterson and Schein make similar arguments. Patterson Post-Tr. Br. at 60; Schein Post-Tr. Br. at 95.

groups provide opportunities for incremental sales.[410] As explained above, Benco may have adopted a no buying group policy pursuant to its self-interest before the conspiracy, but knew that it could not maintain the policy if its largest rivals began working with buying groups,[411] which became a reality and prompted the conspiracy.[412] Additionally, following the conspiracy, Benco worked with buying group EDA, and sought to get the Kois Buyers Group to join EDA.[413]

Benco spends pages arguing that, rather than the natural experiments Dr. Marshall conducted, he should have done a "counterfactual" analysis to identify the actual sales and profits from dealing with buying groups.[414] Yet, Benco cites to no authority requiring a plaintiff to do such an analysis to show conduct against self-interest,[415] and Complaint Counsel is aware of none. Further, it was not possible to reconstruct a hypothetical marketplace absent the conspiracy because, as a result of Respondents' conduct, no such data exists; Respondents cannot destroy the counterfactual world and then gripe when Dr. Marshall fails to study non-existent data.[416] Moreover, Dr. Marshall used the well-recognized method of analyzing natural experiments to determine the impacts on price, margin, and customer switching when distributors begin and/or stop working with a buying group, as well as the price and margin

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[410] CCRF (Schein) ¶¶ 1662-1669 (explaining that Dr. Marshall's analyses are consistent in demonstrating that it was against Respondents' unilateral economic self-interest to have a no buying group policy whereby Respondents instructed their employees to categorically reject all buying groups, irrespective of the time period).

[411] CCFF ¶¶ 214-218, 232, 246-249.

[412] CCFF ¶¶ 432-473.

[413] CCRF (Benco) ¶ 242 (CX1084 at 003 ("JLR and I convinced [EDA] that . . . we should bring in Seattle Study Club and Kois as additional partners, because of their broad market reach and strong brands.").

[414] Benco Post-Tr. Br. at 37-40. Schein puts forward the same unwarranted critique but uses different terminology, arguing that Dr. Marshall should have done a "but for" analysis. Schein Post-Tr. Br. at 95.

[415] Benco Post-Tr. Br. at 38-40. Neither does Schein or Patterson. Schein Post-Tr. Br. at 94-95; Patterson Post-Tr. Br. at 59-61.

[416] *Cf. United States v. Microsoft Corp.*, 253 F.3d 34, 79 (D.C. Cir. 2001) ("To require that Section 2 liability turn on a plaintiff's ability or inability to reconstruct the hypothetical marketplace absent a defendant's anticompetitive conduct would only encourage monopolists to take more and earlier anticompetitive action. . . . [N]either plaintiff nor the court can confidently reconstruct a product's hypothetical technological development in a world absent the defendant's exclusionary conduct. To some degree, 'the defendant is made to suffer the uncertain consequences of its own undesirable conduct.'") (quoting Areeda & Hovenkamp ¶ 651c).

impacts on independent dentist buying group members.[417] Studying natural experiments is a widely accepted method of analysis in antitrust cases.[418] Even Respondents' experts concede the value of natural experiments: Patterson's economic expert Dr. Wu employed a natural experiment in conducting a product market analysis in his expert report.[419] Similarly, Schein's economic expert, Dr. Carlton, has recognized natural experiments as "convincing evidence."[420]

Benco also criticizes Dr. Marshall for not studying a broader percentage of the total number of dentists nationwide.[421] To analyze the profitability of discounting to buying groups, however, Dr. Marshall needed to study sales for dentists who were buying group members; examining sales of independent dentists who were not members of buying groups would have been irrelevant.[422] Dr. Marshall's studies analyzed the purchasing behavior of *all* dentists who were members of Smile Source and Kois who purchased from the buying group distributor.[423]

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[417] CCFF ¶¶ 1637-1684; CCRF (Benco) ¶¶ 1023-1025; CCRF (Schein) ¶¶ 1715-1717 (contrasting Dr. Marshall's natural experiments with Dr. Carlton's unreliable and unsupported "formula" that Schein attempts to use to buttress its but-for world arguments); *see also* Bruce D. Meyer, *Natural and Quasi-Experiments in Economics* 13 J. BUS. & ECON. STAT. 152-158 (1995) (discussing the validity of natural experiments involving before and after designs with various comparison and treatment groups) (attached hereto as Attachment B); *Proving Antitrust Damages: Legal and Economic Issues*, ABA SEC. ANTITRUST L., 89-99, 179, 186-187, 227-235 (3d ed. 2017) (discussing the validity of before-during-after and yardstick models) (attached hereto as Attachment C); *Issues In Competition Law and Policy*, ABA SEC. ANTITRUST L. 2331, 2335-2339 (2008) (same) (attached hereto as Attachment D); *Econometrics Legal, Practical, and Technical Issues*, ABA SEC. ANTITRUST L. 301-324 (2d ed. 2014) (same) (attached hereto as Attachment E).

[418] *See, e.g.*, *In re NCAA Athletic Grant-in-Aid Cap Antitrust Litig.*, No. 14-md-02541 CW, 2019 WL 1747780, at *13 (N.D. Cal. Mar. 8, 2019) (expert analysis based on natural experiments "reliable and persuasive"); *FTC v. ProMedica Health Sys., Inc.*, No. 3:11 CV 47, 2011 WL 1219281, at *14 (N.D. Ohio Mar. 29, 2011) (relying on "real-world natural experiments in the marketplace" to confirm that merging parties competed for significant number of patients in the marketplace); *FTC v. Penn State Hershey Med. Ctr.*, 838 F.3d 327, 345 (3d Cir. 2016) (relying on results of natural experiment); U.S. Dep't of Justice & FTC Horizontal Merger Guidelines ("Merger Guidelines") § 2.1.2 (2010) ("The [antitrust enforcement] Agencies look for historical events, or 'natural experiments,' that are informative regarding the competitive effects of the merger."); *FTC v. Foster*, No. CIV 07-352 JBACT, 2007 WL 1793441, at *38 (D.N.M. May 29, 2007) ("
natural market experiments to provide the relevant evidence.").

[419] CCRF (Benco) ¶ 1023 (RX2833-050, at ¶ 122 (Wu Expert Report) ("I also looked at this natural experiment to determine whether dentists are turning to full-service distributors to discipline the prices charged by online distributors like Darby.").

[420] *United States v. AT & T Inc.*, 310 F. Supp. 3d 161, 215 (D.D.C. 2018) ("Professor Carlton recognize[s] that empirical analysis of prior, similar transactions can be 'convincing evidence.'").

[421] Benco Post-Tr. Br. at 38. *See also* Patterson Post-Tr. Br. at 61-62.

[422] CCRF (Benco) ¶¶ 1026-1028; *see also* CCRF (Patterson) ¶¶ 733-740; CCRF (Schein) ¶¶ 1689-1690.

[423] CCRF (Benco) ¶¶ 1026-1028; *see also* CCRF (Patterson) ¶¶ 733-740; CCRF (Schein) ¶¶ 1689-1690.

This entailed the analysis of hundreds of dentists across the country—[redacted].[424] There is nothing to suggest that the purchasing behaviors of these dentists are not representative of other buying group members. Indeed, given Respondents' conspiracy, buying groups remained a small segment of the market, thus significantly limiting the number of dentists appropriate for these studies. If followed, Respondents' attempt to gerrymander the biggest possible denominator to include all dentists in the country creates an absurd result that is of no use to this Court.[425]

Finally, Benco argues that Dr. Marshall did not undertake any analysis of how much profit Benco could have earned by deploying its resources elsewhere.[426] First, this argument is based on a false premise because Benco's no buying group policy was unrelated to resource constraints.[427] Second, while Benco relies on Dr. Johnson, [redacted].[430] Dr. Marshall, on the other hand,

[424] CCFF ¶¶ 1642-1643; CCRF (Benco) ¶¶ 1026-1028, 1038-1041; CCRF (Patterson) ¶¶ 733-740; CCRF (Schein) ¶¶ 1689-1690.

[425] Benco also quibbles with Dr. Marshall's analysis, arguing that he failed to consider the cost to distributors of paying administrative fees and rebates. These costs did not change Dr. Marshall's overall opinions, however, so they are irrelevant. CCRF (Benco) ¶ 1126 [redacted]. Dr. Marshall's profitability analysis demonstrated that the end of Schein's relationship with Smile Source was unprofitable for Schein and that it was [redacted]. CCRF (Benco) ¶ 1126.

[426] Benco Post-Tr. Br. at 40.

[427] CCFF ¶ 397 (Benco always had the ability to sell to buying groups); CCRF (Benco) ¶ 189 (Ryan, Tr. 1031 ("So in other words, it has not been a matter of resources restraining Benco from selling to buying groups? A. No.")).

[428] CCFF ¶ 1996; CCRF (Benco) ¶¶ 1190-1193 (responding to Benco's proposed findings on this point).

[429] CCRF (Benco) ¶¶ 1190-1193.

[430] CCFF ¶¶ 1999-2003; CCRF (Benco) ¶¶ 1190-1193, 1197-1198, 1200-1203, 1207-1208, 1210-1213, 1237-1242.

examined the complete data across all MSAs. For example, [redacted].[431]

In sum, Dr. Marshall's profitability analysis bolsters the record evidence establishing that Respondents' coordinated policies against discounting to buying groups was contrary to their unilateral economic interest.

4. A Finding that Respondents Acted In Accordance with Individual Self-Interest Does Not Defeat a Conspiracy Finding.

Benco claims that, where Respondents acted in accordance with their individual self-interest, it defeats the inference of a conspiracy.[432] But none of the cases that Benco cites says anything of the sort. Instead, Benco's cases simply stand for the unsurprising proposition that no conspiracy can be found in the absence of acts against self-interest, *if* there is insufficient *other* evidence to support a finding of conspiracy.[433] Thus, while evidence of conduct against self-interest is a plus factor tending to show the existence of a conspiracy, the lack of this evidence does not detract from other evidence of conspiracy.

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[431] CCFF ¶¶ 2002-2003; CCRF (Benco) ¶¶ 1207-1208, 1210-1213; *see also* CCRF (Benco) ¶¶ 1190-1193, 1197-1198, 1200-1203 [redacted], and CCRF (Benco) ¶¶ 1237-1242 [redacted].

[432] Benco Post-Tr. Br. at 31.

[433] *Orson Inc. v. Miramax Film Corp.*, 79 F.3d 1358, 1362-65 (3d Cir. 1996) (vertical restraint of trade case holding no conspiracy where plaintiff failed to establish motive to conspire and conduct was in defendants' self-interest); *Todorov v. DCH Healthcare Authority*, 921 F.2d 1438, 1455-59 (11th Cir. 1991) (plaintiff produced no direct or unambiguous evidence of a conspiracy and identified no motive to conspire, and the defendant provided "amply supporte[d]" procompetitive reasons for its behavior); *Merck-Medco Managed Care, LLC v. Rite Aid Corp.*, No. 98-2847, 1999 WL 691840, at *2, 9-15 (4th Cir. 1999) (unpublished) (group boycott case resting entirely on parallel behavior and "plus-factor" circumstantial evidence where no evidence of actions against self-interest, nor an utter failure to negotiate with the boycotted entity); *In re Citric Acid*, 191 F.3d 1090, 1093 (9th Cir. 1999) (no direct communications between defendant and co-conspirators on the subject matter of the conspiracy); *Valspar Corp. v. E.I. Du Pont De Memours and Company*, 873 F.3d 185, 194-95 (3d Cir. 2017) (parallel conduct case without any evidence of inter-firm communications on the subject matter of the conspiracy); *Wilcox Development Co. v. First Interstate Bank of Oregon, N.A.*, 605 F. Supp. 592 (1985) (parallel conduct case without any evidence of inter-firm communications on the subject matter of the conspiracy).

Indeed, Courts have explicitly rejected Benco's argument. In *United States v. Apple, Inc.*, the Second Circuit rejected Apple's claim that evidence of conduct consistent with business interests undermined a finding of conspiracy.[434] Likewise, in *Gainesville*, the Fifth Circuit upheld a finding of conspiracy despite defendants' claims that they based their conduct on valid economic considerations.[435] As the Supreme Court held in *United States v. General Motors Corp.*, "[i]t is of no consequence . . . that each party acted in its own lawful interest."[436]

II. RESPONDENTS' COORDINATED REFUSAL TO DISCOUNT TO BUYING GROUPS WAS A *PER SE* VIOLATION OF ANTITRUST LAWS, MEANING PROOF OF ACTUAL HARM IS NOT REQUIRED.

A. Respondents' Agreement was *Per Se* Unlawful.

Neither Patterson nor Schein contest that Respondents' agreement, if established, is anything but *per se* unlawful. Benco, on the other hand, claims that Respondents' agreement was not *per se* unlawful. Tellingly, Benco concedes that agreements that "always or almost always tend to restrict competition" are *per se* unlawful,[437] yet it fails to explain how an agreement preventing the three largest dental products distributors from discounting to buying groups—entities comprised of independent dentists seeking lower prices by aggregating purchasing power—is not an agreement that restricts competition.[438]

Instead of addressing the countless cases that have already held an agreement among competitors not to discount is *per se* unlawful,[439] Benco argues that Complaint Counsel must present "empirical" evidence of "demonstrable economic effect" to establish that this is a *per se* case.[440] The entire purpose of the *per se* rule, however, is to avoid precisely the type of empirical analysis that Benco urges for agreements, like the one at issue here, that are inherently

[434] 791 F.3d 290, 316 (2d Cir. 2015).
[435] *Gainesville Utils. Dep't v. Fla. Power & Light Co.*, 573 F.2d 292, 301 (5th Cir. 1978).
[436] *United States v. Gen. Motors Corp.*, 384 U.S. 127, 142 (1966).
[437] Benco Post-Tr. Br. at 44.
[438] *See* Benco Post-Tr. Br. at 43-48.
[439] *See* Complaint Counsel's Post-Tr. Br. at 40-41, 67-70.
[440] Benco Post-Tr. Br. at 44-45.

anticompetitive.[441] *Per se* unlawful agreements are condemned without "inquiry as to the precise harm they have caused" to avoid "economic investigation . . . to determine at large whether a particular restraint has been unreasonable."[442] To support its argument, Benco quotes inapposite language from *Continental T.V., Inc. v. GTE Sylvania Inc.*, where the Supreme Court held that *vertical restrictions* are subject to the rule of reason standard unless there are "demonstrable economic effect" to justify applying the *per se* rule.[443] The reason was that vertical restrictions have "economic utility" and stimulate "interbrand competition," and thus, could not be deemed *per se* unlawful.[444] *GTE Sylvania* has no application here—where Respondents have entered into a *horizontal* agreement to eliminate a form of competition that has no conceivable "economic utility."[445]

Benco also argues that this case is not subject to *per se* condemnation because courts do not have considerable experience with this type of challenged conduct.[446] Contrary to Benco's assertion, the Supreme Court has long recognized that "an agreement to eliminate discounts . . . falls squarely within the traditional *per se* rule against price fixing."[447] And a long line of lower

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[441] *Denny's Marina, Inc. v. Renfro Prods., Inc.*, 8 F.3d 1217, 1222 (7th Cir. 1993) (overturning district court's ruling that plaintiff must first establish potential impact on market before establishing the agreement is *per se* unlawful, noting "one of the purposes of the *per se* rule is that in cases like this such a potential [for impact on the market] is so well-established as not to require individualized showings").

[442] *Northern Pac. R. Co. v. United States*, 356 U.S. 1, 5 (1958); *Denny's Marina*, 8 F.3d at 1221 ("As far back as 1940, it has been clear that horizontal price-fixing is illegal *per se* without requiring a showing of actual or likely impact on a market.").

[443] 433 U.S. 36, 58 (1977).

[444] *Cont'l T.V.*, 433 U.S. at 51, 58.

[445] Benco also attempts to twist the Supreme Court's words in *NCAA v. Board of Regents of University of Oklahoma*, claiming that the Court held that the "essential inquiry" under both rule of reason and *per se* is "whether there is an impact on competition." Benco Post-Tr. Br. at 44. Instead, the Supreme Court held that the essential inquiry was "whether or not the challenged restraint *enhances* competition." *NCAA v. Bd. of Regents of Univ. of Okla.*, 468 U.S. 85, 104 (1984). Benco does not even attempt to argue that Respondents' agreement "enhance[d] competition."

[446] Benco Post-Tr. Br. at 44-45.

[447] *Catalano, Inc. v. Target Sales, Inc.*, 446 U.S. 643, 647 (1980).

court cases further affirm this holding.[448] It is of no consequence that these cases did not involve the dental products industry, or buying groups, for "it is experience with the *types of agreement* at issue" that determines whether application of the *per se* rule is appropriate.[449] It is well established that the type of agreement here—horizontal agreement to limit discounting—is subject to *per se* condemnation.

None of the cases advanced by Benco addressed a "naked" horizontal price fixing conspiracy, untethered from any procompetitive justification, as is the case here. *Continental T.V., Inc. v. GTE Sylvania Inc.* addressed an alleged vertical restriction, noting that vertical restrictions sometimes contain 'redeeming virtues' that promote competition and overruling *per se* application to vertical restrictions.[450] *National Collegiate Athletic Ass'n v. Board of Regents*, addressed a unique case "involv[ing] an industry in which horizontal restraints on competition are essential if the product is to be available at all."[451] In that case, therefore, the procompetitive justification was obvious.[452] Here, no such restraints are essential and not a single procompetitive justification has been identified. *Broadcast Music, Inc. v. Columbia Broadcasting System, Inc.* addressed the issue of blanket licensing of copyrighted music, in which the restraint at issue offered substantial procompetitive benefits including reducing costs, providing necessary resources for blanket sales and enforcement of copyrighted music.[453]

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[448] *Freeman v. San Diego Ass'n of Realtors*, 322 F.3d 1133, 1146 (9th Cir.2003) ("Agreements not to offer discounts are per se violations of section 1."); *United States v. Beaver*, 515 F.3d 730, 737 n.3 (7th Cir. 2008) ("[N]et-price-discount limit constituted an illegal price-fixing arrangement, and thus was . . . *per se* illegal"); *United States v. Olympia Provision & Baking Co.*, 282 F. Supp. 819, 828 (S.D.N.Y. 1968) ("The uniform minimum discounts . . . constituted illegal fixing under the circumstances herein. . . . It is also elementary that boycotts and attempted boycotts are illegal."); *TFWS, Inc. v. Schaefer*, 242 F.3d 198, 210 (4th Cir. 2001) ("volume discount ban is . . . a per se violation of the Sherman Act").

[449] *United States v. Kemp & Assocs., Inc.*, No. 2:16CR403 DS, 2019 WL 763796, at *4 (D. Utah Feb. 21, 2019).

[450] *Cont'l T.V.*, 433 U.S. at 54, 58-59.

[451] *NCAA*, 468 U.S. at 101.

[452] *NCAA*, 468 U.S. at 102 ("In performing this role, [NCAA's] actions widen consumer choice . . . and hence can be viewed as procompetitive.").

[453] *Broad. Music, Inc. v. Columbia Broad. Sys., Inc. ("BMI")*, 441 U.S. 1, 21-23 (1979).

Finally, *Texaco Inc. v. Dagher* dealt with a joint venture in which competitors pooled their capital and were thus viewed as a single firm under antitrust laws.[454]

Unlike the cases Benco cites, Respondents have not come up with a shred of evidence to suggest that the agreement here could foster competition, nor have they even argued that the agreement is not anticompetitive. Witness after witness acknowledged at trial that there are no procompetitive justifications for the communications at issue.[455] In fact, Patterson's own expert admits that an agreement not to discount to customers is anticompetitive.[456]

Next, Benco alleges that Respondents' agreement was not *per se* unlawful, claiming that there is no allegation that "Respondents discussed anything having to do with prices."[457] But it is well-settled law that *per se* treatment is not limited to agreements that literally set or fix prices.[458] Instead, any agreement that raises or stabilizes the price of a commodity is *per se* illegal, even where there is "no direct agreement on the actual prices to be maintained."[459]

The Supreme Court held in *Catalano* that an agreement among competing wholesalers to refuse to sell unless retailers made payments in cash was a *per se* price-fixing agreement.[460] In *United States v. Socony-Vacuum Oil*, the Court held that an agreement among competitors to engage in a program of buying surplus gasoline on the spot market in order to prevent prices from falling was a price-fixing agreement.[461] Similarly, in *United States v. Apple, Inc.*, the Second Circuit found that an agreement among publishers to shift the model of the ebook industry to eliminate Amazon's low pricing "comfortably qualifies as a horizontal price-fixing

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[454] 547 U.S. 1, 5-6 (2006).

[455] CCFF ¶¶ 1167-1177.

[456] CCFF ¶ 1175 (Wu: "As an economist, if there is an agreement among competitors to, not to discount to customers, then I would view that as being anticompetitive."). Wu testified that he was not offering any opinion that "an agreement among respondents not to do business with buying groups would have any pro-competitive benefits." CCFF ¶ 1175.

[457] Benco Post-Tr. Br. at 46.

[458] *BMI*, 441 U.S. at 8-9 ("But this is not a question simply of determining whether two or more potential competitors have literally 'fixed' a 'price.'"); *United States v. Apple*, 791 F.3d 290, 327 (2d Cir. 2015).

[459] *Catalano, Inc. v. Target Sales, Inc.*, 446 U.S. 643, 647 (1980).

[460] *Catalano, Inc. v. Target Sales, Inc.*, 446 U.S. 643, 650 (1980).

[461] *United States v. Socony-Vacuum Oil Co.*, 310 U.S. 150, 222 (1940).

conspiracy."[462] Thus, contrary to Benco's claim, Complaint Counsel need not introduce evidence that Respondents discussed "prices."[463] Respondents conspired to prevent a "huge price war"[464] and a "race to the bottom,"[465] based on knowledge that buying groups could result in dramatic industry-wide reduction in margins.[466]

Nor is Respondents' agreement saved from *per se* condemnation simply because Respondents competed for individual dentists[467] and the agreement was limited to buying groups.[468] While Respondents competed for individual dentists, the purpose of the conspiracy was to deprive dentists the opportunity to aggregate their business to increase their bargaining power.[469] Buying groups, as defined by Respondents' executives, "aggregate the purchase volume" of independent dentists "in order to leverage price."[470] Indeed, Benco's contemporaneous [redacted].[471] Further supporting these facts, Dr. Marshall's analysis of distributors' transactional data showed that dentists pay less for dental products upon joining a

[462] 791 F.3d 290, 327 (2d Cir. 2015) (citing *United States v. Socony-Vacuum Oil Co.*, 310 U.S. 150, 223 (1940)).

[463] Benco claims that the conspiracy did not cause harm because Respondents still competed aggressively for the business of dentists. Benco Post-Tr. Br. at 52-53. Yet, Dr. Marshall's evidence shows that distributors sold products for lower margins and reduced profits to individual buying group members. CCFF ¶¶ 1423-1433; CCRF (Benco) ¶ 1377-1378.

[464] CCFF ¶¶ 197, 689 (quoting CX2113 at 001).

[465] CCFF ¶ 198 (quoting CX1149 at 002).

[466] CCFF ¶¶ 198, 261, 690.

[467] Benco Post-Tr. Br. at 46.

[468] *See, e.g., United States v. Kemp & Associates, Inc.*, No. 2:16CR403, 2019 WL 763796, at *2 (D. Utah Feb 21, 2019) (finding that *per se* rule applies to customer allocation agreement even though the agreement implicated only 3-5% of Defendant's business).

[469] CCFF ¶¶ 1439-1441, 125-132.

[470] CCFF ¶ 67 (quoting CX1156 at 001).

[471] CCFF ¶ 1441 (citing [redacted].

buying group.[472] Thus, Respondents' competition for dentists on an individual basis is irrelevant.[473]

Finally, Benco argues that this is not a "group boycott" case, citing *FTC v. Indiana Federation of Dentists* ("*IFD*").[474] Benco's argument is based on an incorrect legal standard. *IFD* addressed a professional association's concerted refusal to deal on particular terms with third-party insurers.[475] In that case, the Court declined to apply *per se* treatment noting that courts have been "slow to condemn rules adopted by professional associations as unreasonable *per se*."[476] Benco rests its entire argument on dicta from *IDF* citing to the standard articulated in *Northwest Wholesale Stationers, Inc. v. Pacific Stationary and Printing Co.*[477] In that case, the Court noted that group boycotts "generally" involved joint efforts by a firm or firms to disadvantage competitors by cutting off access to a supply, facility, or market necessary to compete.[478] Nowhere did the Court in *IFD* or *Northwest* hold that *only* agreements targeting a competitor constitute a group boycott, however.[479] The Fifth Circuit rejected just such an argument: "Nothing in *Northwest Wholesale Stationers* or the Supreme Court's later cases [] establishes a bright-line rule limiting the application of the *per se* rule to cases in which the victim is a competitor."[480] In fact, four years after *IFD*, the Supreme Court held that an

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[472] CCFF ¶¶ 1423-1433, 1441.

[473] Benco also appears to argue that Respondents' agreement is not *per se* unlawful because buying groups are not "customers." Benco Post-Tr. Br. at 47. But Respondents did view buying groups as customers. CCFF ¶ 404 (citing CX1372 at 002 (Cohen: "Benco does NOT currently recognize as a single *customer* . . . Any kind of GPO." (emphasis added); CCFF ¶ 410 (citing CX1219 at 002 (Ryan: "Benco doesn't recognize GPOs as a single customer")); *see also* CCRF (Benco) ¶ 903 (citing CX0305 (Cavaretta, IHT at 119 ("A buying group would be . . . a customer of Henry Schein."); CX0312 (Fields, IHT at 77 ("Q. So you viewed GPOs or buying groups as customers? A. I do.")). In addition, whether Benco labeled buying groups customers or not, it is beyond dispute that buying groups negotiate discounts on behalf of independent dentists, who are undeniably customers. *See* CCFF ¶ 148 (Cohen, Tr. 432-33 ("A buying group is a group of dentists who . . . get together to negotiate a lower price on the products and services that they buy.")).

[474] Benco Post-Tr. Br. at 47-49.

[475] *FTC v. Ind. Fed'n of Dentists* ("*IFD*"), 476 U.S. 447, 459 (1986).

[476] *IFD*, 476 U.S. at 459.

[477] Benco Post-Tr. Br. at 47-49.

[478] *Nw. Wholesale Stationers, Inc. v. Pac. Stationary and Printing Co*., 472 U.S. 284, 294 (1985).

[479] *See IFD*, 476 U.S. 447, 459 (1986); *Nw. Wholesale Stationers*, 472 U.S. 284, 294 (1985).

[480] *Tunica Web Adver. v. Tunica Casino Operators Ass'n*, 496 F.3d 403, 413 (5th Cir. 2007).

agreement among a group of lawyers to refuse to compete for new clients was *per se* unlawful in *FTC v. Superior Court Trial Lawyers Association*.[481] The Court noted that "[p]rior to the boycott [] lawyers were in competition with one another . . . . The agreement . . . was implemented by a concerted refusal to serve an important customer in the market for legal services."[482] So too, here, Respondents concerted refusal to deal with buying groups should be condemned as *per se* unlawful.

B. Respondents' Failure to Offer Any Justification for the Agreement Means This Case Should *Not* Be Removed From the Ambit of the *Per Se* Rule.

Benco claims that Complaint Counsel offered alternative counts under the truncated rule of reason because it recognized the agreement here is not *per se* unlawful.[483] In reality, Complaint Counsel included these additional counts in the event that Respondents came forth with some plausible and cognizable procompetitive justification for their agreement. In *BMI*, the Supreme Court held that an agreement to fix prices may be removed from the ambit of the *per se* rule if the agreement is designed to "increase economic efficiency and render markets more, rather than less, competitive."[484] As explained in the Commission's opinion in *Polygram*, the truncated rule of reason was developed as an "intermediate approach[]" for conduct that resembled *per se* agreements but "also appeared to promote the attainment of valuable efficiencies."[485] Respondents' post-trial briefs fail to offer any efficiency or procompetitive

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[481] 493 U.S. 411, 418 (1990).

[482] *Superior Court Trial Lawyers Ass'n*, 493 U.S. at 422-23.

[483] Benco Post-Tr. Br. at 49.

[484] *Broadcast Music, Inc. v. Columbia Broadcasting System, Inc.*, 441 U.S. 1, 20 (1979); *see also NCAA v. Bd. Of Regents of Univ. of Okla.*, 468 U.S. 85, 100-01 (1984) (removing price fixing case from ambit of *per se* rule because "this case involves an industry in which horizontal restraints on competition are essential if the product is to be available at all").

[485] *In re Polygram Holding, Inc.*, Docket No. 9298, 2003 WL 25797195, at *9 (FTC July 24, 2003) (Comm'n Op.), *aff'd sub nom. PolyGram Holding, Inc. v. FTC*, 416 F.3d 29 (D.C. Cir. 2005).

justification for their agreement not to discount to buying groups, thus obviating the need to look past *per se* condemnation.[486]

C. Even if *Per Se* Treatment is Inapplicable, Respondents' Agreement was Unlawful Under a Truncated Rule of Reason Analysis.

1. Respondents' Agreement Should Be Analyzed Under a Truncated or "Inherently Suspect" Analysis.

Even if the Court does not find the agreement *per se* unlawful, it is unlawful under a truncated or "inherently suspect" rule of reason analysis. Benco's argument that the truncated rule of reason does not apply boils down to a single case, *California Dental Association* ("*California Dental*") *v. Federal Trade Commission*, but that case supports Complaint Counsel. *California Dental* affirmed the application of a truncated rule of reason where "the great likelihood of anticompetitive effects can easily be ascertained," including horizontal agreements to refuse to discuss prices with potential customers (*National Society of Professional Engineers*) and horizontal agreements to refuse to provide a service to customers (*Indiana Federation of Dentists*).[487] The facts here compel the same conclusion. Discounting to, and doing business with, buying groups is undeniably one form of competition among dental distributors. For example, as demonstrated by contemporaneous records and witness testimony, Schein gained $1.5 million in business from its competitors by doing business with the buying group, Smile Source, pre-conspiracy;[488] [redacted] ;[489] Benco gained new customers and sales by discounting to the EDA buying group post

[486] These *per se* rules against price fixing and group boycotts are not mere suggestions for administrative convenience, but rather have the "same force and effect as any other statutory commands." *FTC v. Superior Court Trial Lawyers Ass'n*, 493 U.S. 411, 432-33 (1990). Indeed, "the law *does not permit* an inquiry into their reasonableness. They are all banned because of their actual or potential threat to the central nervous system of the economy." *United States v. Socony-Vacuum Oil Co.*, 310 U.S. 150, 224 n. 59 (1940) (emphasis added).

[487] *California Dental Association v. FTC*, 526 U.S. 756, 770 (1999) (citing *Nat'l Soc'y of Prof'l Eng'r v. United States*, 435 U.S. 679, 692 (1978); *FTC v. Indiana Federation of Dentists*, 476 U.S. 447, 459 (1986)).

[488] CCFF ¶¶ 447, 1702 (citing CX2469 at 001).

[489] CCFF ¶¶ 1246, 1303, 1311; *see also* CCFF ¶¶ 1301-1302, 1304-1310.

conspiracy,[490] including stealing customers from Schein and Patterson.[491] Respondents' agreement preventing competition by discounting to buying groups eliminated one form of competition between the co-conspirators, and thus, was plainly anticompetitive. Indeed, the Commission has already held in *Polygram I* that "restraints on price discounting . . . are inherently suspect because experience and economic learning consistently show that restraints of this sort dampen competition and harm customers."[492] Indeed, the anticompetitive effects here are even more obvious than in *Polygram* because Respondents conspired to prevent a "huge price war"[493] and a "race to the bottom,"[494] based on knowledge that buying groups could result in dramatic industry-wide reduction in margins.[495]

Benco relies on *California Dental's* refusal to apply the truncated rule of reason to the association's restrictions on dentists' ability to advertise because defendants offered the plausible claim that the advertising restrictions had the procompetitive purpose and effect of preventing misleading or false advertising claims that distort the market.[496] The Court held the "likelihood of anticompetitive effects" was far less "obvious" in comparison to prior truncated rule of reason cases.[497] Unlike the restriction to limit advertising in *California Dental*, Respondents have not even attempted to argue (let alone offer evidence) that an agreement to refuse to discount to buying groups is procompetitive. Thus, *California Dental* has no application here.

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[490] CCFF ¶¶ 1385-1387.

[491] CCRF (Benco) ¶ 263 (citing CX1016 at 001, CX1086 at 008, CX1087 at 001). Dr. Marshall's profitability analysis further corroborates the factual record, demonstrating that distributors that do business with buying groups gain shares at the expense of other competitors. CCFF ¶¶ 1637-1684.

[492] *PolyGram Holding I*, 2003 WL 25797195, at *31; *see also N.C. State Bd. of Dental Exam'rs v. FTC*, 717 F.3d 359, 374 (4th Cir. 2013), *aff'd*, 135 S. Ct. 1101 (2015) ("It is not difficult to understand that forcing low-cost teeth-whitening providers from the market has a tendency to increase a consumer's price for that service."). *PolyGram* applied the truncated rule of reason rather than the *per se* rule because the agreement limiting discounting was tied to a joint venture rather than a naked restraint. *PolyGram Holding I*, 2003 WL 25797195, at *16-17.

[493] CCFF ¶¶ 197, 689 (quoting CX2113 at 001).

[494] CCFF ¶ 198 (quoting CX1149 at 002).

[495] CCFF ¶¶ 198, 261, 690.

[496] 526 U.S. at 776-79.

[497] 526 U.S. at 771.

2. Respondents' Agreement Harmed Competition.

Benco next claims that the record fails to support the allegation of harm.[498] Benco puts the cart before the horse. Under a truncated analysis, a defendant must first offer some plausible, cognizable justification for the restraint at issue to shift the burden to the plaintiff to show likelihood of harm.[499] Benco has not produced one iota of evidence of procompetitive justification to necessitate a more detailed showing that the restraint is likely to harm competition.[500]

Although no additional showing of harm is necessary, the record shows that Respondents' conspiracy harmed competition by preventing discounts to buying groups—entities that negotiate discounts off dental supplies for independent dentist members.[501]

Benco makes a half-hearted attempt to argue that there was no harm to competition because Respondents competed aggressively against each other for the business of *individual* dentists.[502] In effect, Benco suggests that the conspirators, rather than the individual dentists themselves, are entitled to determine whether the dentists would benefit from participating in buying groups. This argument fails. The Supreme Court has long held that competitors are "not entitled to preempt the working of the market" by eliminating competition, even if that competition has not been proven to have a significant impact on customers.[503] For example, in *IFD*, the Court held that a coordinated refusal to provide service to customers would be unlawful even if the service "were in fact completely useless," as an antitrust defendant "would still not be

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[498] Benco Post-Tr. Br. at 51-53.

[499] *PolyGram Holding I*, 2003 WL 2579715, at *15 ("If the challenged restrictions are of a sort that generally pose significant competitive hazards . . . then the defendant can avoid summary condemnation only by advancing a legitimate justification . . . .").

[500] Respondents have adduced no evidence to show that their coordinated refusal had no effect on competition, and such a showing would be irrelevant in any event. *See infra* note 503.

[501] CCFF ¶¶ 1391-1445.

[502] Benco Post-Tr. Br. at 52-53.

[503] *FTC v. Indiana Federation of Dentists*, 476 U.S. 447, 462 (1986).

justified in deciding on behalf of its members' customers that they did not need" the service.[504] Further, as explained above, and in Complaint Counsel's Post-Trial Brief, the very purpose of buying groups is to *increase individual* dentists' bargaining power by leveraging their collective purchasing volume.[505] Respondents' continued competition for individual dentists does nothing to diminish the harm to competition of an agreement that prevents individual dentists from aggregating their purchasing power to obtain better terms.

Benco next argues that Complaint Counsel must show "dentists paid more for dental products" to show harm to competition.[506] Benco confuses *harm to competition* for *injury-in fact*.[507] In *IFD*, applying the truncated rule of reason, the Court explicitly rejected the defendant's argument that the Commission was required to show higher prices to prove that the agreement was an unreasonable restraint of trade.[508] The Court held the concerted refusal to offer a service to customers was "likely enough to disrupt the proper functioning of the price-setting mechanism of the market that it may be condemned even absent proof that it resulted in higher prices."[509]

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[504] 476 U.S. 447, 462 (1986). For the same reason, Benco cannot shift the burden back to Complaint Counsel to demonstrate the effects of an inherently suspect conspiracy by attempting to show that the agreement had "no effect" on certain customers. *See also Nat'l Soc. of Prof. Eng'rs*, 435 U.S. 679, 694-95 n.21 (1978) ("[A]n individual purchaser's decision not to seek lower prices through competition does not authorize the vendors to conspire to impose that same decision on all other purchasers."); *Catalano, Inc. v. Target Sales, Inc.*, 446 U.S. 643, 649 (1980) ("[W]hen a particular concerted activity entails an obvious risk of anticompetitive impact with no apparent potentially redeeming value, the fact that a practice may turn out to be harmless in a particular set of circumstances will not prevent its being declared unlawful *per se*.").

[505] Complaint Counsel's Post-Tr. Br. at 9-11; *see also supra* Section II.A ("Respondents' Agreement was *Per Se* Unlawful").

[506] Benco Post-Tr. Br. at 52.

[507] Indeed, even the elimination of the "risk of competition" between the Big Three for buying groups "constitutes [a] relevant anticompetitive harm." *See FTC v. Actavis, Inc.*, 570 U.S. 136, 157 (2013).

[508] *IFD*, 476 U.S. at 461-62; *see also Catalano, Inc. v. Target Sales, Inc.*, 446 U.S. 643, 649 (1980) ("[W]hen a particular concerted activity entails an obvious risk of anticompetitive impact with no apparent potentially redeeming value, the fact that a practice may turn out to be harmless in a particular set of circumstances will not prevent its being declared unlawful *per se*."); *In re Flat Glass Antitrust Litig.*, 385 F.3d 350, 362-63 (3d Cir. 2004) (a horizontal agreement to fix prices is unlawful even if prices declined); *see also In re High Fructose Corn Syrup*, 295 F.3d at 656 ("An agreement to fix list prices is . . . a per se violation of the Sherman Act even if most or for that matter all transactions occur at lower prices.").

[509] *IFD*, 476 U.S. at 461-62.

The record shows that Respondents' (which together control over 80% of the market for dental supplies)[510] agreement to refuse to discount to buying groups harmed competition. Before the conspiracy, Respondents each decided independently whether to compete by discounting to buying groups, which resulted in Schein discounting to several buying groups, and Patterson nearly completing a buying group arrangement.[511] During the conspiracy, however, Respondents systematically instructed their respective sales forces to reject buying groups.[512] As a result, Respondents refused to discount to at least 29 buying groups.[513] After the collapse of the conspiracy, all three Respondents started competing by doing business with buying groups.[514]

Further, while the law does not require a showing of elevated prices, the record shows that buying groups obtain lower prices for dentists than they can on their own. Before and after the conspiracy, Respondents provided discounts to buying groups in the range of [redacted],[515] while many individual dentists paid catalog price.[516] Indeed, Schein argues in its post-trial brief that a 7% discount is "beyond what [dentists] could individually realize."[517] Similarly, [redacted]

[510] CCFF ¶¶ 1458 (citing CX2742 at 032), 1450, 1455-1457.

[511] CCFF ¶¶ 432-453 (Schein sold to buying groups before 2011); CCFF ¶¶ 454-473 (Patterson was negotiating with the New Mexico Dental Cooperative).

[512] CCFF ¶¶ 394-431 (Benco); CCFF ¶¶ 589-656 (Patterson); CCFF ¶¶ 717-860 (Schein); *see* also Complaint Counsel Post-Tr. Br. at 15-16, 23-24, 26-29.

[513] Complaint Counsel Post-Tr. Br. at 74-75; CCFF ¶¶ 935-939, 1750 (Academy of General Dentistry Buying Group); CCFF ¶ 418 (American Academy of Cosmetic Dentistry); CCFF ¶ 1750 (Business Intelligence Group); CCFF ¶ 645 (Catapult Group); CCFF ¶¶ 422, 646 (Dental Purchasing Group); CCFF ¶ 419 (Dental Visits LLC); CCFF ¶ 425 (Dentistry Unchained); CCFF ¶ 415 (DDS Group); CCFF ¶ 411 (Dr. David Carter); CCFF ¶ 417 (Erie Family Dental Equipment); CCFF ¶¶ 925-927 (Florida Dental Association); CCFF ¶ 750 (IDA); CCFF ¶ 423 (Insight Sourcing Group); CCFF ¶¶ 421, 639, 928-929, 1750 (Kois Buyers Group); CCFF ¶ 648 (Dr. Narducci Buying Group); CCFF ¶¶ 414, 643, 930 (New Mexico Dental Cooperative); CCFF ¶ 409 (Nexus Dental); CCFF ¶¶ 931-933, 1750 (Pacific Group Management Services); CCFF ¶¶ 948-951, 1750 (Pearl Network Buying Group); CCFF ¶¶ 412, 934, 1750 (Unified Smiles); CCFF ¶ 649 (UOBG); CCFF ¶¶ 410, 641 (Smile Source); CCFF ¶¶ 420, 644 (Dr. Stephen Sebastian); CCRF ¶ (Benco) ¶ 262 (CX1208 at 001, CCFF ¶ 404) (Save Dentists, Inc.); CCFF ¶ 424 (Schulman Group); CCFF ¶¶ 408, 952-954, 1750 (Synergy Dental Partners); CCFF ¶¶ 942-945 (Tralongo); CCFF ¶ 416 (WheelSpoke LLC); CCFF ¶ 413 (XYZ Dental).

[514] CCFF ¶¶ 1316-1387.

[515] CCFF ¶¶ 1391-1395, 1398-1410.

[516] CCFF ¶ 1415.

[517] Schein Post-Tr. Br. at 40.

[redacted].[518] In fact, Respondents' concern that the entry of buying groups would dampen their prices and margins prompted the conspiracy in the first place—each of the Big Three knew that growth of the buying group model in dental would result in lower margins.[519] Thus, the agreement to refuse to deal with buying groups deprives independent dentists of the ability to obtain those lower prices. Benco has no response to this factual record.

In addition, Dr. Marshall's analysis of dental distributors' transactional data further confirmed the evidence in the record.[520] Dr. Marshall's analysis tracked the prices and margins that buying group members (*i.e.*, individual dentists) paid to a distributor before and after the distributor began working with the buying group.[521] [redacted].[523] Benco does not even attempt to address the latter, which further confirms the record evidence that buying group members pay less for dental products than non-buying group members:

[518] CCRF (Benco) ¶ 383 [redacted].
[519] Complaint Counsel's Post-Tr. Br. at 12-14.
[520] CCFF ¶¶ 1412-1445.
[521] CCFF ¶¶ 1416-1422.
[522] CCFF ¶¶ 1419, 1421, 1423-1441.
[523] CCRF (Benco) ¶ 1377.

Benco argues the Court should ignore the results of Dr. Marshall's analysis because he failed to properly define a relevant market.[525] But market definition is not relevant to Dr. Marshall's analysis—which examined the distributors' transactional data— .[526] This result does not change no matter how one defines the market.[527]

[524] CCRF (Benco) ¶ 1377 (citing).

[525] Benco Post-Tr. Br. at 52.

[526] CCFF ¶¶ 1419, 1421, 1423-1441.

[527] Furthermore, as discussed in Complaint Counsel's opening brief, relevant market definitions are not necessary here because Respondents put forward no cognizable procompetitive justification for the restraint at issue and there is otherwise proof of anticompetitive harm. Complaint Counsel's Post-Tr. Br. at 79-80.

[redacted][528] Even if it were true, this happenstance would be completely irrelevant, as discussed above. Moreover, Benco's claim is unsupported in any event. [redacted].[531] Dr. Marshall looked across multiple geographic regions, multiple distributors, and multiple time periods to confirm his finding that dentists paid lower prices and margins upon joining a buying group.[532] By aggregating data—a standard economic tool that has been identified as one of the pillars of statistical analysis[533]—Dr. Marshall's analysis provides a much

[528] Benco Post-Tr. Br. at 53.
[529] CCRF (Benco) ¶ 1377. [redacted].
[530] CCRF (Benco) ¶ 1373; *see also* CX 7101 at 061 (¶ 156) (Marshall Rebuttal Expert Report).
[531] CCRF (Benco) ¶¶ 1373, 1377.
[532] CCFF ¶¶ 1416-1441.
[533] Stephen M. Stigler, *The Seven Pillars of Statistical Wisdom* 4, 13-44 (2016) (attached hereto as Attachment A).

more robust conclusion than the two MSAs cherry-picked by Dr. Johnson.[534] More importantly, Dr. Marshall's conclusions *confirm* the factual record (while Benco's argument *contradicts* the record), including [redacted].[535]

III. BENCO'S INVITATION TO COLLUDE VIOLATED SECTION 5.

A. The FTC Has Authority to Bring Invitation to Collude Cases.

Benco first challenges the FTC's ability to bring any invitation to collude case, ignoring binding Supreme Court precedent.[536] It is well-settled law that the FTC has authority to challenge behavior that "conflict[s] with the basic policies of the Sherman and Clayton Acts even though such practices may not actually violate those laws."[537] This authority enables the FTC to

[534] CCRF (Benco) 1373; *see also* CX 7101 at 062 (¶ 159) (Marshall Rebuttal Expert Report). [redacted] Dr. Wu's analyses also suffer from numerous other fundamental flaws that make it impossible for the Court to rely on them. *See* CCRF (Benco) ¶ 1373 (identifying additional flaws in Dr. Wu's analysis).

[535] CCFF ¶ 1406 [redacted]; Cohen, Tr. 449 (same)).

[536] Benco Post-Tr. Br. at 54-55.

[537] *FTC v. Brown Shoe Co.*, 384 U.S. 316, 321 (1966); *see also Fashion Originators' Guild v. FTC*, 312 U.S. 457, 466 (1941); *FTC v. Motion Picture Advertising Servs. Co.*, 344 U.S. 392, 394-95 (1953) ("It is also clear that the Federal Trade Commission Act was designed to supplement and bolster the Sherman Act and the Clayton Act to stop in their incipiency acts and practices which, when full blown, would violate those Acts.") (internal citations omitted); *FTC v. R.F. Keppel & Bro.*, 291 U.S. 304, 425 (1934) ("It would not have been a difficult feat of draftsmanship to have restricted the operation of the Trade Commission Act to those methods of competition in interstate commerce which are forbidden at common law or which are likely to grow into violations of the Sherman Act, if that had been the purpose of the legislation.").

stop behavior, which could otherwise ripen into a Sherman Act violation, at its incipiency.[538] In *Fashion Originators' Guild v. FTC*, the Supreme Court held that the petitioner need not succeed in achieving a complete monopoly to find a violation of the FTC Act.[539] "It was, in fact, one of the hopes of those who sponsored the [FTC Act] that its effect might be prophylactic and that through it attempts to bring about complete monopolization of an industry might be stopped in their incipiency."[540]

Benco relies on a single case, *Boise Cascade*, to argue that Section 5 of the FTC Act does not reach invitations to collude because invitations "involve[] no actual harm to competition."[541] *Boise Cascade* held that, where the Commission challenged an industry's use of a delivered pricing systems without any evidence of collusive behavior, the plaintiff must establish the effect of price fixing to make out a Section 5 violation.[542] Benco ignores that the court expressly limited its holding to allegations related to delivered pricing systems *in the absence* of any evidence of collusive behavior.[543] The court never held that the FTC Act does not extend to invitations to collude, and it certainly does not limit invitations like this one where there *is* attempted overt collusion.[544]

Benco next argues that an August 13, 2015 Commission statement somehow reflects a change in the Commission's long held views[545] that invitations to collude are "the quintessential

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[538] *Fashion Originators' Guild v. FTC*, 312 U.S. 457, 466 (1941); *FTC v. Cement Institute*, 333 U.S. 683, 693 (1948) ("All of the committee reports and the statements of those in charge of the Trade Commission Act reveal an abiding purpose to vest . . . the Commission . . . with adequate powers to hit at every trade practice . . . which restrained competition or might lead to such restraint if not stopped in its incipient stages."); *id.* at 708 ("A major purpose" of FTC Act is "to enable the Commission to restrain practices as 'unfair' which, although not yet having grown into Sherman Act dimensions would, most likely do so if left unrestrained.").

[539] 312 U.S. 457, 466 (1941).

[540] *Fashion Originators' Guild*, 312 U.S. at 466.

[541] Benco Post-Tr. Br. at 54-55.

[542] *Boise Cascade Corp. v. FTC*, 637 F.2d 573, 576-77 (9th Cir. 1980).

[543] 637 F.2d 573, 582 (9th Cir. 1980) ("[T]he law of delivered pricing is well forged . . . . [T]he Commission must find either collusion or actual effect on competition to make out a section 5 violation for use of delivered pricing.")

[544] 637 F.2d 573, 576-77 (9th Cir. 1980).

[545] Benco Post-Tr. Br. at 55.

example" of conduct that should be challenged.[546] On the contrary, that Commission statement confirmed its view that it has authority over invitations to collude and other cases "that contravene the spirit of the antitrust laws" and "if allowed to mature or complete, could violate the Sherman or Clayton Act."[547] As to anticompetitive effects, Benco's argument ignores that, had Burkhart accepted the invitation to collude, it would have been an anticompetitive agreement resulting in harm to competition without a shred of a procompetitive benefit.[548] That Burkhart declined the invitation does not immunize Benco from liability—the FTC Act is broader than the Sherman and Clayton Acts to deter just such pernicious behavior.[549] Indeed, a solicitation to engage in an anticompetitive agreement is dangerous "because of its *potential* to cause harm to consumers if the invitation is accepted."[550]

Finally, Benco argues that because invitations to collude have not been litigated in federal court, they must be rejected.[551] Benco ignores Supreme Court precedent establishing that the FTC has authority to bring cases that threaten antitrust principles even though they have not ripened into a Sherman Act or Clayton Act case.[552] Benco likewise ignores that the First Circuit explicitly recognized the FTC's authority to bring an invitation to collude as a standalone Section

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[546] *In re McWane, Inc.*, Docket No. 9351, 2012 WL 4101793, at *17 (FTC Sept. 14, 2012) (Comm'n Op.) (internal quotation omitted).

[547] Statement of Enforcement Principles Regarding "Unfair Methods of Competition" Under Section 5 of the FTC Act (Aug. 13, 2015). The Commission continues to bring new invitation to collude cases even where the solicitee rejects the invitation. *See, e.g.*, *In re Oregon Lithoprint Inc.*, File No. 161-0230, 2018 WL 1314915, at *1-2 (FTC Mar. 9, 2018) (Complaint).

[548] As established, *supra*, Respondents' agreement not to discount to a customer segment is *per se* unlawful (and unlawful under the truncated rule of reason analysis) because it causes harm to competition without a single procompetitive benefit. *See supra* Section II.A and II.C. As discussed in more detail *infra* Section III.B, had Burkhart accepted Benco's invitation to join the conspiracy, it too would cause harm to competition without any procompetitive benefit. CCFF ¶ 1250.

[549] *See In re Fortiline, Inc.*, No. 151-0000, 2016 WL 4379041, at *11 (FTC Aug. 9, 2016) (citing *In re Valassis Commc'ns*, No. C-4160, 2006 WL 6679058, at *8 (FTC Apr. 19, 2006) (Analysis of Agreement Containing Consent Order to Aid Public Comment)); *see also* Complaint Counsel's Post-Tr. Br. at 104 (discussing three policy rationales for the Commission's prosecution of invitations to collude).

[550] *Liu v. Amerco*, 677 F.3d 489, 494 (1st Cir. 2012) (emphasis added); *see also In re Valassis Commc'ns*, 2006 WL 6679058, at *8 (Analysis of Agreement Containing Consent Order to Aid Public Comment)).

[551] Benco Post-Tr. Br. at 55.

[552] *Fashion Originators' Guild v. FTC*, 312 U.S. 457, 466 (1941); *FTC v. Motion Picture Advertising Servs. Co.*, 344 U.S. 392, 394-95 (1953); *FTC v. Brown Shoe Co.*, 384 U.S. 316, 321 (1966).

5 violation;[553] leading scholars have endorsed the Commission's use of Section 5 to challenge unaccepted invitations to conspire;[554] and federal courts have upheld complaints alleging similar claims of attempted monopolization[555] and attempted price-fixing.[556]

B. The Evidence Establishes that Benco Invited Burkhart to Refuse to Discount to Buying Groups.

1. Benco Invited Burkhart on Three Occasions to Refuse to Discount to Buying Groups.

Benco next argues that the facts here fail to establish an invitation to collude. Benco is incorrect. The evidence shows that Benco invited Burkhart on three separate occasions to stop discounting to buying groups.[557] Benco's McElaney warned Reece over two telephone conversations to "be really careful"[558] working with buying groups because they were "not favorable to the dental industry."[559] Benco's Cohen also pressured Reece to stop working with buying groups, informing Reece that buying groups would cause "declining margins," "threaten profitability," and were unhealthy for the dental distribution industry.[560] Reece testified that over the course of the three unsolicited communications:

> Benco [ ] encouraged Burkhart not to engage in group purchasing organizations based on the fact that that was going to be detrimental to our business and certainly to the business in the dental industry.[561]

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[553] *Liu v. Amerco*, 677 F.3d 489, 494 (1st Cir. 2012).

[554] Philip Areeda & Herbert Hovenkamp, *Fundamentals of Antitrust Law* ("Areeda") ¶ 1419d (4th ed. 2011); Stephen Calkins, *Counterpoint: The Legal Foundation of the Commission's Use of Section 5 to Challenge Invitations to Collude is Secure*, 14 Antitrust 69 (Spring 2000).

[555] *United States v. American Airlines Inc.*, 743 F.2d 1114, 1122 (5th Cir. 1984).

[556] *Liu v. Amerco*, 677 F.3d 489, 494, 496 (1st Cir. 2012).

[557] CCFF ¶¶ 1199-1252.

[558] CCFF ¶¶ 1211, 1238; CCRF (Benco) ¶ 640 (quoting Reece, Tr. 4377).

[559] CCFF ¶ 1211 (quoting Reece, Tr. 4377).

[560] CCFF ¶ 1232; *see also* ¶¶ 1227-1231, 1234.

[561] CCFF ¶ 1237 (quoting Reece, Tr. 4391); *see also* CCFF ¶¶ 1211-1214, 1222, 1228, 1231-1232, 1234, 1238.

Burkhart declined Benco's advances and continued to work with new buying groups.[562] The year following Benco's invitation, Burkhart entered into a discounting arrangement with the Kois Buyers Group, offering members savings of at least [redacted] off catalog price.[563] Had Burkhart accepted Benco's offer, the impact would have been an increase in the price of dental supplies.[564]

Benco's argument boils down to three points, none of which refutes the existence of an invitation to collude. First, Benco claims that there was no invitation because Benco did not specifically inform Reece of its policy, and at the time of the conversations, Reece believed that Benco was selling to buying groups.[565] Benco misinterprets the underpinnings of an invitation to collude. It is the state of mind of Benco—the solicitor—that is relevant to establishing an invitation to collude.[566] Benco acted with the intent to facilitate collusion by encouraging Burkhart to match Benco's no buying group policy.[567] Benco's repeated emphasis on the harm to the industry as a whole[568] reflects its goal of collective action. Confirming Benco's intent, Benco sought to shore up the agreement with Schein and Patterson following the first telephone call in which Reece rebuffed McElaney's invitation.[569]

Furthermore, just as no magic words are required for an agreement, solicitors are not confined to any particular formula in making their solicitation.[570] As stated in the Areeda & Hovenkamp treatise, "The solicitation may appear ambiguous, such as when a competitor merely

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[562] CCFF ¶ 1240; CCRF (Benco) ¶ 641.

[563] CCFF ¶ 1240; CCFF ¶ 138 [redacted]; CCFF ¶ 1728; CCFF ¶ 164 (Kois Buyers Group started in 2014).

[564] CCFF ¶ 1250.

[565] Benco Post-Tr. Br. at 57.

[566] *See In re Valassis Commc'ns, Inc.*, Docket No. C-4160, 2006 WL 6679058, at *3 (FTC Apr. 19, 2006) (Complaint) (respondent's statements on an earnings call were made with "intent to facilitate collusion and without a legitimate business purpose.")

[567] CCFF ¶¶ 1217-1218. Following the first communication, Benco's McElaney reported that "I spoke with Jeff Reece at length late Friday about buying groups. JEFF [Reece] DOES NOT GET IT!!!" CCFF ¶ 1218.

[568] CCFF ¶¶ 1211-1214, 1227-1229, 1231-1234, 1237-1238.

[569] CCFF ¶ 1103.

[570] *See Esco Corp. v. United States*, 340 F.2d 1000, 1007 (9th Cir. 1965) ("A knowing wink can mean more than words."); Areeda ¶ 1419a.

complains to its rival about the latter's 'low price.'"[571] A solicitor need not inform the solicitee of its own prices to invite collusion; complaining about the competitor's pricing is action enough because "the only business rationale for complaining is to induce a higher price."[572] Likewise, here, that Benco did not inform Burkhart of its specific policy is of no consequence.[573] Benco complained about Burkhart's discounting to buying groups, imploring Burkhart to stop working with buying groups—the only conceivable purpose for Benco's repeated overtures was to induce Burkhart to match Benco's no buying group policy.[574]

Second, Benco argues that Reece did not speak with Cohen at the 2013 DTA meeting, citing Cohen's testimony that he did not recall the conversation and relying on the absence of a note in Cohen's files to suggest that the meeting did not occur.[575] But Cohen's failure of recollection cannot erase Benco's concession in its Answer that Cohen and Reece spoke at the October 2013 DTA meeting.[576] Additionally, Benco ignores contemporaneous documents and testimony from its own witness (Ryan) supporting Reece's testimony that the meeting occurred.[577]

Third, Benco argues that its executives did not tell Reece about the unlawful agreement between Schein, Patterson, and Benco. This is both legally irrelevant and completely unsurprising: most conspirators are not foolish enough to inform their non-conspiring competitors of an anticompetitive agreement, nor does the law require such specificity to find an

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[571] Areeda ¶ 1419a.

[572] Areeda ¶ 1419a.

[573] *See, e.g.*, *In re Precision Moulding Co.*, Docket No. C-3682, 1996 WL 33412156, at *2 (FTC Sept. 3, 1996) (Complaint) (respondent told competitor that its prices were "ridiculously low" and the competitor need not "give the product away"); *In re YKK (USA) Inc.*, Docket No. C-3445, 1993 WL 13009644, at *1-2 (FTC July 1, 1993) (Complaint) (respondent sought to urge competitor to desist from offering free installation equipment).

[574] *See* Areeda ¶ 1419a.

[575] Benco Post-Tr. Br. at 57.

[576] CCRF (Benco) ¶ 646; *see also* CCRF (Benco) ¶ 647 (citing CX1112 at 028-029 (Benco's Answer to Complaint ¶ 59).

[577] CCFF ¶¶ 1244-1245; CCRF (Benco) ¶¶ 646-647 [redacted]; Cohen, Tr. 584-585; Ryan, Tr. 1107-1108). Benco also argues that Reece testified inconsistently in a deposition in a completely unrelated lawsuit. Benco Post-Tr. Br. at 57; BFF ¶ 646. Benco's cited testimony is in response to an unrelated line of questioning in a proceeding in which the FTC was neither present nor a party, and as such, it should not be considered. CCRF (Benco) ¶ 646.

antitrust violation.[578] The evidence shows that Benco approached Burkhart and encouraged Burkhart to refuse to engage with buying groups based on the collective threat to the dental industry as a whole[579]—no additional words are required.[580] In soliciting an anticompetitive agreement, "a knowing wink can mean more than words."[581]

2. The Three Communications At Issue Were Not Vague.

Benco next claims that the communications were too vague to meet the standard set out in *E.I. du Pont de Nemours & Co. v. FTC* ("*Ethyl*"). [582] *Ethyl* is inapposite because the court's holding related to challenged practices that are "not collusive, coercive, predatory or exclusionary in character."[583] By contrast, the challenged practice in this case—*i.e.*, inviting Burkhart to refuse to discount to a customer segment—was an invitation to "collusive" behavior.

While *Ethyl* is irrelevant to the facts here, the conduct at issue meets the *Ethyl* standard. *Ethyl* directed that there must be some indicia of "anticompetitive intent or purpose" or absence of a "legitimate business reason" for the conduct.[584] The indicia here confirms both. Benco invited Burkhart three times to refuse to discount to buying groups for the purpose of keeping buying groups out of the dental industry.[585] Benco does not provide any procompetitive business reason for its competitor communications.

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[578] *In re Wholesale Grocery Prods. Antitrust Litig.*, 752 F.3d 728, 734 (8th Cir. 2014) ("Perhaps there are aspiring monopolists foolish enough to reduce their entire anticompetitive agreement to writing, which would make the answer easy. But most would-be monopolists probably can be expected to display a bit more guile, jotting down only a few seemingly common terms while sealing their true anticompetitive agreement with a knowing nod and wink.").

[579] CCFF ¶ 1237 (quoting Reece, Tr. 4391); *see also* CCFF ¶¶ 1211-1212, 1222, 1227-1232, 1234, 1238, 1241.

[580] *See Wholesale Grocery Prods.*, 752 F.3d at 734; *Esco*, 340 F.2d at 1007 ("A knowing wink can mean more than words.").

[581] *Esco*, 340 F.2d at 1007.

[582] 729 F.2d 128, 130 (2d Cir. 1984).

[583] 729 F.2d at 138. In *Ethyl*, the court addressed non-collusive behavior, in which firms independently and unilaterally adopted three business practices: delivered pricing, advance notice of price increases, and "most favored nation" clauses in customer contracts. 729 F.2d at 138.

[584] 729 F.2d at 139.

[585] CCFF ¶¶ 1212-1213; *see also* CCFF ¶¶ 1214, 1227-1229, 1231-1234, 1237-1238, 1241.

Benco next argues that the communications at issue do not violate Section 5 because they do not involve an "explicit invitation specifying the details of a proposed unlawful agreement."[586] As discussed previously, an antitrust conspiracy does not require an exchange of specific words.[587] Moreover, this is not a case of vague and ambiguous indirect communications—Reece testified to three direct competitor communications in which Benco encouraged Burkhart to refuse a customer segment.[588] The Commission's consent agreements cited by Benco establish that no formal words are required to find an invitation to collude, much less the "explicit invitation specifying the details" of the agreement that Benco urges.[589]

[586] Benco Post-Tr. Br. at 59.

[587] *See Am. Tobacco Co. v. United States*, 147 F.2d 93, 107 (6th Cir. 1944); *Esco*, 340 F.2d at 1007; *see also In re Wholesale Grocery Prods. Antitrust Litig.*, 752 F.3d 728, 734 (8th Cir. 2014) ("Perhaps there are aspiring monopolists foolish enough to reduce their entire anticompetitive agreement to writing, which would make the answer easy. But most would-be monopolists probably can be expected to display a bit more guile, jotting down only a few seemingly common terms while sealing their true anticompetitive agreement with a knowing nod and wink.").

[588] CCFF ¶¶ 1211-1214, 1227-1229, 1231-1234, 1237-1238, 1241.

[589] *In re Quality Trailer Prods. Corp.*, Docket No. C-3403, 1992 WL 12011079, at *1 (FTC Nov. 5, 1992) (Complaint) (respondent complained to competitor that its price was "too low"); *In re AE Clevite, Inc.*, Docket No. C-3429, 1993 WL 13009628, at *1 (June 8, 1993) (Complaint) (respondent advised competitor that its prices were "ruining the marketplace" because they were too low); *In re Valassis Commc'ns, Inc.*, Docket No. C-4160, 2006 WL 6679058, at *3 (FTC Apr. 19, 2006) (Complaint) (respondent stated on earnings call that it would "quote all [competitor's] first right of refusal customers at the floor price"); *see also In re Precision Moulding Co.*, Docket No. C-3682, 1996 WL 33412156, at *2 (FTC Sept. 3, 1996) (Complaint) (respondent told competitor that its prices were "ridiculously low" and the competitor need not "give the product away"); *In re YKK (USA) Inc.*, Docket No. C-3445, 1993 WL 13009644, at *1-2 (FTC July 1, 1993) (Complaint) (respondent sought to urge competitor to desist from offering free installation equipment).

COMPLAINT COUNSEL'S REPLY TO PATTERSON'S POST-TRIAL BRIEF

INTRODUCTION

Patterson's post-trial brief fails to explain away the unambiguous evidence showing that from 2013 to 2015: (1) Patterson and Benco exchanged assurances about not discounting to buying groups, then Patterson confronted Benco over perceived cheating on the agreement;[590] (2) Patterson demonstrated a conscious commitment to a policy of not discounting to buying groups;[591] and (3) Patterson's executives confidently predicted its competitors' conduct and acted in reliance on that prediction.[592] This is direct evidence that the competitors formed a "conscious commitment to a common scheme."[593] Patterson alleges that this is not direct evidence, but even if construed as circumstantial evidence, when considered in conjunction with the totality of the evidence including parallel conduct and plus factors, it constitutes proof of a meeting of the minds between Patterson and its competitors to refuse discounts to buying groups.

Patterson's internal communications establish its conscious commitment to a policy of not discounting to buying groups from 2013 to 2015.[594] Patterson's co-conspirators agree.[595] Likewise, contemporaneous documents authored by Patterson executives prove Patterson's

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[590] *See* Complaint Counsel's Post-Tr. Br. at 17-22 (filed Apr. 11, 2019); *United States v. Beaver*, 515 F.3d 730, 738 (7th Cir. 2008) (confrontation about cheating); *In re Flat Glass Antitrust Litig.*, 385 F.3d 350, 361 (3d Cir. 2004) (exchange of assurances of common action); *United States v. FMC Corp.*, 306 F. Supp. 1106, 1149-50 (E.D. Pa. 1969) ("mutual exchanges of assurances of joint action constituted an illegal agreement in violation of the Sherman Antitrust Act.").

[591] *See* Complaint Counsel's Post-Tr. Br. at 23-25.

[592] *See id.* at 19-20.

[593] *See Monsanto Co. v. Spray-Rite Serv. Corp.*, 465 U.S. 752, 764 (1984) (citation omitted).

[594] *See, e.g.*, Complaint Counsel's Proposed Finding of Facts ("CCFF") ¶¶ 630, 635 (filed Apr. 11, 2019) (quoting CX3168 at 001 ("We don't sell to buying groups.")), 544 (quoting CX0093 at 001 ("[C]urrently we do [not] participate with group purchasing organizations.")), 635 (quoting CX3342 at 001 ("I want to make sure that GPO's are not something we as a company are choosing to partner with at this point. I know Dave has been clear about this in the past and I wanted to verify that this is still the case.")), 635 (quoting CX3128 at 001 ("As a rule we are trying our best to steer clear of all buying groups.")), 607 (quoting CX3074 at 001 ("We have said no at every turn" in response to buying groups)).

[595] *See, e.g.*, Schein Post-Tr. Br. at 88 (filed Apr. 11, 2019) ("Patterson followed a practice of declining business with buying groups. Neither Benco nor Patterson made sales to buying groups during the alleged conspiracy, or made serious attempts to negotiate with them."); Schein F ¶ 349 ("In practice, *Patterson summarily rejected many groups based on the fact that they were buying groups or GPOs*, which did not fit Patterson's strategy.") (emphasis added).

compliance with the agreement. These include VP of Sales David Misiak's, "[c]onfidential and not for discussion" assurance that "our 2 largest competitors stay out of these [buying groups] as well,"[596] and VP of Marketing Tim Rogan's exhortation that "[w]e don't need GPO's in the dental business. Schein, Benco, and Patterson have always said no. I believe it is our duty to uphold this and protect this great industry."[597] Finally, the exchange of assurances with Benco, and Patterson confronting Benco about cheating on their common scheme, is exposed through six unambiguous emails, to which Patterson has no serious response.

First, on February 8, 2013, Cohen informed Guggenheim of Benco's policy to "not recognize, work with, or offer discounts to buying groups."[598] As Cohen himself admitted, he had no business reason to make his competitor aware of non-public information[599] of significant strategic importance.

Second, approximately twenty minutes after receiving it, Guggenheim forwarded Cohen's email to Misiak and Rogan.[600] Guggenheim admitted that he promptly sent Cohen's email to these two men because it was relevant to their positions as VP of Sales and head of pricing,[601] and the relevance is clear: Patterson could refuse to discount to buying groups, secure in the knowledge that Benco adhered to the same policy.

Third, more than two hours after he forwarded Cohen's assurance to his two key pricing and sales executives, Guggenheim crafted and sent a response to Cohen,[602] assuring him that "We feel the same way about these."[603] Patterson's brief dismisses this critical communication as "a 10-second email,"[604] but the length of time it took to type out the words is irrelevant. What

[596] CCFF ¶¶ 549 (quoting CX0093 at 001) (emphasis in original), 1187.
[597] CCFF ¶ 603 (quoting CX0106 at 001).
[598] CCFF ¶ 483 (quoting CX0056 at 001); *see also* CCFF ¶ 484.
[599] CCFF ¶¶ 488-490 (quoting Guggenheim, Tr. 1597; citing CX0301 (Cohen, IHT at 243)).
[600] CCFF ¶ 491.
[601] CCFF ¶¶ 494 (citing Guggenheim, Tr. 1607), 1944-1945, 1947, 1951-1952; Complaint Counsel's Response to Patterson Proposed Finding of Fact ("CCRF (Patterson)") ¶ 272 (citing CX0314 (Guggenheim, IHT at 256)).
[602] CCFF ¶¶ 491, 493, 1938.
[603] CCFF ¶ 495 (quoting CX0090 at 001).
[604] *See* Patterson Post-Tr. Br. at 5-6, 26, 28-29, 57-58, 63 (filed Apr. 11, 2019).

matters is the words themselves and the meaning they conveyed. Patterson's statement to Benco that it "fe[lt] the same way" about "not recognize[ing], work[ing] with, or offer[ing] discounts to buying groups"[605] was an assurance that the two competitors would not offer discounts to specific customers, with no procompetitive justification. Indeed, Guggenheim admitted that he had no legitimate business reason for sharing this information with Benco.[606]

Fourth, on June 6, 2013, Guggenheim confronted Cohen upon learning Benco was discounting to an entity it believed to be a buying group (Atlantic Dental Care), and to confirm that his competitor had not abandoned its policy not to discount to buying groups, asking Cohen: "Reflecting back on our conversation earlier this year . . . I'm wondering if your position on buying groups is still as you articulated back in February."[607] Patterson's brief provides no explanation for this confrontation, which required Guggenheim to remember Cohen's February email (he admitted he never forgot it[608]), locate it in his email inbox four months after the fact, and blind-copy the key executives in his organization who had previously been assured of Benco's policy (Misiak, Rogan, and Nease).

Fifth, on June 8, 2013, Cohen reassured Guggenheim of Benco's policy ("As we've discussed, we don't recognize buying groups"), and explained in point-by-point detail that Benco had not changed its policy or cheated on the agreement with respect to Atlantic Dental Care.[609]

Sixth, on June 10, 2013, Guggenheim confirmed to Cohen that the common policy was still understood ("Sounds good Chuck, Just wanted to clarify where you guys stand"),[610] and then forwarded the exchange of assurances to another Patterson executive responsible for refusing discounts to buying groups (McFadden).[611]

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[605] CCFF ¶ 495 (quoting CX0090 at 001).
[606] CCFF ¶ 1168 (citing Guggenheim, Tr. 1612; CX0314 (Guggenheim, IHT at 248)).
[607] CCFF ¶¶ 569-570 (quoting CX0095 at 001).
[608] CCFF ¶ 567 (citing Guggenheim, Tr. 1627).
[609] CCFF ¶ 575 (quoting CX0062 at 001); *see also* CCFF ¶¶ 574, 577, 579.
[610] CCFF ¶ 582 (quoting CX0062 at 001).
[611] *See* CCFF ¶¶ 585 (citing CX0098; CX0062), 624; CCRF (Patterson) ¶ 58 (McFadden, Tr. 2685 ("I believe pretty much every inquiry I received from buying groups or GPOs and such, I always told them thank you, but no thanks.")).

These documents provide direct evidence that Patterson and its competitors reached a meeting of the minds that each would refuse to discount to buying groups.[612] Patterson's post-trial brief does not seriously address this evidence. Instead, to evade liability, Patterson attempts to impose a heightened legal standard for proving an antitrust conspiracy, such as a requirement that Patterson use the word "commit," or that the agreement be "written" or "signed." These suggestions fail as a matter of law.[613]

Patterson's post-trial brief fails to confront additional inter-firm communications establishing a conspiracy among competitors. For example, Patterson ignores the exchange between Patterson and Schein about attending the Texas Dental Association ("TDA") annual meeting in response to TDA's creation of a buying group.[614] This direct communication establishes that Schein and Patterson discussed a shared approach to TDA after it sponsored a buying group, and that Patterson considered confronting Schein with a phone call when it appeared that Schein reneged.[615] The evidence does not lose its probative value simply because the Complaint does not allege a separate count of boycotting TDA's 2014 meeting.[616]

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[612] *Copperweld Corp. v. Independence Tube Corp.*, 467 U.S. 752, 771 (1984) ("[A]greement may be found when 'the conspirators had a unity of purpose or a common design and understanding, or a meeting of minds in an unlawful arrangement.") (citation omitted).

[613] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.A & n.16; Complaint Counsel's Post-Tr. Br. at 38-40.

[614] *See* Complaint Counsel's Post-Tr. Br. at 36-37. In January 2014, Steck emailed Misiak: "I'll be calling you to let you know about our decision on the matter we recently discussed in the next couple of days," referring to Schein's decision on whether to pull out of the TDA annual meeting. CCFF ¶ 1130 (quoting CX0112 at 001); *see also* CCFF ¶¶ 1123-1132. By this point, Patterson had already withdrawn from the meeting, and Misiak forwarded this email to his colleague Rogan, with the note: "He already told me they were out. Full blown!" CCFF ¶ 1131 (quoting CX0112 at 001). Rogan responded, "That sucks. You should call him. 'Thought I could trust you' type of conversation." *Id.*

[615] Further direct evidence of communications regarding TDA is provided by Benco's Texas regional manager's admission: "I have been talking to the directors of Schein and Patterson. We are going to be taking a stand together against [TDA]." CCFF ¶ 1119 (quoting CX1278 (Excel worksheet "Chats" tab at row 9)); *see also* CCFF ¶¶ 1118-1119.

[616] Patterson attempts to dodge the entire TDA episode with a footnote claiming Complaint Counsel has conceded it is not alleging a boycott of the TDA. Patterson Post-Tr. Br. at 27 n.28. While Complaint Counsel is not alleging that Respondents' actions with respect to the TDA are a boycott of the TDA, Respondents communications and conduct in response to TDA's buying group demonstrates a conscious commitment to a common scheme. These communications are highly relevant and should be considered along with totality of the record. *In re High Fructose Corn Syrup Antitrust Litig.*, 295 F.3d 651, 655-56 (7th Cir. 2002) ("The question for the jury in a case such as this would simply be whether, when the evidence was considered as a whole, it was more likely that the defendants had conspired to fix prices than that they had not conspired to fix prices.").

Patterson's own executives could not think of any other way to interpret this exchange,[617] leaving Patterson no recourse other than to attempt to sweep this episode under the rug.

Nor does Patterson have a response to inculpatory internal Patterson communications, such as Misiak's statement: "I'm concerned that Schein and Benco sneak into these co-op bids and deny it."[618] Patterson fails to explain (1) how this "concern" makes sense absent a prior agreement not to discount to buying groups; (2) why Schein or Benco have to "sneak" around to bid on a buying group when they should be in open competition with Patterson for customers; or (3) why would they "deny it" to Patterson. Like Patterson's post-trial brief, Misiak himself could not come up with a justification for what he meant.[619] Patterson's "concern" about its competitors "sneaking into bids" (cheating) establishes a conscious commitment to a common scheme not to discount to buying groups. The conspiracy is confirmed by Misiak's other efforts to monitor Benco's and Schein's compliance with the common scheme. For example, he wrote: "Confidential and not for discussion . . our 2 largest competitors stay out of these as well. *If you hear differently and have specific proof please send that to me*."[620] This statement shows that Misiak confidently predicted what his biggest rivals will do in a competitive situation, which is unambiguous evidence of conspiracy.[621] Such information was not based on mere market intelligence, as Misiak testified that market intelligence is neither "confidential" nor "not for discussion."[622] In addition, Misiak's statement indicates that Patterson contemplated action if it detected a rival failing to adhere to the agreement – e.g., confronting its co-conspirators in an effort to enforce the agreement, just as Patterson did in the June 2013 Guggenheim-Cohen email (blind-copied to Misiak).[623]

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[617] CCFF ¶ 1132; (quoting Misiak, Tr. 1414; CX8038 (Misiak, Dep. at 290-93)).
[618] CCFF ¶¶ 540 (quoting CX0092 at 001), 549 (quoting CX0093 at 001), 555, 1187.
[619] CCFF ¶ 1189 (citing Misiak, Tr. 1370, 1372).
[620] CCFF ¶ 1184 (quoting CX0093 at 001); *see also* CCFF ¶¶ 549, 552.
[621] *See B&R Supermkt., Inc. v. Visa, Inc.*, No. 16-01150, 2016 U.S. Dist. LEXIS 136204, *20-22 (N.D. Cal. Sept. 30, 2016) (MasterCard's representative "could not speak so confidently on behalf of *all* networks save and except for her knowledge of collusion, for true competition would have driven one or more networks to break ranks and offer more competitive terms.")
[622] CCFF ¶ 553 (citing Misiak, Tr. 1363-1364).
[623] CCFF ¶¶ 569 (quoting Guggenheim, Tr. 1628), 564-568, 570-571.

Likewise, Patterson fails to address incriminating admissions of Patterson's co-conspirators, notably the statement by Benco's Ryan: "CHUCK—maybe what you should do is make sure you tell Tim and Paul to hold their positions as we are."[624] Such blatant exhortations to naked collusion provide compelling evidence of conspiracy.

RESPONSE TO PATTERSON'S ASSERTIONS REGARDING "THE FACT RECORD"

I. PATTERSON'S COMPETITION FOR INDEPENDENT DENTISTS' BUSINESS IS IRRELEVANT TO THE VIOLATION COMPLAINT COUNSEL ALLEGES

Patterson spends several pages arguing that Respondents competed for independent dentists and DSOs.[625] Whether Respondents competed for *other* customers is irrelevant to whether Respondents conspired to restrict competition for buying groups.[626] No matter how vigorous, Patterson's competition for independent dentists and DSOs does not absolve it from Respondents' illegal agreement not to discount to buying groups.[627] "There is no requirement under Section 1 of the Sherman Act that all avenues of competition be eliminated . . . ."[628]

Patterson emphasizes the number of price class change forms it located, but its own executives conceded that the price class change forms reveal not a single discount to a buying

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[624] CCFF ¶ 1103 (quoting CX0023 at 001).

[625] *See* Patterson Post-Tr. Br. at 10-15.

[626] *See In re Benco Dental Supply Co.*, Docket No. 9379, 2018 WL 6338485, at *15 (FTC Nov. 26, 2018) (Patterson's claims of competition for independent dentists and DSOs is "not material" as it is "outside the scope of the alleged conspiracy.").

[627] *See Fashion Originators Guild of Am. v. FTC*, 312 U.S. 457, 461 (1941) ("While continuing to compete with one another in many respects . . ."); *In re Yarn Processing Patent Validity Litig.*, 541 F.2d 1127, 1136 (5th Cir. 1976) ("[I]t has been uniformly held that competition on one or more terms of a contract does not obviate a combination among competitors to fix a different term."); *Plymouth Dealers' Ass'n of N. Cal. v. United States*, 279 F.2d 128, 132 (9th Cir. 1960) ("The fact that there existed competition of *other kinds* between the various [] dealers, or that they cut prices in bidding against each other, is *irrelevant*.") (emphasis added); *In re PolyGram Holding, Inc. ("PolyGram Holding I")*, Docket No. 9298, 2003 WL 25797195, at *354 (FTC July 24, 2003) (Comm'n Op.) ("Moreover, it does not matter that, as Respondents argue, the moratorium applied 'only' to two products and 'only' for a period of ten weeks."), *aff'd sub nom. PolyGram Holding, Inc. v. FTC*, 416 F.3d 29 (D.C. Cir. 2005).

[628] *Yarn Processing*, 541 F.2d at 1137.

group during the conspiracy period.[629] Indeed, this evidence only highlights the sharp contrast between Respondents' ordinary course competitive efforts and their striking refusal to compete for buying groups, underscoring how their unusual behavior towards buying groups is something other than interdependent oligopoly conduct.[630]

II. PATTERSON'S COMPETITION FOR DSO BUSINESS IS IRRELEVANT TO THE VIOLATION COMPLAINT COUNSEL ALLEGES

Like its efforts to compete for independent dentists, Patterson's efforts to compete with Schein and Benco for DSO business are beside the point. Normal, healthy competition for certain customers does not disprove, and is not relevant to, a conspiracy to deny discounts to buying groups.

III. DURING THE CONSPIRACY PERIOD, PATTERSON HAD A POLICY OF NOT DISCOUNTING TO BUYING GROUPS, CONTRARY TO PATTERSON'S CLAIM THAT "PATTERSON *DENTAL*" MADE INDEPENDENT DECISIONS REGARDING BUYING GROUPS

Patterson claims that "Patterson Dental" (unlike "Patterson Special Markets") has always evaluated buying groups one-by-one and made independent decisions regarding whether to work with them.[631] This assertion is contradicted by its internal documents, its co-conspirators

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[629] *See, e.g.*, CCRF (Patterson) ¶ 18 (citing Rogan, Tr. 3669; Misiak, Tr. 1516). However, Complaint Counsel has discovered one price class change form that pre-dates the conspiracy (May 2010) for a group of dentists "who have gathered together to boost purchasing power." CCRF (Patterson) ¶ 18 (quoting RX0010 at 001).

[630] *Benco*, 2018 WL 6338485, at *15; *see also Petruzzi's IGA Supermkts. v. Darling-Del. Co.*, 998 F.2d 1224, 1245 (3d Cir. 1993) ("[D]efendants' argument [that abstaining from bidding on new accounts was due to interdependent oligopolistic behavior] makes no sense for there is no reason that bidding on each other's accounts should start a price war any[]more than bidding on new accounts."); CCRF (Patterson) ¶¶ 48-49 (quoting CX7100 at 203 (¶ 475) (Marshall Expert Report) ("I describe how Respondents behaved toward customers other than buying groups and how Benco entered Southern California. The behavior underlying both these episodes contrasts with Respondents' non-competitive behavior toward dental buying groups. This contrast suggests that the Respondents' non-competitive behavior toward buying groups is not the result of the Respondents acting as they typically do. In other words, this contrast in conduct is an indicator that Respondents' parallel conduct with respect to buying groups is driven by something other than non-competitive oligopoly behavior.")).

[631] Patterson Post-Tr. Br. at 15-23.

arguments,[632] and even Patterson's post-trial brief. Remarkably, Patterson concedes that Guggenheim's June 2013 email to Cohen "shared Patterson's existing feeling or policy."[633] A corporation (e.g., Patterson) is a legal construct incapable of possessing or expressing a "feeling." However, a corporation can adopt or demonstrate a "policy," which as noted above is "a definite course or method of action . . . to guide and determine present and future decisions."[634] Patterson's claimed existing policy not to work with buying groups is the antithesis of its simultaneously claimed one-by-one approach to evaluating buying groups. Numerous contemporaneous documents confirm Patterson's concession that it maintained a policy of not discounting to buying groups, and that this policy was not restricted to Special Markets.[635]

Patterson attempts to deny its policy by citing two instances in which McFadden rejected buying groups on behalf of Special Markets but supposedly did not prevent the local branches from taking action.[636] This effort fails, however, because McFadden did not oversee the local branches and had no authority to permit them to discount to buying groups;[637] during the conspiracy, Misiak did[638] and his guidance to the branches was "clear"[639]—"stay out of" buying groups.[640] Indeed, in the very documents Patterson cites for this point, McFadden confirmed, "I will follow Dave Misiak's lead here. We have said no many times in order to remain pure in our intent and consistent across the company."[641] It is impossible to square this contemporaneous

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[632] *See, e.g.*, Schein Post-Tr. Br. at 88 ("Patterson followed a practice of declining business with buying groups. Neither Benco nor Patterson made sales to buying groups during the alleged conspiracy, or made serious attempts to negotiate with them."); SF ¶ 349 ("In practice, *Patterson summarily rejected many groups based on the fact that they were buying groups or GPOs,* which did not fit Patterson's strategy.") (emphasis added).

[633] Patterson Post-Tr. Br. at 37.

[634] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.A.1.

[635] *See* Complaint Counsel's Post-Tr. Br. at 24-25.

[636] Patterson Post-Tr. Br. at 16-17.

[637] *See* CCFF ¶¶ 589, 591, 1941 (McFadden was President of Special Markets from July 2013-2017. Special Markets focused on large group practices.).

[638] CCFF ¶¶ 1944-1945.

[639] CCFF ¶ 635 (quoting CX3342 at 001).

[640] CCFF ¶ 543 (quoting CX0093 at 001).

[641] Patterson Proposed Finding of Fact ("PFF") ¶ 668 (quoting RX0451 at 001).

statement that McFadden (Special Markets) was following the lead of Misiak (Patterson Dental, who oversaw the local branches) by saying "no" many times with Patterson's unsupported assertion that local branches were free to pursue buying groups. Certainly, a goal "to remain pure in [] intent and consistent across the company" contradicts the notion that Special Markets and local branches had different buying group policies, or that the branches evaluated buying groups one-by-one. Moreover, and tellingly, Patterson proffers zero evidence that the relevant local offices—or any of its local offices—*actually evaluated* the buying groups or offered discounts to them.[642]

Patterson further attempts to deny its clear policy by claiming it said "yes" to Jackson Health and OrthoSynetics during the conspiracy period, which Patterson claims "it thought" were buying groups.[643] The factual record undermines this assertion, and reveals that Patterson's employees knew that neither of these entities were buying groups. Rogan testified that Jackson Health is a hospital system, and contemporaneous documents confirm that Patterson viewed it as such in 2014.[644] Indeed, the very emails Patterson quotes in its brief show that Patterson knew Jackson Health to be a hospital system, not a buying group: Patterson's brief quotes Rogan's statement in RX0271: "This is a GPO. They are taking 2% off the top. This is a very slippery slope."[645] Patterson's brief omits mention of Rogan being corrected by his colleague, Alain Carles: "*this is not a GPO*, this is the Jack[s]on Health system that owns and manages several hospitals in the area,"[646] as well as Mr. Carles's next-day email on the same email chain: "The Branch has been selling to the Jackson *system of hospitals and clinics* for over 10 years . . . I sent it up to corporate to read before I sign on behalf of the company . . ."[647]

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[642] One of Patterson's two instances has nothing to do with discounting pricing or selling to a buying group, it indicates only that McFadden did not prohibit a local branch from paying $5,000 to attend a "sponsorship event for Tralongo Management." Patterson Post-Tr. Br. at 16.
[643] Patterson Post-Tr. Br. at 16.
[644] CCFF ¶ 656 (citing Rogan, Tr. 3534; RX0270 at 001).
[645] Patterson Post-Tr. Br. at 17.
[646] CCRF (Patterson) ¶ 175 (quoting RX0270 at 001; quoting CX0107) (emphasis added).
[647] CCRF (Patterson) ¶ 175 (quoting RX0271) (emphasis added).

Likewise, Patterson's contemporaneous documents indicate that it viewed OrthoSynetics as a DSO, not a buying group, in 2013 and 2014,[648] and McFadden testified that OrthoSynetics is a specialty group for orthodontists that is "not like a buying group."[649]

Patterson also lists a number of buying groups that it rejected during the conspiracy period and attempts to provide an individualized justification for not doing business with the groups. But that Patterson may have had other reasons for refusing to discount to individual buying groups does not rebut the unambiguous evidence that Patterson adopted and maintained a policy to not discount to buying groups. Moreover, Patterson's after-the-fact explanations are unsupported by the contemporaneous documents and amount to no more than pretext. For example, Patterson alleges that it rejected a couple of buying groups because they sought a "vig,"[650] but the word "vig" appears nowhere in the documentary evidence, much less in Patterson's cited documents. Patterson claims to have turned down the Dental Purchasing Group in April 2014 because the individual who contacted it was a veterinarian.[651] But the contemporaneous documents indicate that Patterson rejected the request not because it objected to the veterinarian at issue, as Guggenheim wrote: "Typical approach of an upstart buying group. *We pass on these as a matter of protecting our business model.*"[652]

Likewise, Patterson contends that it "turned down United Orthodontic Buying Group" in March 2014 because the buying group sought to buy only one x-ray machine,[653] but the cited documents fail to support this assertion. Instead, the documents suggest an entirely different situation: this was not a buying group requesting a discount or seeking a partnership with Patterson, but an existing independent dentist customer inquiring whether Patterson had access to

[648] CCFF ¶¶ 611, 654-55 (citing CX3014 at 023-24; RX0342 at 001).
[649] CCRF (Patterson) ¶ 174 (quoting RX0342; citing McFadden, Tr. 2728-2730).
[650] Patterson Post-Tr. Br. at 16, 18.
[651] *Id.* at 18.
[652] CCRF (Patterson) ¶ 168 (quoting CX3080) (emphasis added). Patterson makes much of the fact that the request came from a veterinarian, but Guggenheim's email demonstrates that he was indifferent to this: "Nothing unusual here. Typical approach of an upstart buying group." *Id.*
[653] Patterson Post-Tr. Br. at 18.

UOBG discounts for a Sirona x-ray machine.[654] There was nothing for Patterson to "turn down," and indeed, Patterson appears to have contacted Sirona to request special pricing for the customer.[655]

Nor are Patterson's arguments assisted by its claim that it rejected some buying groups before and after the conspiracy period.[656] The offense of conspiracy consists of a conscious commitment to a common scheme during the conspiracy period. Patterson's behavior outside the conspiracy period does not transform unmistakable and unambiguous evidence of a conspiracy between 2013 and 2015 into ambiguous evidence.[657]

[654] CCRF (Patterson) ¶ 663.

[655] *Id.* (quoting RX0227 at 001 ("They have moved on with contacting Sirona to see if they would have any special pricing they would be able to offer this Dr . . . .")).

[656] *See* Patterson Post-Tr. Br. at 19-22. Patterson discusses most of these buying groups multiple times in its brief. To avoid repetition, Complaint Counsel responds to these arguments *infra* Complaint Counsel's Reply to Patterson Post-Trial Brief §§ II.A. (Argument) (2013 Smile Source bid and Kois bid), II.B.1 (Argument) (NMDC and Dentistry Unchained), II.B.2 (Argument) (Smile Source cannibalization risk).

Patterson also erects a strawman argument by misconstruing Complaint Counsel's discovery responses about opportunities to collude and the uncharacteristically friendly nature among rivals. Patterson's Post-Tr. Br. at 4-5, 19-23. Patterson attaches more significance to these responses than warranted to generate unjustified prejudice and cast aspersions of perjury. Any suggestion that this evidence forms the heart of Complaint Counsel's case on Respondents' agreement is dead wrong.

[657] Patterson also insinuates that it provided discounts to Steadfast Medical during the conspiracy period, based on pre-conspiracy sales. Patterson Post-Tr. Br. at 20 n.11. Yet, the document that it cites stops reporting in February 2013 and provides no data for the conspiracy period. CCRF (Patterson) ¶ 637 (citing RX0072 at Sales Data tab, Row 230). Moreover, Patterson erroneously claims "there is no evidence Patterson stopped [selling to Steadfast] after February 2013," Patterson Post-Tr. Br. at 20 n.11, as it has admitted that it did not do business with buying groups during the conspiracy period. CCRF (Patterson) ¶ 637 (citing CX3504 at 004; Misiak, Tr. 1392).

IV. WITNESSES' DENIALS DO NOT DEFEAT COMPLAINT COUNSEL'S EVIDENCE OF A CONSCIOUS COMMITMENT TO A COMMON SCHEME

Like Benco, Patterson argues that multiple witnesses denied the conspiracy's existence. But this does not render "ambiguous" Complaint Counsel's direct evidence that Patterson communicated assurances and confrontations with its competitors, and consciously adhered to a common scheme. "Unambiguous" does not mean "uncontested." Executives accused of illegal agreements routinely deny them, but that does not mean their denials outweigh contemporaneous documents that render it more likely than not that an agreement was reached. As previously discussed,[658] Patterson misstates governing precedent in suggesting that Complaint Counsel can only carry its burden if conspirators straightforwardly admit their wrongdoing, or provide exhaustive documentation of the terms of their common scheme.

V. PATTERSON INCORRECTLY INSISTS THAT "ONLY TWO COMMUNICATIONS" RELATE TO BUYING GROUPS

As discussed above, the conspirators' common policy of not discounting to buying groups was explicitly discussed in communications between competitors, as well as numerous Patterson internal communications.[659] Patterson's quibble with the precise number of these communications does nothing to diminish their significance. Nor can Patterson diminish the importance of these communications by selectively citing testimony and ignoring inconvenient evidence, as it attempts to do in its brief.

For example, with respect to the February 2013 Cohen-Guggenheim exchange of assurances, Patterson cites Guggenheim's trial testimony and represents that he did not investigate the NMDC situation or talk to anyone in Patterson's Albuquerque branch,[660] ignoring Guggenheim's contradictory same-day trial testimony that he *could not recall one way or the*

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[658] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.A.; *see also* Complaint Counsel's Post-Tr. Br. at 90-91.
[659] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.A.1.
[660] Patterson Post-Tr. Br. at 26.

other whether he investigated the NMDC situation.[661] Guggenheim's trial testimony that he *could not recall whether* he followed up on Cohen's request is more credible than his blanket denial of taking any action, in light of both his deposition testimony ("It's possible that I called [Patterson's New Mexico branch manager] and looked into it, but I don't remember that specifically"[662]) and his history of investigating other matters of mutual interest raised by Cohen.[663] Guggenheim's confident denial in response to a leading question from Patterson's counsel at trial cannot be squared with his failure to recall on cross-examination earlier in the day,[664] nor establishes that Guggenheim, Misiak, or Rogan failed to react to Benco's overture. And regardless of who communicated with the New Mexico branch, there is no dispute that three days after Cohen's request, Patterson informed NMDC (to its surprise) that Patterson had reneged on its earlier enthusiasm for partnering with the buying group.[665]

Patterson likewise fails to detract from the significance of the February 8, 2013 Cohen-Guggenheim exchange by arguing "Guggenheim forwarded Cohen's [Feb. 2013] email but not his own response to David Misiak and Tim Rogan."[666] This statement is irrelevant, as there can be no dispute that Misiak was well aware of Patterson's no buying group policy when he confirmed to his colleagues on February 27, 2013 that Patterson did not "participate with group purchasing organizations," and that "our 2 largest competitors stay out of these as well."[667] While Guggenheim may not have "forwarded" his own response on that date, he kept both

[661] CCRF (Patterson) ¶¶ 275 (citing Guggenheim, Tr. 1611). *See also* CCRF ¶¶ 188, 195.

[662] CCRF (Patterson) ¶ 275 (quoting CX8023 (Guggenheim, Dep. at 121)); *see also FTC v. Qualcomm Inc.*, No. 5:17-cv-00220, 2019 WL 2206013, at *9 (N.D. Cal. May 21, 2019) ("It is odd that [defendant's executive] had better recall during the January 2019 trial than nearly a year earlier at his March 2018 deposition.").

[663] CCFF ¶¶ 297-298 (Guggenheim promised Cohen he would investigate Proctor & Gamble product pricing issues, and he did so), 301-305 (citing CX1055), 307 (citing CX3222; Guggenheim, Tr. 1562-1564 (Guggenheim told Cohen he would investigate a clause in a manufacturer contract, and reported back to Cohen what he learned)).

[664] CCRF (Patterson) ¶ 275.

[665] *See* Complaint Counsel's Post-Tr. Br. at 19 (citing CCFF ¶¶ 503-506, 465).

[666] Patterson Post-Tr. Br. at 27.

[667] CCFF ¶¶ 549 (quoting CX0093 at 001), 543, 545; *see also* CCFF ¶ 550.

Misiak and Rogan in the loop when he confronted Cohen about Benco's bid to ADC, as he blind copied them on the June 2013 email reply.[668]

Nor is it persuasive to assert that Guggenheim's statement to Cohen was "not a commitment to do anything."[669] It is sufficient where competitors provide one another with assurances and have a meeting of the mind that each will pursue a common policy. As discussed above,[670] precedents such as *Gainesville* and *Foley* impose liability where a firm assures a competitor that it will pursue a specific policy, even if there is no enforceable "commitment" to do so.[671]

Patterson's attempts to downplay the June 2013 Guggenheim-Cohen ADC communications are even less persuasive. Notably, Patterson does not attempt to provide an innocent or procompetitive explanation for this exchange; and the relevance is inescapable: absent an understanding between Guggenheim and Cohen, there is no conceivable reason for Guggenheim to reach out to his competitor. Indeed, Guggenheim could not recall any other instance where he reached out to Cohen to gain information on lost business,[672] and could not provide any business reason for Cohen to share this information with Guggenheim.[673]

Considered in the context of each Respondents' desire to win ADC's business in 2013, the episode confirms each Respondents' adherence to a common scheme. In February 2013, ADC approached Patterson's Chesapeake, Virginia branch office requesting a bid for its business.[674] The branch feared that if it did not bid, it would "lose a big chunk of business."[675]

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[668] CCFF ¶ 571 (citing CX0095 at 001).

[669] Patterson Post-Tr. Br. at 27.

[670] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.A.1.

[671] *United States v. Foley*, 598 F.2d 1323, 1332 (4th Cir. 1979) (liability imposed where a firm "expressed an intention or gave the impression that his firm would adopt a similar change," even though the defendant explicitly stated "he did not care what the others did"); *Gainesville Utils. Dep't v. Fla. Power & Light Co.*, 573 F.2d 292, 301 (5th Cir. 1978) ("[E]xchange of letters between high executives of [competing firms] . . . points so strongly to the existence of a conspiracy that 'reasonable men could not arrive at a contrary verdict.'" "[T]here was no reason for communicating with a competitor about the refusal" to serve customers.).

[672] CCRF (Patterson) ¶ 195 (citing CX0314 (Guggenheim, IHT at 297-298)).

[673] CCFF ¶ 1168 (citing CX0314 (Guggenheim, IHT at 235)).

[674] CCFF ¶ 534.

[675] CCFF ¶ 547 (quoting CX0092 at 001).

Believing ADC to be a buying group, Misiak instructed the branch not to compete and assured it that Benco and Schein would not bid: "*Confidential and not for discussion . . [.] our 2 largest competitors stay out of these as well.*"[676]

Benco and Schein—like Patterson[677]—initially mistook ADC for a buying group and thus did not plan to bid.[678] Their first reaction was *the same* as Patterson's. Benco and Schein decided to bid only after multiple direct communications (that Patterson's post-trial brief ignores entirely) eventually satisfied Benco and Schein that ADC was not an off-limits buying group.[679]

Patterson did not have the benefit of Benco and Schein's exchanges on ADC before 2013 bids were due. After Guggenheim confronted Cohen about winning ADC's business and Cohen justified how ADC was not a buying group, Guggenheim directed the Chesapeake branch to compete aggressively for ADC's business.[680] He also forwarded Cohen's email to McFadden (the head of Patterson's Special Markets), informing McFadden that winning ADC's business did not violate the agreement to refrain from discounting to buying groups.[681]

[676] CCFF ¶¶ 549 (quoting CX0093 at 001) (emphasis in original), 1187.
[677] CCFF ¶ 566.
[678] CCFF ¶¶ 1022-1025 (CX0021 at 002 (Benco's initial response to ADC: "We're out")), 1097 (CX2021 at 013 (Sullivan (Schein) admission that "Our first reaction to this was it was simply a buying group and we were going to walk away.")).
[679] CCFF ¶¶ 1028-1060.
[680] CCFF ¶¶ 586-587 (citing Guggenheim, Tr. 1634).
[681] CCFF ¶ 585 (quoting CX0098 at 001); *see also* CCFF ¶ 586 (citing Guggenheim, Tr. 1634).

Thus, Benco, Schein, and Patterson reacted identically: First, believing ADC to be a buying group, none planned to bid. Then, upon realizing that it was not a buying group, Benco, Patterson, and Schein each wanted to aggressively pursue ADC's business. Most telling from this episode is that upon Respondents agreeing that ADC was outside the scope of the conspiracy and there was no obligation to refrain from bidding, each found it in their economic interest to pursue ADC.

VI. PATTERSON'S ATTACKS ON DR. MARSHALL REPRESENT AN INAPPROPRIATE EFFORT TO TRANSFORM EXPERT TESTIMONY INTO FACT TESTIMONY

Patterson's brief discusses Dr. Marshall's testimony in its section regarding "The Fact Record" for an obvious reason: rather than attack the opinions Dr. Marshall actually offered, it attempts to put words into his mouth to influence the Court's interpretation of documentary evidence. This is an impermissible attempt to use expert testimony to establish facts.[682] The documentary evidence speaks for itself.

To the extent Patterson's discussion of "The Fact Record" relates to the expert opinions Dr. Marshall actually offered, rather than irrelevant soundbites about the facts that Respondents tried to extract, Patterson's assertions are addressed below.[683]

VII. DANGER OF RECURRENCE

As discussed,[684] entry of an order is necessary as there exists a danger of recurrence. The conspiracy began to unravel after Benco was required to log its inter-firm communications as part of its settlement with the Texas Attorney General. Patterson eventually settled with the Texas Attorney General in April 2018. Its settlement decree also required a log of competitor

[682] *See* Scheduling Order ¶ 20 (Mar. 14, 2018) ("Unless an expert is qualified as a fact witness, an expert witness is only allowed to provide opinion testimony; expert testimony is not considered for the purpose of establishing the underlying facts of the case.").
[683] *See infra* Complaint Counsel's Reply to Patterson Post-Tr. Br. § III.B (Argument).
[684] *See infra* Complaint Counsel's Reply to Patterson Post-Tr. Br. § IV (Argument).

communications for one year, which recently expired.[685] As Respondents will soon be free from reporting their competitor contacts,[686] there exists a danger that they may again begin to coordinate their conduct.

RESPONSE TO PATTERSON'S "ARGUMENT"

I. CONTRARY TO PATTERSON'S SUGGESTION, THE EVIDENCE ESTABLISHES AN AGREEMENT

A. Explicit Competitor Communications Establish Patterson Reached An Unlawful Agreement With Benco.

As Patterson acknowledges, competitors violate the antitrust laws where they have "a unity of purpose or a common design and understanding, or a meeting of minds" that each will refuse to discount to certain classes of customers: this constitutes an unlawful "agreement."[687] Here, Patterson shared a unity of purpose with its competitors to refuse discounts to buying groups. The evidence that establishes this unity of purpose consists of Guggenheim and Cohen's February and June 2013 exchanges of assurances not to discount to buying groups.[688] Such "assurances of common action" provide a sufficient basis for liability.[689] No signed contract is required in antitrust cases. Moreover, an agreement exists "when the co-conspirators either confronted others about cheating on the cartel, or reassured others . . . that they were abiding by the agreement."[690] The unambiguous evidence shows this is precisely what Patterson and Benco did in June 2013: Guggenheim confronted Cohen when he was concerned that Benco's sales to ADC constituted cheating on the no buying group policy, and Cohen reassured Guggenheim that

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[685] CCFF ¶¶ 1159-1162 (citing CX6021, April 9, 2015 Benco Final Judgment); CCRF (Patterson) ¶ 764 (citing CX6021 at 012-013 (Benco); CX6023 at 006-007 (Schein); CX6024 at 005-007 (Patterson)).

[686] CCFF ¶¶ 1161-1164; CCRF (Patterson) ¶ 764.

[687] *Am. Tobacco Co. v. United States*, 328 U.S. 781, 810 (1946) (quoted in Patterson Post-Tr. Br. at 33).

[688] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.A.

[689] *Flat Glass*, 385 F.3d at 361 (3d Cir. 2004) ("[E]vidence may involve . . . 'proof that the defendants got together and exchanged assurances of common action or otherwise adopted a common plan even though no meetings, conversations, or exchanged documents are shown.'") (citation omitted).

[690] *Beaver*, 515 F.3d at 738 ("[A]ssertion that 'no person voiced their assent to the supposed conspiracy' rings hollow. Such assent was voiced when the co-conspirators either confronted others about cheating on the cartel, or reassured others . . . that they were abiding by the agreement.").

Benco was abiding by the agreement. Additionally, Patterson acted in reliance on Respondents' agreement: Patterson refrained from bidding for ADC's business when it believed ADC was an off-limits buying group, and immediately reversed course once Patterson received assurances that ADC fell outside the scope of the agreement.[691]

Patterson's attempts to avoid this unambiguous evidence rest on significant mischaracterizations of what is required to violate the antitrust laws.

First, Patterson argues that "direct evidence" of conspiracy means evidence that requires zero inferences – in effect, a written contract spelling out the parameters of the conspiracy (and presumably defining the terms used in the contract).[692] That is not the law, as "[a]ll evidence, including direct evidence, can sometimes require a factfinder to draw inferences to reach a particular conclusion, though 'perhaps on average circumstantial evidence requires a longer chain of inferences.'"[693] Instead, direct evidence is that which "removes any ambiguities . . . with respect to whether the parallel conduct in question is the result of independent or concerted action."[694] The February and June 2013 emails constitute direct evidence of exchanges of assurances[695] and a confrontation about perceived cheating followed by reassurance of

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[691] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.C.2; CCRF ¶ 309.

[692] Patterson Post-Tr. Br. at 35-36. As explained in Section I.A of Complaint Counsel's Reply to Benco Post-Trial Brief , it is well established that "in Section 1 cases, it is unnecessary for a court to engage in the exercise of distinguishing strong circumstantial evidence of concerted action from direct evidence of concerted action, for both are 'sufficiently unambiguous.'" *Petruzzi's IGA Supermkts.*, 998 F.2d at 1233 (internal citation omitted). Whether evidence is designated as "direct" or "circumstantial" is irrelevant at this stage—there is no requirement that conspiracies be proven by "direct evidence." *Id.* at 1230. In the end, "'[u]nambiguous evidence of an agreement to fix prices . . . is all the proof a plaintiff needs' to establish a violation of Section 1." *United States v. Apple Inc.*, 952 F. Supp. 2d 638, 689 (S.D.N.Y. 2013) *aff'd*, 791 F.3d 290 (2d Cir. 2015) (internal citation and emphasis omitted).

[693] *In re Publ'n Paper Antitrust Litig.*, 690 F.3d 51, 64 (2d Cir. 2012) (internal citation omitted); *accord Apple.*, 952 F. Supp. 2d at 689 ("In fact, even direct evidence in antitrust cases 'can sometimes require a factfinder to draw inferences to reach a particular conclusion.'") (citation omitted); *see also Sylvester v. SOS Children's Villages Ill., Inc.*, 453 F.3d 900, 903 (7th Cir. 2006) ("[A]ctually all evidence, even eyewitness testimony, requires drawing inferences; the eyewitness is drawing an inference from his raw perceptions. 'All evidence is probabilistic, and therefore uncertain; eyewitness testimony and other forms of 'direct' evidence have no categorical epistemological claim to precedence over circumstantial . . . evidence.' . . . Perhaps on average circumstantial evidence requires a longer chain of inferences, but if each link is solid, the evidence may be compelling—may be more compelling than" sworn testimony.) (citation omitted).

[694] *In re Ins. Brokerage Antitrust Litig.*, 618 F.3d 300, 324 n.23 (3d Cir. 2010).

conduct,[696] either of which removes any ambiguity as to whether there was an agreement. Numerous precedents have found liability based on considerably less.[697]

Second, Patterson asserts that assurances must specify "future, concerted action" in order to establish conspiracy.[698] Assuming, *arguendo*, these limitations are accepted, they do not help Patterson's position. The February 2013 and June 2013 communications in fact referenced future actions. Indeed, Patterson remarkably concedes that Guggenheim's February 2013 statement to Cohen communicated to Cohen Patterson's then-existing "policy."[699] As explained above, a "policy" is necessarily forward-looking, as it will "guide and determine present and future decisions."[700] So by informing Benco of its "policy," Patterson communicated its *future* actions to its competitor.

Likewise, by informing Benco that Patterson's policy was "the same" as Benco's, Patterson assured its competitor that its future actions would be "concerted." Patterson does not make clear what it means by suggesting a communication must relate to "concerted action,"[701] but precedent establishes that "[t]he phrase 'concerted action' is often used as shorthand for any

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[695] *Flat Glass*, 385 F.3d at 361 (Agreement is shown upon 'proof that the defendants got together and exchanged assurances of common action or otherwise adopted a common plan even though no meetings, conversations, or exchanged documents are shown.'").

[696] *Beaver*, 515 F.3d at 738 ("[A]ssertion that 'no person voiced their assent to the supposed conspiracy' rings hollow. Such assent was voiced when the co-conspirators either confronted others about cheating on the cartel, or reassured others . . . that they were abiding by the agreement.").

[697] *See e.g.*, *United States v. Maloof*, 205 F.3d 819, 830-31 (5th Cir. 2000) (finding defendant orchestrated an antitrust price-fixing conspiracy by, *inter alia*, informing his competitor when "sales representatives from other companies deviated from the agreed upon pricing"); *United States v. Gravely*, 840 F.2d 1156, 1161 (4th Cir. 1988) ("[T]he efforts of the conspirators to enforce their agreement, by pooling and subsequent meetings, is further proof of the conspiracy."); *In re Plywood Antitrust Litig.*, 655 F.2d 627, 633-34 (5th Cir. 1982) (finding internal memoranda sufficient evidence of agreement); *Foley*, 598 F.2d at 1332-33 (finding evidence of competitors calling each other about their failure to adopt a higher commission as probative of conspiracy to raise commission rate); *Standard Oil Co. of Cal. v. Moore*, 251 F.2d 188, 209-12 (9th Cir. 1957) (evidence of parallel behavior and communications between defendants concerning practices not at issue in the case probative of an agreement to refuse to serve a customer); *FMC Corp.*, 306 F. Supp. at 1150 (finding persuasive evidence of a conspiracy that "[t]hese exchanges of assurances continued after the initial [agreement].").

[698] Patterson Post-Tr. Br. at 37.

[699] *Id.*

[700] *See supra* at Complaint Counsel's Reply to Benco Post-Tr. Br. § I.A.1.

[701] Patterson Post-Tr. Br. at 37.

form of activity meeting the Section 1 'contract . . . combination or conspiracy' requirement."[702] Antitrust conspirators engage in "concerted" action when they act pursuant to a meeting of the minds. The action need not be jointly undertaken.[703] In a paradigmatic case, each conspirator that agrees to a geographic market allocation scheme engages in "concerted" action when it restricts its sales efforts to its assigned region. The sales efforts need not be joint or simultaneous – indeed, the whole point of the conspiracy is to avoid overlapping sales efforts in the first place. In this case, Respondents violated the antitrust laws when each refused to discount to buying groups, pursuant to a shared understanding that the others would do the same.

Whether Respondents refused discounts to buying groups before their agreement was formed is immaterial, as an agreement to adhere to a pre-existing course of action nonetheless constitutes an agreement.[704] For example, in *United States v. North Dakota Hospital Ass'n*, the court found an unlawful agreement where rival hospitals agreed not to discount to Indian Health Services and "to adhere to [the hospitals'] independently developed, preexisting policies against granting [such] discounts."[705] While the hospitals' policies predated the agreement, the agreement nonetheless had the effect of "foreclose[ing] any potential competition" among the hospitals.[706] Assuming Patterson had a long-standing policy against discounting to buying groups, Guggenheim's agreement with Cohen to continue such a policy nonetheless violated the antitrust laws (and reduced the risk of future competition for buying groups).[707]

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[702] *In re Baby Food Antitrust Litig.*, 166 F.3d 112, 117 n.3 (3d Cir. 1999) (quoting *Bogosian v. Gulf Oil Corp.*, 561 F.2d 434, 445-46 (3d Cir. 1977)).

[703] *See Interstate Circuit, Inc. v. United States*, 306 U.S. 208, 227 (1939) ("It is elementary that an unlawful conspiracy may be and often is formed without simultaneous action or agreement on the part of the conspirators.").

[704] *See, e.g.*, *United States v. N.D. Hosp. Ass'n*, 640 F. Supp. 1028, 1036-37 (D.N.D. 1986) (an agreement among rival hospitals to adhere to their existing policies against discounting to Indian Health Services was a Section 1 violation); *see also United States v. Champion Int'l Corp.*, 557 F.2d 1270, 1273 (9th Cir. 1977) (A bidding pattern among defendants that "developed by 'normal economic forces'" was condemned as part of an illegal agreement after defendants discussed their preferred auctions and had an understanding about bidding, with the court noting: "defendants did not leave the exchange of this information to chance").

[705] 640 F. Supp. at 1039.

[706] *Id.*

[707] *FTC v. Actavis*, 570 U.S. 136, 157 (2013) (preventing "the risk of competition . . . constitutes the relevant anticompetitive harm").

In response, Patterson cites *Blomkest Fertilizer, Inc. v. Potash Corp. of Saskatchewan*[708] for the proposition that sharing existing policies does not constitute direct evidence of an agreement. This supposed rule of law appears nowhere in *Blomkest*. Instead, *Blomkest* was a conscious parallelism case where plaintiffs attempted to prove plus factors through inter-firm communications of price verifications on completed sales.[709] The court held that based on the facts of the industry, after-the-fact price verifications bore no relationship to future market prices and lacked any causal link to defendants' parallel pricing, rendering insufficient evidence to infer an agreement.[710] Here, the facts are more akin to *North Dakota Hospital Ass'n* than to *Blomkest*, as in this case Patterson concedes that the conspirators did not exchange *facts* about events that occurred in the past (i.e., sales prices), and instead exchanged assurances of *policies* that would apply in the future.[711]

Patterson also quibbles with the timing of the June 2013 email, asserting that the email cannot constitute direct evidence of conspiracy because Benco and Patterson had already taken action regarding ADC at the time the email was sent. But Patterson fails in its effort to stretch *Blomkest* into a rule that "discussions of decisions already made" can never violate the antitrust laws.[712] Confrontations over perceived cheating constitute unambiguous evidence of conspiracy,[713] and such confrontations will inevitably occur *after* decisions have been made. Patterson and Benco's confrontations and assurances provide unambiguous evidence of conspiracy where there is no procompetitive explanation for communications that relate to

[708] 203 F.3d 1028, 1033-34 (8th Cir. 2000).

[709] *Id.*

[710] *Id.*

[711] Indeed, *Blomkest* is even more inapposite where the price verifications may have led to defendants competing *more* aggressively. *Id.* at 1334 ("There is no evidence to support the inference that the verifications had an impact on price increases. The only evidence is that prices were possibly cut as a result."). The same is not true here, where horizontal communications about buying groups led Respondents *not* to do business with buying groups. *See, e.g.*, CCRF (Patterson) ¶ 278 (Patterson rejected NMDC after the Guggenheim-Cohen February 2013 exchange).

[712] Patterson Post-Tr. Br. at 37.

[713] *Beaver*, 515 F.3d at 738 (confrontation about cheating constitutes direct evidence of conspiracy).

policies that will be applied in the future, such as Cohen's June 10, 2013 assurance to Guggenheim that "[a]s we've discussed, we don't recognize buying groups."[714]

Finally, Patterson inaccurately claims that no internal Patterson document "expressly references the alleged agreement."[715] This is transparently false, as McFadden wrote "[W]e've signed an agreement that we don't do business with [buying groups]."[716] This documented admission provides direct evidence of the agreement's existence.

B. Compelling Evidence of Conspiracy Is Not Outweighed by Executives' Denials.

As explained in Complaint Counsel's opening brief, the Court need not credit executives' denials of conspiracy where contemporaneous documents establish a meeting of the minds.[717] Nor, contrary to Patterson's suggestion, is it necessary for the Court to determine that anyone "lied under oath" or "committed perjury"[718] to credit the contemporaneous documents over executives' trial testimony. Antitrust liability is a mixed question of law and fact, and a common scheme violates the FTC Act even if an executive truthfully testifies that he would not label his course of action as an "agreement."[719]

Patterson discounts Complaint Counsel's direct evidence and declares its executives' denials as definitive on the question of agreement. Yet the cases that it cites do not support such a proposition. In *Benton v. Blair*, the Fifth Circuit found it was error to reject "*uncontradicted*" denials.[720] In *Chesapeake & Ohio Railway Co. v. Martin*, the Supreme Court valued employee testimony "in the absence of conflicting proof or of circumstances justifying countervailing

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[714] *See* CCFF ¶¶ 575 (quoting CX0062 at 001), 1169-1170.
[715] Patterson Post-Tr. Br. at 38.
[716] CCFF ¶ 657 (quoting CX0164 at 002).
[717] *See* Complaint Counsel's Post-Tr. Br. at 90-91 (citing, inter alia, *Gainesville*, 573 F.2d at 301 n.14).
[718] Patterson Post-Tr. Br. at 41.
[719] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.A.1 (citing *United States v. Gen. Motors Corp.*, 384 U.S. 127, 141 n.16 (1966); *Gainesville*, 573 F.2d at 301 n.14); *see also United States v. U.S. Gypsum Co.*, 333 U.S. 364, 395-96 (1948) ("On cross-examination most of the witnesses denied that they had acted in concert . . . . Where such testimony is in conflict with contemporaneous documents we can give it little weight, particularly when the crucial issues involve mixed questions of law and fact").
[720] 228 F.2d 55, 61 (5th Cir. 1955) (emphasis added).

inferences."[721] Here, executives' denials are contradicted by Respondents' own contemporaneous documents. *In re McWane* is likewise distinguishable, as in that case Complaint Counsel lacked evidence that the rivals discussed the alleged conspiracy.[722] Here, Respondents' executives have *admitted* that they communicated directly with one another—through private emails and text messages—about their shared policy against discounting to buying groups and when they saw deviations from that policy.[723] Moreover, Respondents' contemporaneous documents manifest the agreement, explicitly reference a joint refusal to discount, and acknowledge a "duty to uphold" the collective refusal.[724]

Patterson relies heavily on *City of Moundridge v. Exxon Mobil Corp.*,[725] but that is an inapposite case involving conscious parallelism, in which plaintiffs failed to produce evidence of parallel pricing, inter-firm communications about pricing, or pricing decisions based on such communications.[726] As the Commission has already concluded, Patterson's reliance on *Moundridge* is misplaced.[727] Here, the record includes evidence that Respondents "discussed their refusal to deal with buying groups and made decisions based on these communications."[728]

Patterson also cites *Williamson Oil Co. v. Philip Morris USA*,[729] though the issue of defendant denials appears nowhere in the opinion. Instead, Patterson cites a portion of the case discussing public statements and industry reports that were too ambiguous to constitute a plus

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[721] 283 U.S. 209, 214 (1931) (emphasis added).

[722] Docket No. 9351, 2013 WL 8364918, at *253 (FTC May 1, 2013) (Initial Decision) (referring to such a conclusion as "unsupported speculation").

[723] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.A.

[724] *Id.*

[725] 429 F. Supp. 2d 117 (D.D.C. 2006), *aff'd*, 409 F. App'x 362 (D.C. Cir. 2011) (unpublished decision).

[726] *Id.* at 132-33.

[727] *Benco*, 2018 WL 6338485, at *18 n.17. Similarly, the Commission concluded *Lamb's Patio Theater, Inc. v. Universal Film Exchanges, Inc.*, 582 F.2d 1068 (7th Cir. 1978), another case cited by Patterson, is distinguishable. *Benco*, 2018 WL 6338485, at *18 n.17.

[728] *Id*.

[729] 346 F.3d 1287, 1305 (11th Cir. 2003).

factor for agreement. In contrast, the record here contains unambiguous evidence of explicit, direct, and secret discussions between Respondents regarding buying groups.[730]

Patterson has cited no case, as none exists, that Respondents' *ex post* claims of innocence are sufficient to overcome contemporaneous documents evidencing a conscious commitment to a common scheme, including Respondents' own admissions that they engaged in the very conduct that numerous courts have found constitute an unlawful agreement.

II. THE EVIDENCE DEMONSTRATES THE BIG THREE'S AGREEMENT WAS MORE LIKELY THAN NOT AND TENDS TO RULE OUT THE POSSIBILITY OF INDEPENDENT ACTION

The circumstantial evidence in the record, viewed in light of the totality of the evidence, tends to exclude the possibility that Respondents acted independently and proves that Respondents' conspiracy was more likely than not. Like Benco, Patterson misstates the test for evaluating circumstantial evidence by arguing that Complaint Counsel can prevail only by satisfying the *Williamson Oil* test (first prove parallel conduct, then prove plus factors).[731] But in a case that does not rest on conscious parallelism, the court assigns the appropriate inferences to circumstantial evidence, consistent with the context and totality of the record, and determines whether the evidence as a whole proves an agreement was more probable than not.[732] "Plaintiffs need *not* prove parallel pricing in order to prevail"[733] and need not prove plus factors in a case

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[730] *In re Polyurethane Foam Antitrust Litig.*, 152 F. Supp. 3d 968, 984 (N.D. Ohio 2015) ("A direct and secret price discussion between competitors is more probative of a conspiracy than are indirect and public communications, ostensibly undertaken by the conspiring competitors to 'signal' to one another.").

[731] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.B.3.

[732] *See Esco Corp. v. United States*, 340 F.2d 1000, 1007 (9th Cir. 1965) (describing circumstantial evidence of an agreement consisting of a round-robin exchange of price information among rivals, and noting that the trier of fact is to determine the logical inferences after hearing the full context of the evidence); *In re Ethylene Propylene Diene Monomer Antitrust Litig. ("EPDM I")*, 681 F. Supp. 2d 141, 168 (D. Conn. 2009) ("As Judge Posner notes, evidence that is 'susceptible of differing interpretations' is not 'devoid of probative value' . . . and it is the role of the jury to determine 'whether, when the evidence is considered as a whole, it is more likely that the defendants had conspired to fix prices than that they had not conspired to fix prices.") (quoting *High Fructose Corn Syrup*, 295 F.3d at 655-56).

[733] *Fleischman v. Albany Med. Ctr.*, 728 F. Supp. 2d 130, 158 (N.D.N.Y. 2010); *see also Interstate Circuit*, 306 U.S. at 227 ("It is elementary that an unlawful conspiracy may be and often is formed without simultaneous action or agreement on the part of the conspirators.").

that is not premised on parallel conduct.[734] Here, given the direct and unambiguous evidence of agreement, there is no need to resort to the *Williamson Oil* test. Thus, contrary to Patterson's attempt to twist the legal standard, whether Respondents engaged in parallel conduct is not "Step One" in the Court's analysis. Rather, "Step One" entails an analysis of Respondents' inter-firm communications about a no buying group policy and internal documents evidencing a conscious commitment to a common scheme.

Nonetheless, the evidence also supports a finding of agreement from parallel conduct and plus factors, beginning with Patterson's drumbeat of instruction not to discount to buying groups following the Cohen-Guggenheim February 2013 communication, which was similar to those of Benco and Schein.[735]

A. The Big Three Acted in Parallel.

Patterson mistakenly argues that parallel conduct must be "identical."[736] To the contrary, parallel conduct need only be similar.[737] Here, Respondents similarly instructed their sales teams to reject buying groups, and, as a result, rejected buying groups.[738] That they used different words or rejected different buying groups on different dates is of no consequence.[739]

It is clear that Respondents' conduct was similar during the conspiracy period. While before and after the conspiracy, Respondents may have reacted to buying groups differently, during the conspiracy, each adhered to a policy of categorical rejection.[740] Patterson argues that three buying groups—Kois Buyers Group, Smile Source, and Georgia Dental Association—

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[734] *Ins. Brokerage*, 618 F.3d at 324 n.23 ("Courts devised the requirement of 'plus factors' in the context of offers of proof of an agreement that rest on parallel conduct.").

[735] Complaint Counsel's Post-Tr. Br. at 57-67.

[736] Patterson Post-Tr. Br. at 42.

[737] *See SD3, LLC v. Black & Decker Inc.*, 801 F.3d 412, 429 (4th Cir. 2015) ("[P]arallel conduct must produce parallel results. . . . [P]arallel conduct 'need not be exactly simultaneous and identical in order to give rise to an inference of agreement.'") (citation omitted); *Petruzzi's IGA Supermkts.*, 998 F.2d at 1234.

[738] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.B.4; CCFF ¶¶ 404-425, 621-624, 637-652, 925-954.

[739] *See, e.g.*, *Vitagraph, Inc. v. Perelman*, 95 F.2d 142, 146 (3d Cir. 1936).

[740] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.B.4.

demonstrate Respondents engaged in non-parallel behavior, but an examination of the relevant facts for each group reveals Respondents reacted similarly in each instance.

For example, contemporaneous documents demonstrate identical refusals to discount to Kois. Benco did not bid for Kois in 2014, explaining to Dr. Kois: "At Benco, our policy is that we don't support, or work with, buying groups, so we'll decline your request."[741] On August 18, 2014, a month *before* Patterson was scheduled to meet with Kois, Guggenheim already decided against working with the group, writing to Rogan, "Agreed . . . I'll kill it."[742] True to his word, Patterson did not bid for Kois in 2014,[743] despite Patterson losing "high quality / high producing" customers and feeling a "deep" cut to its business as a result.[744] A few weeks later, on September 8, 2014, Schein's Sullivan explained regarding Kois: "I still believe this is a slippery slope and have yet to see a successful one in dental and don't plan to take the lead role."[745] Like Benco and Patterson, Schein refused to work with Kois.[746] From the vantage of the Kois Buyers Group, Respondents certainly seemed to act in parallel.[747] When this evidence is placed in context of Respondents' parallel directives against discounting to buying groups, the evidence of agreement outweighs any attempt by Patterson to use Qadeer Ahmed as its scapegoat.

Likewise, Patterson argues that its response to Smile Source in 2013 was different from Benco and Schein, but minor variances between Benco and Patterson's rejection of Smile Source are not material.[748] Both Benco and Patterson refused to provide a discount to Smile Source because it was a buying group. Benco rejected Smile Source every year from 2011 through

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[741] CCFF ¶ 421 (quoting CX1240 at 001).
[742] CCFF ¶ 638 (CX0116 at 001; Guggenheim, Tr. 1676-1678).
[743] CCFF ¶ 639 (CX3086 at 001).
[744] CCFF ¶ 1738 (CX3089 at 001).
[745] CCFF ¶ 809 (quoting CX2469 at 002; CX8025 (Sullivan, Dep. at 295)).
[746] CCFF ¶ 928.
[747] CCFF ¶ 928 (citing Kois Sr., Tr. 190, 196 (Respondents all refused to work with Kois)).
[748] *See SD3*, 801 F.3d at 428-29 (citing *Am. Tobacco*, 328 U.S. at 800-01, for the proposition that co-conspirators may use "a variety of different methods to achieve the same ultimate objective," and noting it was not fatal that SawStop never alleged a common manner for the conspirators to effectuate the anticompetitive agreement).

2013.[749] Contrary to Patterson's suggestion, Benco's interest in Smile Source did not change in 2014, as Benco's Patrick Ryan then described Smile Source as "terrifying."[750] Patterson also rejected Smile Source in 2013: *"[W]e have said no to smile source. They are [a] buying club."*[751] [redacted].[752] Patterson points out that Schein reacted differently to Patterson and Benco in 2014. As addressed *infra*,[753] Schein's attempt at cheating on the conspiracy by negotiating with Smile Source does not negate Respondents' otherwise parallel conduct. Indeed, at the same time Schein was allegedly working on a bid for Smile Source, it was instructing its team not to do business with buying groups: "Just for clarity, we are NOT participating in any GPOs regardless of what they promise to bring us."[754]

Regarding the Georgia Dental Association, Patterson misstates the date that the conspiracy ended to claim that parallel conduct post-conspiracy negates the existence of the conspiracy. As discussed,[755] Complaint Counsel did not allege that the conspiracy came to a hard stop in April 2015. Instead, after Benco was forced to log its competitor communications, the conspiracy became harder to manage and began to unravel. Patterson's attempt to put too precise an end date on the conspiracy does not controvert Respondents' parallel conduct. And even if the conspiracy had ended prior to the GDA bid, according to Patterson's reasoning,

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[749] CCFF ¶ 410 (quoting CX1138 at 001 (2011: "Unfortunately, I don't think we would be able to help you. Your structure meets our definition of GPO, and Benco does not participate in group purchasing organizations"); quoting CX1219 at 002 (2012: "Benco doesn't recognize GPOs as a single customer")); CCFF ¶ 1020 ([redacted]).

[750] CCFF ¶ 1021 (quoting CX0015 at 001; Ryan, Tr. 1045).

[751] CCFF ¶ 642 (quoting CX3009 at 001) (emphasis added).

[752] CCFF ¶ 642 [redacted].

[753] *See infra* Complaint Counsel's Reply to Schein Post-Tr. Br. § II.B.3.b.

[754] *See, e.g.*, CCFF ¶ 816 (quoting CX2354 at 001); *see also* CCFF ¶¶ 788 (quoting CX2073 at 001 (Dec. 20, 2013 email from Schein's Foley: "It's a buying group that we do not participate with, as with all buying groups.")), 799 (quoting CX2235 at 001 (July 17, 2014 email from Schein's Titus: "We had a GPO prospect called PGMS. Very intriguing, willing to be exclusive . . . . It went to [Sullivan] and he shot it down. I think the meta msg is officially, GPO's are not good for Schein.")).

[755] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.B.7; Complaint Counsel's Post-Tr. Br. at 37-38.

Respondents would have to act differently from one another in every instance upon the conclusion of the conspiracy. Neither law nor economics requires such an absurd result.

Patterson cites a number of cases for the obvious and tautological proposition that parallel conduct is required for conscious parallelism cases.[756] As noted earlier, the record evidence goes beyond conscious parallelism, but nonetheless, Respondents acted in parallel.[757]

B. Plus Factor Evidence Proves the Agreement.

Complaint Counsel has proffered unambiguous evidence of Respondents' agreement. In addition, Respondents' agreement is corroborated by parallel conduct and the presence of plus factor evidence. Patterson mistakenly claims that plaintiffs relying on circumstantial evidence must meet a heightened burden of proof,[758] but this is incorrect: Complaint Counsel need only prove that Respondents' agreement was more likely than not.[759] Patterson cites *InterVest, Inc. v. Bloomberg, L.P.*,[760] but *InterVest* merely repeats the *Matsushita* standard,[761] noting that courts apply "special considerations so that only reasonable inferences are drawn" from circumstantial

[756] *See* Patterson Post-Tr. Br. at 44.

[757] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.B.4.

[758] Patterson Post-Tr. Br. at 45.

[759] *Apple*, 952 F. Supp. 2d at 690 ("Even where a plaintiff relies on ambiguous evidence, however, to prove its claim, the plaintiff does not bear the burden of showing that the existence of a conspiracy is the '*sole* inference' to be drawn from the evidence. The plaintiff is only required to present evidence that is sufficient to allow the fact-finder 'to infer that the conspiratorial explanation is more likely than not.'") (quoting *Publ'n Paper*, 690 F.3d at 63); Phillip Areeda & Herbert Hovenkamp, *Fundamentals of Antitrust Law*, ¶ 14.03(b) (4th ed. 2011) ("It is important not to be misled by *Matsushita*'s statement . . . that the plaintiff's evidence, if it is to prevail, must 'tend . . . to exclude the possibility that the alleged conspirators acted independently.' The Court surely did not mean that the plaintiff must disprove all nonconspiratorial explanations for the defendants conduct.' Not only did the Court use the word 'tend,' but also the context made clear that the Court was simply requiring sufficient evidence to allow a reasonable fact finder to infer that the conspiratorial explanation is more likely than not.").

[760] 340 F.3d 144 (3d Cir. 2003).

[761] *Matsushita* does not apply to this case, but its standard is nonetheless easily satisfied here. *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.B.2.

evidence.[762] Nowhere does *InterVest* instruct that circumstantial evidence elevates a plaintiff's burden to clear proof or proof beyond a reasonable doubt.[763]

In what is presumably an attempt at being glib, Patterson repeatedly dismisses relevant evidence and announces that because it does not qualify as a plus factor, it must be a "minus factor." But this is contrary to law. Just as no single plus factor is always determinative of an agreement, the absence of any particular plus factor does not render less probable the existence of an agreement.[764] Instead, plus factors are incremental units that tip the evidentiary scale from ambiguous into probable agreement,[765] and are required only when a case rests on parallel conduct.[766] The lack of any particular plus factor does not tip the scale the other way.[767] Here, evidence of Patterson's change in conduct, actions against self-interest, motive to conspire, and inter-firm communications, combined with the totality of the evidence, further tip the scale towards probable agreement.

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[762] 340 F.3d at 160.

[763] *See also Toys "R" Us v. FTC*, 221 F.3d 928, 934-35 (7th Cir. 2000) ("When circumstantial evidence is used, there must be some evidence that 'tends to exclude the possibility' that the alleged conspirators acted independently. This does not mean, however, that the Commission had to exclude *all* possibility that the manufacturers acted independently. . . . [T]hat would amount to an absurd and legally unfounded burden to prove with 100% certainty that an antitrust violation occurred. The test states only that there must be *some* evidence which, if believed, would support a finding of concerted behavior.") (internal citations omitted).

[764] *Baby Food*, 166 F.3d at 122.

[765] *See Apple*, 952 F. Supp. 2d at 690 (noting that the change of conduct plus factor may strengthen the inference of agreement).

[766] *Ins. Brokerage*, 618 F.3d at 323 ("[P]lus factors need be pled only when a plaintiff's claims of conspiracy rest on parallel conduct.").

[767] *See, e.g.*, *Gen. Motors*, 384 U.S. at 142 (finding an agreement even though there was no conduct against self-interest, because "[i]t is of no consequence, for purposes of determining whether there has been a combination or conspiracy under § 1 of the Sherman Act, that each party acted in its own lawful interest."); *United States v. Apple, Inc.*, 791 F.3d 290, 317-18 (2d Cir. 2015) (finding an agreement even though there was no conduct against self interest, reasoning "the fact that Apple's conduct was in its own economic interest in no way undermines the inference that it entered an agreement to raise ebook

Champion, 557 F.2d at 1272-73 (finding an agreement even though defendants acted the same before and during the conspiracy, reasoning "despite the innocent beginnings of the noncompetitive bidding, the trial court found collusion in its continuation."); *N.D. Hosp.*, 640 F. Supp. at 1036-37 (finding an agreement even though the defendants did not change their preexisting policies after entering into the agreement, and thus, did not exhibit the "change in conduct" plus factor).

1. Patterson's Change in Conduct is Evidence of the Agreement.

As with all plus-factor evidence, change of conduct evidence is not required where Complaint Counsel does not rely solely on parallel conduct to prove agreement. Nonetheless, Patterson's change of conduct corroborates the evidence of agreement.[768] Patterson claims that its approach to buying groups did not vary over time, but the evidence it cites contradicts this proposition.

Patterson's executives testified under oath at various times that Patterson "didn't have a policy" regarding buying groups prior to February 2013.[769] But, at a minimum, Patterson considered working with buying groups until February 2013. For example, in 2010, a Branch Manager sought approval for a discount to a "group of dentists who have gathered together to boost purchasing power."[770] And in 2012, Rogan authorized a discount to Smile Source's Hawaii chapter.[771] Indeed, Patterson was on the cusp of partnering with NMDC on February 7, 2013.[772] This willingness to discount to buying groups disappeared following the February 8, 2013 Guggenheim-Cohen exchange of assurances, which prompted Patterson executives to begin instructing sales representatives to stay out of buying groups, and insisting that internal communications regarding this new policy be conducted "live" rather than documented in e-

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[768] Patterson cites *Cosmetic Gallery, Inc. v. Schoenman Corp.*, 495 F.3d 46, 54 (3d Cir. 2007), and claims that it stands for the proposition that pre-conspiracy actions, if continued, cannot be actions in furtherance of the conspiracy. However, courts recognize that an agreement on an existing course of action is no less an agreement. *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.D.1. To the extent that Patterson's authority is contrary, it is disputed.

[769] CCFF ¶¶ 498-499 (quoting, inter alia, CX8023 (Guggenheim, Dep. at 134 (Q. "At the time you received Mr. Cohen's e-mail on February 8, 2013, did Patterson have a company policy with respect to buying groups? A. No. Each of these evaluated individually, largely in the markets with the salespeople and the managers in those branches.")); CX8023 (Guggenheim, Dep. at 137 ("don't have . . . a uniform way to deal with [buying groups].")))), 627-628.

[770] CCRF (Patterson) ¶ 18 (quoting RX0010 at 001).

[771] CCRF (Patterson) ¶ 130 (citing CX3422 at 001).

[772] CCRF (Patterson) ¶ 278 (quoting CX4090 (Patterson's NM branch manager's Feb. 7, 2013 email, noting the NMDC partnership "has the opportunity to be huge . . . I am hoping Patterson can be a partner you trust and that will always do the right thing for you. . . . I definitely want to keep this moving forward . . . .")).

mails.[773] The consistent instruction to sales personnel to *avoid* exploring opportunities with buying groups notably contrasts with Patterson's approach to other customer segments, such as dental schools and prisons; even though such segments were not a strategic focus for Patterson executives, sales employees remained free to explore such opportunities.[774]

Patterson mentions three emails that pre-date its joining the conspiracy to suggest that its position towards buying groups was the same prior to and during the conspiracy period.[775] Specifically, Patterson cites two 2009 documents, neither of which concern buying groups for independent dentists: one involves a GPO aimed at corrections facilities,[776] the other addresses partnering with insurance companies.[777] Finally, Patterson cites the March 2012 email exchange in which Patterson's McFadden wrote Misiak, "I get these [contacts from buying groups] more often than I like. This stuff scares me. I'm gonna tell him thanks but no thanks. Your thoughts?"[778] These pre-conspiracy emails confirm that Patterson feared the implications of buying groups but considered them on a one-by-one basis, and are distinctly different from McFadden's during-conspiracy declarations, such as: "we don't deal with GPO's,"[779] "as of now we are not working with GPO's,"[780] and "[a]s a *rule* we are trying our best to steer clear of all buying groups."[781]

Patterson likewise attempts to downplay the significance of Patterson's pre-conspiracy willingness to explore a relationship with NMDC. First, Patterson attempts to obscure Guggenheim's testimony that Patterson was open to working with NMDC as of February 7,

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[773] *See* CCFF ¶ 630. *Compare* CCRF (Patterson) ¶ 130 (citing CX3422 at 001 (June 26, 2012 Rogan email re Smile Source Hawaii: "Just tell us what discount you want to go with and we will get it loaded.")), *with* CCRF (Patterson) ¶ 150 (citing CX3117 at 001 (Nov. 20, 2013 Misiak email re Smile Source: "We are currently not interested.")), *and* CCRF (Patterson) ¶ 150 (citing CX3168 at 001 (Nov. 20, 2013 Rogan email: "We don't sell to buying groups. Let's talk live.")).

[774] CCRF (Patterson) ¶¶ 86-87 (citing Guggenheim, Tr. 1587-1589); *see also* CCFF ¶¶ 616-617, 620.

[775] *See* Patterson Post-Tr. Br. at 47.

[776] *See id.* (citing PFF ¶ 126 (RX0401 at 002-003)); *see also* CCRF (Patterson) ¶¶ 119, 126.

[777] PFF ¶ 122 (CX3114 at 001-002); *see also* CCRF (Patterson) ¶¶ 122, 125.

[778] *See* Patterson Post-Tr. Br. at 47 (discussing CX0084).

[779] CCFF ¶ 630 (quoting CX3045 at 001 (Jan. 2015)).

[780] CCFF ¶ 630 (quoting CX3010 at 001 (Dec. 2013)).

[781] CCFF ¶ 650 (quoting CX3128 at 001 (Oct. 2014)) (emphasis added).

2013, arguing that Guggenheim's testimony related to the date of the *investigational hearing*.[782] This implausible interpretation ignores the question to which Guggenheim responded, which directly addressed the time prior to Guggenheim's response to Cohen's February 2013 NMDC email: "What do you mean *at that time* you hadn't formed a full opinion?"[783] More importantly, Patterson claims that the proposed partnership between NMDC and Patterson was falling apart before the February 8, 2013 email. Not so. Contemporaneous documents reveal that on February 7, 2013, Patterson's New Mexico branch manager, Scott Belcheff, was on track to finalize the partnership with NMDC on February 11. He asked NMDC to cancel a meeting it had scheduled with manufacturers in part because Patterson wanted to handle manufacturer bids on NMDC's behalf.[784] At the same time, Belcheff was excited about partnering with NMDC: "This has the opportunity to be huge and is moving fast and I want to make sure we are doing this right from the beginning. . . . I am hoping Patterson can be a partner you trust and that will always do the right thing for you. . . . I definitely want to keep this moving forward."[785] Belcheff and Dr. Mason from NMDC scheduled a dinner meeting for February 11, where they would "get guidelines in place" for the new relationship.[786] The Cohen-Guggenheim exchange occurred on February 8. With no contact since the February 7 email, Dr. Mason was surprised to discover at the February 11 dinner meeting that Patterson was refusing to work with NMDC, as NMDC was "well on our way" to partnering with Patterson.[787]

Patterson has no substantive response to the compelling evidence that during the conspiracy Patterson refrained from bidding on ADC when it believed ADC was subject to the agreement, and then immediately competed for the ADC business once Benco informed Patterson that ADC was not covered by the agreement. Patterson's only assertion is that it would

[782] Patterson Post-Tr. Br. at 48-49.
[783] CCRF (Patterson) ¶ 134 (citing CX0314 (Guggenheim, IHT at 246) (emphasis added)).
[784] CCRF (Patterson) ¶ 289 (citing CX4090 at 002 ("If Patterson is going to be your preferred vendor then we handle the bid process for you.)).
[785] CCFF ¶¶ 469-471 (quoting CX4090 at 001-002); CCRF (Patterson) ¶ 289 (quoting CX4090).
[786] CCRF (Patterson) ¶ 278 (quoting CX4090 at 002); *accord* CCFF ¶ 472 (quoting Mason, Tr. 2350).
[787] CCFF ¶¶ 504-506; CCRF (Patterson) ¶ 284 (citing CX8035 (Mason, Dep. at 51)).

have made no sense for Patterson to compete for ADC business once Benco won ADC's 2013 bid. But this ignores Patterson's own testimony and evidence on this topic. Guggenheim instructed the Chesapeake regional office that he wanted to aggressively pursue this business.[788] And he forwarded his email exchange with Cohen to McFadden (who oversaw Special Markets) to inform him that the account was not out-of-bounds.[789] Whether the competition Guggenheim envisioned was to take place immediately in 2013 or at the next available opportunity is beside the point. The point is that Patterson (like Benco and Schein) refrained from competing for an account that it believed to be covered by the conspiracy, and then aggressively pursued its own economic self-interest and competed for the account once Patterson understood from Benco that the account was not off-limits.[790]

And Patterson's post-conspiracy willingness to work with buying groups differs markedly from its during-conspiracy refusal to do so. Patterson pretends that Complaint Counsel is alleging the conspiracy ended at a particular moment in 2015. But as explained above, the conspiracy was not snuffed out on a particular date, instead Respondents' common understanding became more difficult to enforce as a result of Benco's 2015 settlement with the Texas Attorney General, and thus the agreement began to lose force beginning in 2015.[791] This is entirely consistent with the evidence regarding Dentistry Unchained, despite Patterson's effort to obfuscate the dates. In July 2015, Dentistry Unchained offered to convert 80% of its 226 members to Patterson.[792] The assigned Territory Manager believed it to be a valuable opportunity but had to be "honest with [Dentistry Unchained] that [Patterson had] not elected to

[788] CCFF ¶ 586 (citing CX0314 (Guggenheim, IHT at 303); Guggenheim, Tr. 1634).

[789] CCFF ¶¶ 585.

[790] *See supra* Complaint Counsel's Reply to Patterson Post-Tr. Br. § V (Facts). Contrary to Patterson's suggestion, at least one document indicates that Patterson indeed competed for ADC's business in 2013. CCRF (Patterson) ¶ 309 (quoting RX0095 at 001 (June 28, 2013 email: "[ADC's representative] admitted [Benco's] overall proposal was better than Schein's and Patterson's.")).

[791] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.B.7.

[792] CCRF (Patterson) ¶ 516 (citing CX3006 at 001-002). In response to the same request from Dentistry Unchained, Benco's Ryan bragged: "The best part about calling these guys is I already KNOW that Patterson and Schein have said NO." CCFF ¶ 1191 (quoting CX0012 at 001).

participate [with buying groups],"[793] which is consistent with the continued force of the conspiracy. In January 2016, the same Territory Manager informed Dentistry Unchained that Patterson was "not going to participate in a GPO type program at th[at] point,"[794] yet within five weeks from that message, the Territory manager was ready to launch a discount program with Dentistry Unchained. McFadden recommended that the Territory Manager "go for it," as Patterson needed to "start stretching," suggesting buying groups were new to Patterson at the time.[795] Thus, this was a significant change in conduct vis-à-vis Dentistry Unchained within a very short period, consistent with the conspiracy's loss of force.

Likewise, Patterson's bid for Smile Source is a perfect example of Patterson's change of course before joining the conspiracy and after it ended. In 2012, Rogan authorized a discount to Smile Source's Hawaii chapter, telling the local manager "Just tell us what discount you want to go with and we will get it loaded."[796] In 2013, Smile Source reached out to Patterson multiple times seeking a partnership.[797] Despite Smile Source's growth and its members' $14 million dental supplies spend, Patterson declined the opportunity because Smile Source was a buying group.[798] Then, in 2017, Patterson bid for Smile Source's business for the first time.[799] Importantly, Smile Source's business model had not changed between 2013 and 2017, and Patterson faced the same risk of cannibalizing some of its existing sales.[800] Patterson's attempt

[793] CCRF (Patterson) ¶ 516 (citing CX3006 at 001-002).

[794] CCRF (Patterson) ¶ 516 (quoting CX0137 at 001). Of note, this was around the time that Wesley Fields was hired to handle buying groups and group purchasing organizations. CCFF ¶¶ 1343-1344. Indeed, McFadden forwarded the January 2016 Dentistry Unchained email to Fields. CCRF (Patterson) ¶ 516 (CX0137 at 001).

[795] CCRF (Patterson) ¶ 516 (quoting CX3018 at 001).

[796] CCRF (Patterson) ¶ 130 (quoting CX3422 at 001).

[797] *See, e.g.*, CCFF ¶¶ 641-642 (citing CX0147 at 001; CX0297 at 001).

[798] *See* CCFF ¶ 642 (CX3009 at 001 ("[W]e have said no to smile source. . . . They are [a] buying club . . . .")). Notably, Benco and Schein also refused to do business with Smile Source during this period. *See, e.g.*, CCFF ¶ 1014 (CX0019 at 001). Benco's Patrick Ryan reporting that he and Schein's Randy Foley specifically talked about Smile Source, allowing him to arrive at the ominous pronouncement: "Buh-bye").

[799] CCFF ¶¶ 1347-1349.

[800] CCFF ¶¶ 1353, 1718.

to diminish this episode as an anecdote lacking probative value flouts clear precedent focusing on the totality of the evidence.

Finally, Patterson has no answer for the fact that after the conspiracy ended, Patterson engaged in a serious exploration of buying groups in late 2015[801] [redacted]. [802]

2. Patterson's Actions Against Self-Interest Support the Agreement.

Patterson's actions against self-interest add support to an inference of agreement. Patterson does not acknowledge its most obvious action against self-interest: divulging a (what should be confidential) business strategy on buying groups to a rival. Guggenheim admitted he had no business reason for doing so,[803] and this action against self-interest remains wholly unexplained.

Patterson argues that its decision not to pursue buying groups with its newly created Special Markets division was independent, but the Cohen-Guggenheim communications make the conclusion of coordinated activity impossible to resist. Patterson rolled out its Special Markets division shortly after the competitor exchanges. Patterson's news garnered a lot of attention from buying groups.[804] McFadden wanted to explore working with buying groups.[805] Despite this interest, however, Guggenheim placed an "extreme amount of pressure" on McFadden to stay away from buying groups.[806] Patterson continued to abstain from buying group opportunities even after its new group was not profitable for more than a year.[807]

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[801] PFF ¶ 760 ("Patterson hired a business development director, Wesley Fields, in late 2015 with the instruction to explore working with buying groups."); CCFF ¶¶ 1327-1342 (Patterson hired a consulting firm to do a "deep dive" into the buying group market segment), 1343-1345.

[802] CCFF ¶ 1364 [redacted].

[803] CCFF ¶ 1168 (citing Guggenheim, Tr. 1612; CX0314 (Guggenheim, IHT at 248)).

[804] CCFF ¶ 597 (CX0315 (citing McFadden, IHT at 116-117))

[805] CCFF ¶¶ 597-602 (citing CX0106 at 001 ("I know in the past we have said no[.] Is it worth it to explore GPO???????")), 1272.

[806] CCFF ¶ 604 (quoting CX0315 (McFadden, IHT at 240)).

[807] CCFF ¶ 626.

Patterson attempts to provide a list of excuses for not working with a number of buying groups. But as discussed,[808] these reasons amount to pretext that is not supported by the record evidence.

When Smile Source approached Patterson at the end of 2013, it had roughly 145 member locations,[809] with approximately $14 million in spend.[810] Patterson claims that it opted not to bid for Smile Source in 2013 because "every Smile Source member appeared to already be a Patterson customer."[811] This statement dramatically overstates the cited document and the underlying facts. A Patterson Corporate Collections Manager looked up *some* of the doctors on Smile Source's website and found that they were Patterson customers.[812] To insinuate that every Smile Source member was buying from Patterson ignores the fact that Smile Source worked with Schein prior to 2013.[813] Moreover, even were it true, Patterson would earn incremental revenue as members shifted more of their spend to Patterson were it Smile Source's preferred vendor. For example, [redacted]. Patterson suggests that fears about cannibalization stopped it from competing for Smile Source in 2013, yet it did not harbor the same fears under similar circumstances in 2017.[815] Moreover, the totality of the evidence confirmed by Patterson's internal communications, suggest that Smile Source was rejected not based on

[808] *See supra* Complaint Counsel Reply to Patterson Post-Tr. Br. § III (Facts).
[809] CCFF ¶ 183.
[810] CCFF ¶ 642 (CX0147 at 001).
[811] Patterson Post-Tr. Br. at 53.
[812] PFF ¶ 153 (quoting CX0148 at 001 ("I checked out some of the names, mainly out of Texas and Denver, and we do conduct business with all that I looked up.")).
[813] CCFF ¶¶ 532, 443 (Schein worked with Smile Source in 2011, and began doing so as early as 2008); CCFF ¶¶ 447, 451 (Smile Source account was profitable to Schein).
[814] CCRF (Patterson) ¶ 152 (citing CX7100 (Marshall Report) at 164 [redacted]; *see* CCFF ¶ 642 (noting Smile Source's 2013 member spend of $14 million).
[815] CCFF ¶¶ 1353-1354. Indeed, contrary to Patterson's stated excuse, Rogan testified that the risk of cannibalization alone was not justification for Patterson to avoid partnering with a buying group. CCFF ¶ 1354 (citing Rogan, Tr. 3548-3549).

cannibalization concerns grounded in an analysis of Smile Source's membership, but instead based on a blanket policy of refusing to work with a "buying club."[816]

Moreover, as discussed *infra*,[817] Dr. Marshall's analysis demonstrates that Patterson sacrificed [redacted].[818]

3. Patterson's Motive Constitutes a Clear Plus Factor Supporting Agreement.

Patterson's fear that buying groups were a "slippery slope" and "a race to the bottom in terms of pricing"[819] provided compelling motive to conspire. Patterson's unpersuasive efforts to contradict this plus factor are based entirely on the fiction that the only evidence showing Patterson feared buying groups consists of two SWOT analyses.[820] Patterson simply ignores its own executives' testimony that buying groups posed a threat, and their contemporaneous documentation of their fears. For example, McFadden wrote in 2012 that buying groups were a threat that "scares me,"[821] and confirmed at trial that he was referring to buying groups and their potential to disrupt Patterson's sales force: "[s]o yes, this stuff scares me."[822] Patterson's brief unpersuasively pretends this evidence does not exist, just as it pretends that Guggenheim did not admit buying groups posed a threat because "often [they] come with reduced pricing."[823]

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[816] CCFF ¶ 642 (quoting CX3009 at 001).
[817] *See infra* Complaint Counsel's Reply to Patterson Post-Tr. Br. § III.B (Argument).
[818] CCFF ¶¶ 1658-1659 (CX7100 at 156 [redacted] (Patterson losing [redacted] and [redacted].
[819] CCFF ¶ 201 (quoting CX3016 at 001; CX8004 (McFadden, Dep. at 105-106)).
[820] *See* Patterson Post-Tr. Br. at 54 ("Complaint Counsel's evidence consists of two SWOT PowerPoint slides").
[821] CCFF ¶ 237 (quoting CX0084 at 001).
[822] CCRF (Patterson) ¶ 178 (quoting McFadden, Tr. 2684-2685).
[823] CCFF ¶ 228 (CX8023 (Guggenheim, Dep. at 221-222)).

4. Patterson's Inter-firm Communications Satisfy the Traditional Hallmarks of Conspiracy.

The factual record has evidence consistent with traditional hallmarks of conspiracy in spades.[824] These communications, which are uncharacteristic of communications among rivals, place significant weight on the side of agreement. Patterson makes an entirely unsupported assertion that every communication is explained, but it has offered no justification that explains away its intra-firm communications.

III. DR. MARSHALL'S ANALYSIS CORROBORATES RESPONDENTS' CONSPIRACY

Patterson's brief largely fails to engage with the expert opinions Dr. Marshall offered to the Court. For example, it does not address his methodologies or opinions regarding product market,[825] geographic market,[826] market shares,[827] or market power,[828] yet Patterson insists that the Court should give "no weight" to them.[829] The opinions Dr. Marshall has offered to the Court are helpful on each of those points, and his profitability analysis tends to corroborate one of the relevant plus factors – Patterson's actions against its self-interest. Beyond those matters, Patterson's attack on Dr. Marshall's reading of documents constitutes nothing more than an effort to distract from the plain language of the documents – which the Court is capable of interpreting for itself.

Patterson's opening attack on Dr. Marshall relies on a red herring: a damages calculation Dr. Marshall offered in *United States v. Birkart Globistics GmbH & Co.*,[830] an unrelated False Claims Act case.[831] Patterson's characterization of *Birkart* is not only incomplete and

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[824] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.A., for a discussion of Respondents' inter-firm communications.
[825] *See* Complaint Counsel's Post-Tr. Br. at 84-86.
[826] *See id.* at 87-88.
[827] *See id.* at 88-89.
[828] *See id.* at 79-80, 88-90.
[829] Patterson Post-Tr. Br. at 55-56.
[830] 89 F. Supp. 3d 778 (E.D. Va. 2014).
[831] *See* Patterson Post-Tr. Br. at 56.

inaccurate,[832] it is irrelevant: *Birkart* simply has nothing to do with Dr. Marshall's opinions in this case, or the weight the Court should afford them. Patterson's other attempts to diminish Dr. Marshall's analyses in this case likewise fail, as discussed below.

A. Patterson Uses Dr. Marshall as a Strawman to Avoid Inconvenient Facts.

Patterson's attacks on Dr. Marshall's reading of the documentary evidence repeat Respondents' efforts at trial to extract soundbites about the meaning of documents the Court can (and will) interpret for itself. For example, Dr. Marshall's role is not to explain basic English words to the Court, and his reading of the definition of the word "feel" is not relevant to the Court's interpretation of the February 2013 Cohen-Guggenheim email exchange related to NMDC.[833]

Patterson's counsel's painful attempt to induce Dr. Marshall to agree that it is a "tragedy" when entities are charged with conspiracy based on a one-hour conversation is irrelevant to Dr. Marshall's opinions and useless to the Court.[834] Setting aside that conspiracy can be based on a wink and a nod,[835] Patterson's stunt came up short at trial.[836] Despite being set straight by Dr. Marshall, Patterson's brief repeats this mischaracterization of Dr. Marshall's book.[837]

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[832] Patterson suggests Dr. Marshall "cherry-picked" information (Patterson Post-Tr. Br. at 56), but this term appears nowhere in the opinion. Instead, the *Birkart* court acknowledged Dr. Marshall's "high level of expertise" and "the well-recognized and accepted underlying principles of multiple regression analyses he used." 89 F. Supp. 3d at 801. Ultimately, however, the court found a lack of industry data made it too difficult for a regression analysis to predict but-for prices, given "the opaque, unusual and complex price setting mechanism" at issue. *Id.*

[833] *See* Patterson Post-Tr. Br. at 57.

[834] CCRF (Patterson) ¶ 690.

[835] *Meyer v. Kalanick*, 174 F. Supp. 3d 817, 825 (S.D.N.Y. 2016) ("Sophisticated conspirators often reach their agreements as much by the wink and the nod as by explicit agreement.").

[836] Dr. Marshall consistently testified his use of the word "tragedy" does *not* refer to a scenario where a company is accused of colluding over a "one-hour lunch" or "eight second email." CCRF (Patterson) ¶ 690 (citing Marshall, Tr. 3327-3330 ("Q. It is a tragedy, according to you, . . . when a company gets accused of colluding during a one-hour lunch; right? A. No. That's not what the intent of this. The intent of this is to say it's a tragedy when firms engage in collusion and find that they haven't thought through what the implications are for being successful with their---with the collusion. . . . No, again, what you are talking about is monitoring one another's conduct in an anticompetitive agreement, that can be done very quickly.")).

[837] Patterson Post-Tr. Br. at 58.

Patterson also attempts unsuccessfully to use Dr. Marshall to distract from the June 2013 Guggenheim-Cohen exchange relating to ADC. Patterson mischaracterizes the facts and the law, suggesting that the Guggenheim-Cohen June 2013 exchange must constitute the "preceding agreement" required by *Twombly*.[838] Dr. Marshall acknowledged (like Complaint Counsel) that the June email exchange occurred after Benco won ADC's business, but this acknowledgement concedes nothing. First, Benco and Patterson communicated their common scheme not to discount to buying groups in February 2013. The June 2013 ADC exchange is not the formation of the agreement between Benco and Patterson. Instead, the June 7 Guggenheim-Cohen email represents a confrontation of suspected cheating on the existing agreement, and the June 10 Cohen-Guggenheim email represents an assurance that the agreement is still in place. Second, *Twombly* simply observes that consciously parallel conduct does not give rise to liability unless an agreement is in place, and thus at the pleading stage allegations that are limited to consciously parallel conduct are insufficient to state a claim.[839] Here, we are far beyond the pleading stage, and the evidence goes far beyond parallel conduct.

To the extent Dr. Marshall considered the factual record in preparing his report, it was appropriate to do so. "It is consistent with sound economic practice to review the factual record and formulate a hypothesis that can then be tested using economic theory—the examination of the factual record is necessary to determine which tests to run and to confirm that the stories drawn from the data and from the factual record are consistent."[840]

B. Dr. Marshall's Profitability Analysis Is Reliable.

Patterson's few arguments directed at Dr. Marshall's profitability analysis recycle many of Benco's arguments. As discussed,[841] by examining natural experiments, Dr. Marshall's

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[838] *See id.*

[839] *Bell Atl. Corp. v. Twombly*, 550 U.S. 544, 554 (2007) ("Hence, when allegations of parallel conduct are set out in order to make a §1 claim, they must be placed in a context that raises a suggestion of a preceding agreement, not merely parallel conduct that could just as well be independent action.").

[840] *In re Processed Egg Products Antitrust Litigation*, 81 F. Supp. 3d 412, 424 (E.D. Pa. 2015).

[841] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.D.3.

analysis provided reliable analysis that further substantiated Respondents' illegal agreement. Studying natural experiments is a widely accepted method of analysis in antitrust cases.[842] Patterson argues that Dr. Marshall's analysis is anecdotal citing two cases, but both cases are irrelevant to the use of a "natural experiment" analysis to confirm whether defendants acted against their self-interest like Dr. Marshall's study.[843]

Patterson also argues that two of Dr. Marshall's analyses do not fit the timeline of this case, arguing that they are outside the benchmark period.[844] However, this argument overlooks that these analyses are natural experiments. As previously noted, even Respondents' experts attest to the "convincing" value of natural experiments.[845] Consistent with Dr. Marshall's profitability analyses, it was against Patterson's unilateral self-interest to have a no buying group policy after 2013, whereby it instructed its employees to categorically reject buying groups.[846] Prior to 2013, Patterson did not have a no buying group policy and, thus, was not acting against its self-interest.[847]

Similarly, while Patterson claims that Dr. Marshall did not study enough data or dentists, [redacted].[848] There is nothing to suggest that the purchasing behaviors of these dentists are not representative of other dental buying group

[842] CCRF (Patterson) ¶ 741.

[843] Patterson Post-Tr. Br. at 59 (citing *Newell Rubbermaid Inc. v. Raymond Corp.*, 676 F.3d 521, 528 (6th Cir. 2012) (in design-defect claim case, "merely count[ing] accidents from accident reports" deemed unreliable); *Va. Vermiculite, Ltd. v. W.R. Grace & Co.*, 98 F. Supp. 2d 729, 740 (W.D. Va. 2000) (where expert had potential for bias due to close work with a party's president, expert data from interviews deemed unreliable)).

[844] Patterson Post-Tr. Br. at 60.

[845] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.D.3 (citing Complaint Counsel's Response to Benco Proposed Finding of Fact ¶ 1023 (RX2833-050, at ¶ 122 (Wu Expert Report)); quoting *United States v. AT&T Inc.*, 310 F. Supp. 3d 161, 215 (D.D.C. 2018)).

[846] CCRF (Patterson) ¶¶ 742-745.

[847] *Id.*

[848] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.D.3 [redacted]; CCRF (Patterson) 733-740.

members. Patterson's cited cases again have absolutely no bearing on the use of a natural experiment method to study actions against self-interest in an antitrust case.[849]

Patterson next complains that Dr. Marshall failed to study the groups that were the subjects of the interfirm communications between Benco and Patterson (ADC and NMDC), but instead focused on two buying groups that Patterson never discussed with a competitor (Kois and Smile Source). *First*, Benco and Patterson exchanged their respective "*policy*" on buying groups generally, not just their conduct specifically with respect to NMDC and ADC. Thus, Dr. Marshall's profitability studies analyzed two buying groups that have the very characteristic that Respondents claim make it unprofitable for them to pursue buying groups—[redacted].[850] As discussed,[851] the characteristics of Smile Source and Kois made them well-suited examples for his analysis.[852] *Second*, as Patterson acknowledged in its inter-firm communications, ADC is not a buying group. It would make no sense for Dr. Marshall to analyze lost sales and profits from a non-buying group entity. *Third*, it was not possible to conduct an analysis of incremental sales from working with NMDC because, as a result of Respondents' concerted action, the buying group never got off the ground.[853] As discussed,[854] Respondents cannot destroy the but-for world and then complain that Dr. Marshall did not study non-existent data.[855] *Fourth*, as previously

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[849] Patterson Post-Tr. Br. at 61 (citing *Floorgraphics, Inc. v. News Am. Mktg. In-Store Servs., Inc.*, 546 F. Supp. 2d 155, 179 (D.N.J. 2008) (refusing to admit expert interviews as a substitute for direct testimony in a tortious interference of contract case where expert knew each of the interviewees); *In re Class 8 Transmission Indirect Purchaser Antitrust Litig.*, 140 F. Supp. 3d 339, 353-56 (D. Del. 2015) (rejecting expert testimony in class certification proceedings on the issue of "common proof" of damages among the class members because expert data not representative of the class)).

[850] CCRF (Patterson) ¶ 720.

[851] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.D.3.

[852] CCRF (Patterson) ¶ 713.

[853] CCFF ¶ 511 (Mason, Tr. 2357-2358; CX3334).

[854] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.D.3.

[855] *Cf. United States v. Microsoft Corp.*, 253 F.3d 34, 79 (D.C. Cir. 2001) ("To require that Section 2 liability turn on a plaintiff's ability or inability to reconstruct the hypothetical marketplace absent a defendant's anticompetitive conduct would only encourage monopolists to take more and earlier anticompetitive action. . . . [N]either plaintiff nor the court can confidently reconstruct a product's hypothetical technological development in a world absent the defendant's exclusionary conduct. To some degree, 'the defendant is made to suffer the uncertain consequences of its own undesirable conduct.'") (quoting Areeda & Hovenkamp ¶ 651c).

noted,[856] that [redacted].[857]

Finally, Patterson argues that Dr. Marshall calculates that Patterson lost relatively little profit by failing to bid on Smile Source in 2013 and Kois in 2014.[858] This misunderstands the purpose of the "plus factor" to which Dr. Marshall's opinion is relevant—the question is not whether Patterson sacrificed significant profits, the question is simply whether it would have been in Patterson's self-interest to have a policy that banned bidding on these types of accounts. Any profit above zero provide the "plus factor," particularly given Patterson's claims of fighting tooth and nail for much smaller independent dentist sales, as well as evidence that Patterson competed for Smile Source post-conspiracy in 2017[859] when it had even less to gain.[860] While it is understandable to not bid for every buying group, for precisely the reasons exhibited in Dr. Marshall's analysis, insofar as Respondents lost buying group sales because they directed their sales teams not to discount to buying groups, these across-the-board directives were contrary to Respondents' economic interest.

At bottom, Patterson nitpicks Dr. Marshall's analysis, but to no useful end. It cannot claim that Dr. Marshall's analysis reached the wrong conclusion and that it was in Patterson's independent self-interest to enforce a blanket rejection of buying groups. The factual record says

[856] *See supra* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.D.3.
[857] CCRF (Patterson) ¶ 713.
[858] Patterson Post-Tr. Br. at 61-62.
[859] CCFF ¶ 1347.
[860] CCRF (Patterson) ¶ 748 (citing, *inter alia*, [redacted].

otherwise.[861] Thus, even if one disregards Dr. Marshall's findings, Patterson is unable to overcome the evidence that indicates that its instructions to universally reject buying groups was contrary to its economic self-interest.

IV. BASIS FOR INJUNCTIVE RELIEF

Finally, Patterson claims that even if Complaint Counsel prevails in proving Respondents entered into an unlawful agreement, injunctive relief is inappropriate because there is no cognizable danger of reoccurrence.[862] This argument is inconsistent with clear legal authority holding that termination of alleged infringing conduct does not warrant dismissal for mootness.[863] It is not a defense to liability.[864] Patterson does not identify a single Section 5 decision that supports its position that an injunction here is improper. Indeed, even the case cited by Patterson — *TRW, Inc. v. F.T.C.* — holds that a voluntary cessation of illegal conduct does not render a case moot.[865]

Rather than rely on appropriate Section 5 cases, Patterson relies on Clayton Act Section 8 (interlocking directorate) cases, which are distinguishable from FTC Act Section 5 cases.[866] Section 8 of the Clayton Act has highly technical thresholds and requirements that apply only to interlocking directorate situations, unlike Section 5. Moreover, Section 8 of the Clayton Act

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[861] *See, e.g.*, CCFF ¶¶ 1738-1739 (quoting CX3089 at 001 ("Patterson lost "high quality / high producing" customers to the Kois Buyers Group that was served by Burkhart, noting that "the cut is deep to us all."); citing CX3186 at 009 (in one region in one period, Patterson lost four customers with total sales of $110,000 to Smile Source)), 1358-1363; *see also* 1270-1273, 1276 (viewing buying groups as growth opportunities), 1290. That Patterson competed for buying groups after the conspiracy ended suggests that it viewed working with buying groups as consistent with its unilateral self-interest. *See, e.g.*, CCFF ¶¶ 1410, 1352-1356, 1364.

[862] Patterson Post-Tr. Br. at 62.

[863] *See FTC v. Goodyear Tire & Rubber Co.*, 304 U.S. 257, 260 (1938) ("Discontinuance of the practice which the Commission found to constitute a violation of the Act did not render the controversy moot.") (internal citations omitted).

[864] *See In the Matter of Sears, Roebuck & Co.*, 95 F.T.C. 406, 520 (1980) ("Courts have recognized that discontinuance of an offending practice is neither a defense to liability, nor grounds for omission of an order.") (internal citations omitted).

[865] *TRW, Inc. v. FTC*, 647 F.2d 942, 953 (9th Cir. 1981).

[866] Patterson also cites two cases that have no relevance to a Section 5 case—a Title VII discrimination case (*Wal-Mart Stores, Inc. v.* Dukes, 564 U.S. 338 (2011)) and an individual's case against a city's police department for misconduct (*City of L.A. v. Lyons*, 461 U.S. 95, 105-06 (1983)).

provides a one-year grace period allowing a director to resign from the position creating the interlock and effectively "curing" the violation.[867] Section 5 allows no such self-cures.

In Section 5 cases like this one, the Commission has broad discretion to fashion orders not only to stop unlawful conduct but also to require affirmative disclosures or other corrective actions. This is the heart of the agency's congressional mandate and one repeatedly recognized by the Supreme Court.[868] Contrary to Patterson's unsupported suggestion, it is well established that the Commission's discretion to fashion injunctive relief is in no way limited by voluntary cessation.[869] Accepting Patterson's argument would effectively render meaningless the Commission's authority to obtain injunctive relief and allow conspirators to bestow immunity on themselves by stopping their misconduct when caught.[870]

Moreover, the orders that led to the collapse of Respondents' agreement are either no longer in effect or are expiring soon. Respondent's conspiracy began to fall apart after Benco's settlement with the Texas Attorney General, which required it to log communications with competitors about buying groups.[871] Patterson and Schein entered similar stipulated agreements in 2018 and 2017, respectively.[872] The orders have now expired for Benco and Patterson.[873] And Schein's obligations under the order terminates in August 2019.[874] Absent an injunction in this case, nothing would prevent Respondents from reverting to the very conduct that led to the

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[867] 15 U.S.C. § 19(b).

[868] *See, e.g.*, *Jacob Siegel Co. v. FTC*, 327 U.S. 608, 612-13 (1946) ("The Commission is the expert body to determine what remedy is necessary to eliminate the unfair or deceptive trade practices which have been disclosed. It has wide latitude for judgment and the courts will not interfere except where the remedy selected has no reasonable relation to the unlawful practices found to exist."); *see also FTC v. Nat'l Lead Co.*, 352 U.S. 419, 428 (1957); *FTC v. Ruberoid, Co.*, 343 U.S. 470, 473 (1952).

[869] *See ITT Cont'l Baking Co. v. FTC*, 532 F.2d 207, 222 n.22 (2d Cir. 1976) (It is "the general rule that voluntary cessation of an illegal practice is no bar to a Commission cease and desist order.").

[870] *In the Matter of Richard S. Marcus Trading As Stanton Blanket Co.*, 66 F.T.C. 1290, 1964 WL 73139, at *10 (1964), *rev'd on other grounds, 354 F.2d 85* (2d. Cir. 1965) ("In any case of the discontinuance of a practice, the Commission is vested with broad discretion in the determination of whether the practice has been surely stopped and whether an order to cease and desist is proper.") (internal citations omitted); s*ee also Hershey Chocolate Corp., v. FTC*, 121 F.2d 968, 971-72 (3d Cir. 1941).

[871] CCFF ¶¶ 1160-1161; *see also* CCFF ¶ 1162.

[872] CCFF ¶¶ 1163-1164.

[873] CCFF ¶¶ 1160-1161, 1164.

[874] CCFF ¶ 1163.

unlawful agreement. Thus, Complaint Counsel seeks a pragmatic but effective order necessitated by Respondents' illegal conduct.[875]

[875] *See* Complaint Counsel's Post-Tr. Br. at 106-111.

COMPLAINT COUNSEL'S REPLY TO SCHEIN'S POST TRIAL BRIEF

I. INTRODUCTION

Schein's contemporaneous documents tell a consistent and simple story: Beginning in 2011, Schein's President Tim Sullivan began instructing Schein's sales force not to deal with buying groups. This followed inter-firm communications between Sullivan and Cohen, and it was a change at Schein—Sullivan had never dictated such a policy before. While Schein recognized that buying groups could trigger a "huge price war",[876] it nonetheless worked with a number of buying groups before 2011. In fact, Sullivan explicitly approved buying groups such as Smile Source as a way of gaining incremental profits. Following the 2011 communications with Cohen, Schein adopted the same policy as Benco (and eventually, Patterson). Sullivan, like Cohen and Guggenheim, instructed his salesforce against buying groups throughout the conspiracy. All three executives—Sullivan, Cohen, and Guggenheim—preached that buying groups were "slippery slopes,"[877] and discussed the threat of margin decline. They rejected buying groups that were elevated to them, and instructed others to do so categorically. The executives—Presidents and CEO of competing firms—communicated with each other about buying groups on multiple occasions and exchanged assurances about their buying group policies. They complied with the agreement, and confronted each other about cheating. And each of the Big Three's contemporaneous documents refer to a common understanding among Schein, Benco, and Patterson that none of them would deal with buying groups.

Schein's Post-Trial Brief, on the other hand, is riddled with holes and internal contradictions, and is undermined by the contemporaneous documents drafted by its own executives. Tellingly, Schein ignores the mountains of evidence in the record that contradict its story.

First, Schein argues that there was no parallel conduct (*i.e.*, that Schein did not comply with the agreement), despite the trove of Schein's contemporaneous documents showing that

[876] CCFF ¶ 197.
[877] CCFF ¶¶ 201-203; 709-711, 809, 950.

Schein, like Benco and Patterson, categorically rejected buying groups throughout the conspiracy. Schein executives and employees at all levels of the company referred to and understood there was a blanket policy not to deal with buying groups that came from Sullivan. Nor did Schein evaluate each buying group individually based on specific factors, as it now claims—it rejected them outright during the conspiracy. Further evidencing Schein's parallel conduct, Schein's own contemporaneous documents, written by its executives, refer to a common understanding among the Big Three not to deal with buying groups. Benco and Patterson's contemporaneous documents, too, confirm this: their executives knew, understood, and instructed sales forces that Schein did not work with buying groups, despite occasionally getting market rumors to the contrary.[878] Benco and Patterson's executives discussed Schein's cheating on the agreement, and Benco's executives confronted Schein on several occasions about perceived deviations.

In the face of this evidence, Schein nonetheless claims that it "routinely" pursued buying groups,[879] and has crafted a list of twenty-five entities it claims are buying groups.[880] But only four of these twenty-five are buying groups with which Schein reached an agreement *during* the conspiracy, *none* were approved by Sullivan, and all were against Sullivan's instructions not to deal with buying groups.[881] The rest are "legacy" pre-conspiracy buying groups that Schein began working with before Schein changed its conduct in 2011 (including ones that Schein

[878] CCFF ¶¶ 675-684. During the conspiracy, Benco's Cohen understood that "the policy that Henry Schein had was that they do not recognize GPOs," despite getting market intelligence suggesting Schein was dealing with buying groups. CCFF ¶¶ 676, 955-977, 994-1004. Patterson had the same understanding. In August 2013, when Patterson executive Tim Rogan received inaccurate market intelligence that Schein might be selling to a buying group, he responded: "We don't need GPO's in the dental business. Schein, Benco, and Patterson have always said no. I believe it is our duty to uphold this and protect this great industry." CCFF ¶ 603 (quoting (CX0106 at 001)); Complaint Counsel's Reply to Schein Finding of Fact (hereinafter "CCRF (Schein)") ¶ 133.

[879] Henry Schein's Post-Trial Brief (hereinafter "Schein Post-Tr. Br.") at 86.

[880] Schein Post-Tr. Br. at 87-88.

[881] By way of example, Schein points to its relationship with Dental Gator, one of the four buying groups during the conspiracy. Dental Gator was established by one of Schein's largest DSO customers, MB2 Dental Solutions ("MB2"). Schein inserted provisions into its 2014 supply agreement with MB2 to prevent MB2 from forming a buying group, told MB2 it did not deal with buying groups, threatened that "if it looks at any time like a GPO we will disenroll," and Sullivan and Schein executives tried to terminate the relationship, pursuant to Schein's policy against buying groups. CCFF ¶¶ 1768-1823.

terminated during the conspiracy), post-conspiracy buying groups that Schein began working with after the agreement fell apart, or not buying groups at all (instead, DSOs and MSOs).[882] The four buying groups that flouted Sullivan's policy merely show Schein's less-than-perfect compliance with the agreement in a handful of instances, which does not negate evidence of a conspiracy, especially in light of the overwhelming record evidence showing Schein's compliance. It is the unlawful agreement itself, not perfect adherence to it, which violates the antitrust laws. In fact, courts have upheld findings of liability even when there was substantial deviation from the agreement, because "the agreement itself, not its performance, is the crime of conspiracy."[883] In *Foley*, the court affirmed the price fixing conviction against a defendant even though it only complied with the agreement part of the time, fluctuating between 30% to 70% compliance.[884]

Further, Schein contradicts itself repeatedly. In one breath, it claims it was the buying group industry leader.[885] In the next, it bashes them, arguing that it "studiously avoided"[886] and was skeptical of buying groups,[887] viewed winning a buying group as "pyrrhic victory,"[888] was justified in rejecting buying groups, and its refusal to deal was just oligopoly behavior.[889] It also argues that it only rejected certain types of buying groups (so-called "price-only" buying groups), despite the contemporaneous documents that demonstrate Schein, just like Benco and Patterson, implemented a categorical no buying group policy that made no such distinctions.[890]

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[882] CCFF ¶ 72 (buying groups are different from DSOs and MSOs).
[883] *United States v. Foley*, 598 F.2d 1323, 1333 (4th Cir. 1979).
[884] *Id.* at 1332-33.
[885] Kass, Tr. 89 ("In fact, we are the leader in dealing with buying groups.").
[886] Schein Post-Tr. Br. at 16.
[887] Schein Post-Tr. Br. at 20.
[888] Schein Post-Tr. Br. at 15.
[889] Schein Post-Tr. Br. at 85-86, 92-93.
[890] *See United States v. Gen. Elec. Co.*, 82 F. Supp. 753, 844-45 (D.N.J. 1949) (Contemporaneous documents have "the highest validity as evidence of intention" and "mirror well the contemporaneous thoughts and the policy considerations of [defendants'] officials, and the testimony at the trial failed to limit them.") (internal quotation omitted), *decision supplemented*, 115 F. Supp. 835 (D.N.J. 1953).

Second, Schein argues that Sullivan's communications with Cohen represent an unsolicited invitation to collude that Schein rebuffed. This argument fails, because the weight of the evidence contradicts Sullivan's testimony that he "admonished"[891] Cohen twice not to discuss buying groups. Schein points to Sullivan's testimony that he purportedly told Cohen, on two occasions,[892] that they should not be discussing or exchanging information about customers—the first time during their March 25, 2013 phone call and again on their April 3, 2013 phone call.[893] Sullivan claims that during the second phone call, he again admonished Cohen "more sternly" not to discuss the subject.[894] Cohen's testimony flatly contradicts this: Cohen testified that he has no recollection of Sullivan ever delivering such a message.[895] Cohen testified that if a rival told him to stop communicating, he would do so: "if someone says stop, I stop."[896] Moreover, Schein's claim that Sullivan rejected Cohen's advances and "admonished" him twice is contradicted by Sullivan's actual behavior.[897]

Further, Sullivan changed his sworn testimony concerning his communications with Cohen about buying groups several times. Sullivan previously testified that he did not know what his April 3, 2013 call with Cohen was about, but that he did not believe it was possible that the call related to Atlantic Dental Care.[898] Sullivan has changed his prior sworn testimony on several other critical points relating to his communications with Cohen. For instance, Sullivan testified under oath in his investigational hearing that Cohen told him on March 25, 2013 that

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[891] Schein Post-Tr. Br. at 83-84.

[892] Schein Post-Tr. Br. at 71-72.

[893] CCFF ¶¶ 1054, 1089.

[894] Schein Post-Tr. Br. at 72.

[895] CCFF ¶¶ 1055-1056, 1090. Cohen testified at trial that he did not recall Sullivan ever telling Cohen to stop contacting him about buying groups, and does not recall Sullivan ever giving Cohen the impression that they should not be talking about buying groups.

[896] CCRF (Schein) ¶ 1491. Further, Sullivan testified that he has never known Cohen to lie. CCRF (Schein) ¶ 1491 (CX0311 (Sullivan, IHT at 271) ("Q. Have you known Mr. Cohen to lie? A. I know him as an odd personality but to flat out lie, no. I don't communicate that much with him to tell you the truth, but it's -- I don't know him to have lied.")).

[897] CCFF ¶¶ 1051, 1058-1060; *see also* Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.C.2, *supra*.

[898] CCFF ¶ 1089.

Benco would not bid for ADC's business, then changed his story at trial to say the opposite.[899] Sullivan also previously testified that he had no recollection of why he called Cohen on March 27, 2013, but that it was not even "possible" that the call related to ADC.[900] Then, Sullivan later self-servingly testified that it was his intent on March 27, 2013 to "remind" Cohen that they "should not be talking about this."[901] Sullivan's testimony cannot be credited.

The contemporaneous documents support Cohen's testimony. Immediately after the March 25, 2013 call about ADC, Sullivan thanked Cohen for the call and joked with Cohen.[902] Cohen later sent Sullivan more information about ADC by text message, and referred to it as "the press release we discussed."[903] Sullivan responded to Cohen's text message, by again thanking him: "[t]hanks for the follow up on that article. Unusual."[904] The two men continued to exchange text messages about buying groups,[905] and Sullivan continued trying to reach out to Cohen by phone.[906] Further, while Sullivan now claims that Cohen's communications raised "red flags," he did nothing to document or report the communications to Schein's legal department or anyone else, as he was required to do under Schein's antitrust policy.[907] In fact, there are *no* contemporaneous documents that support Sullivan's claim; instead, they all contradict his claim.[908]

Schein tries to argue that the communications were an unaccepted invitation because Sullivan never reciprocated with information about Schein's buying group policies, and that the

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[899] CCFF ¶¶ 1038-1041.
[900] CCRF (Schein) ¶ 1491.
[901] CCRF (Schein) ¶ 1491 (CX8025 (Sullivan Dep. 409-410); *see also* Sullivan, Tr. 3963, 3965)).
[902] CCFF ¶¶ 1051-1053.
[903] CCFF ¶¶ 1057-1059.
[904] CCFF ¶ 1058.
[905] CCFF ¶ 1069.
[906] CCFF ¶¶ 1079-1080; CCRF (Schein) ¶ 1491 (CX6027 at 028 (Row 247), 029 (Row 250), 029 (Row 255)).
[907] CCFF ¶¶ 1049-1050. Schein's Antitrust Compliance Policy required Sullivan to report the call to Schein's "Legal Department, the Human Resources Department, or the Senior Vice President of Administration."
[908] CCFF ¶¶ 1022-1110.

communications were thus a "one-way" exchange of information.[909] The evidence contradicts Schein's claim that the exchanges were one-way, as Benco was certain that Schein had implemented a policy prohibiting discounts to buying groups,[910] and Benco executives advocated confronting Schein executives when Schein deviated from this approach.[911] *Cf. B&R Supermkt*[912]. Rather, the evidence shows that Sullivan and Cohen reached a common understanding about buying groups through an exchange of assurances, as discussed *supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.A.1. ("There is Direct and Unambiguous Evidence of Agreement"). Thus, Schein's arguments fail to disprove an agreement. Regardless, as the Supreme Court held in *Interstate Circuit v. United States*, "[i]t was enough [to support a conspiracy] that, knowing that concerted action was contemplated and invited, the distributors gave their adherence to the scheme and participated in it."[913] Moreover, this case is similar to *Esco Corp. v. United States*. There, the Ninth Circuit affirmed a price fixing conviction where the defendant followed a course of conduct suggested by a competitor, even though the defendant never expressly gave an assurance of commitment to the competitor.[914] Here, the evidence shows that, *at minimum*, Cohen communicated Benco's no buying group policy to Sullivan,[915] that Sullivan received assurances from Cohen about buying groups,[916] and that Sullivan acted in accordance with those assurances.[917]

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[909] Schein Post-Tr. Br. at 71, 84.

[910] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.A.1 ("There is Direct and Unambiguous Evidence of Agreement").

[911] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § 1.A.1 (discussing "Better tell your buddy Tim to knock this shit off.").

[912] *Cf. B&R Supermkt. Inc. v. Visa, Inc.*, No. C 16-01150 WHA, 2016 WL 5725010, at *6 (N.D. Cal. Sept. 30, 2016) (MasterCard's representative "could not speak so confidently on behalf of *all* networks save and except for her knowledge of collusion, for true competition would have driven one or more networks to break ranks and offer more competitive terms.").

[913] *Interstate Circuit v. United States*, 306 U.S. 208, 226 (1939) ("It was enough [to support a conspiracy] that, knowing that concerted action was contemplated and invited, the distributors gave their adherence to the scheme and participated in it.").

[914] *Esco Corp. v. United States*, 340 F.2d 1000, 1007-08 (9th Cir. 1965).

[915] CCFF ¶¶ 661-664.

[916] For example, Sullivan previously testified that Cohen informed him that Benco was not planning to bid on ADC. CCFF ¶¶ 1038-1040.

[917] *See infra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.A.1 (discussing evidence of Schein's enforcement of a policy against buying groups).

Finally, Schein takes aim at Complaint Counsel's "plus factor" evidence supporting a finding of an unlawful agreement, although the plus factors simply corroborate the otherwise unambiguous evidence of an agreement. It criticizes Dr. Marshall's work, including a profitability analysis confirming that it was against Respondents' self-interest to reject buying groups categorically. Yet the plus factor evidence largely comes from Respondents' contemporaneous documents showing a common motive to conspire, changes in conduct ("structural breaks") before and after the agreement, and Respondents' actions against self-interest by refusing to deal with buying groups. Dr. Marshall's analyses thus only confirm and are consistent with the evidence of plus factors already in the factual record.

Schein asks this Court to ignore the unjustified communications between direct competitors relating to buying groups, and the internal company documents confirming an agreement. Instead, it asks this Court to consider only its witness denials of an agreement, as did the defendants in *Gainesville* (who denied the existence of an agreement and claimed the competitor communications were nothing more than "common courtesy");[918] in *Champion* (who testified the communications "were innocent");[919] in *Foley* (who "offered explanatory and exculpatory evidence");[920] in *Beaver* (who argued the trial evidence showed "no person voiced their assent to the supposed conspiracy");[921] and in *Esco* (who argued "the record is utterly lacking in evidence of agreement").[922] But just like the defendants in each of these cases, Schein cannot run away from the contemporaneous documents, which confirm Schein's participation in an agreement with Benco and Patterson.

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[918] *Gainesville Utilities Department v. Florida Power & Light Co.*, 573 F.2d 292, 301 n.14 (5th Cir. 1978) ("The officials of the power companies deny the existence of a territorial agreement . . . .").

[919] *United States v. Champion International Corp.*, 557 F.2d 1270, 1273 (9th Cir. 1977) ("The defendants have always asserted that these meetings were innocent, but the court found otherwise.").

[920] *United States v. Foley*, 598 F.2d 1323, 1334 (4th Cir. 1979) ("Defendants of course offered explanatory and exculpatory evidence . . . .").

[921] *United States v. Beaver* 515 F.3d 730, 737 (7th Cir. 2008).

[922] *Esco Corp. v. United States*, 340 F.2d 1000, 1006 (9th Cir. 1965).

II. RESPONSE TO SCHEIN'S MISCHARACTERIZATIONS OF THE EVIDENCE.

Schein's post-trial brief ignores the overwhelming weight of the evidence for which it has no good explanation, and instead selectively quotes or mischaracterizes documents and testimony, and mischaracterizes Complaint Counsel's allegations.[923]

A. Schein Worked With Buying Groups Prior to The Conspiracy, and Adopted a Policy of Not Working With Buying Groups During the Conspiracy.[924]

Schein's central argument is that it worked with buying groups during the conspiracy, and never had a policy or practice against them. According to Schein, it worked with buying groups that controlled purchasing and made volume commitments during the conspiracy,[925] but avoided so-called "price-only" buying groups focused only on price.[926] The documents tells a different story: Schein categorically rejected buying groups based on the instructions of Tim Sullivan—Schein's President who entered into the unlawful agreement with Benco.

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[923] Schein claims ignorance of the timeframe that Complaint Counsel alleges for the conspiracy, and tries to portray this as a "weakness" in Complaint Counsel's allegations. Schein Post-Tr. Br. at 1 n.2. For avoidance of doubt, Complaint Counsel alleges that Schein and Benco entered into an agreement in 2011, followed by Patterson joining in early 2013. Kahn, Tr. 19. Beginning in April 2015, the agreement became difficult to maintain, and began to fall apart, after Benco settled an antitrust investigation into its response to the TDA buying group by entering into an Agreed Final Judgment and Stipulated Injunction with the Texas Attorney General's Office. Kahn, Tr. 19; CCFF ¶¶ 1159-1162. Complaint Counsel is not required to present evidence of the precise start of the conspiracy. *See United States v. Consol. Packaging Corp.*, 575 F.2d 117, 126 (7th Cir. 1978) (finding sufficient evidence to establish a conspiracy even without finding evidence in the record of the "specific agreement, its embryo or history of its development," noting "[t]he form or manner of making the agreement are not crucial"). Moreover, Schein's claim that Complaint Counsel previously alleged that the agreement began in July 2012 is false. Schein Post-Tr. Br. at 68 n.53. The Complaint alleges that Benco and Schein entered into an agreement "*no later* than July 2012," and is fully consistent with Complaint Counsel's contentions. *See* Complaint, ¶ 32.

[924] Section II.A of Complaint Counsel's Reply Brief responds to arguments in Section A of Schein's Post-Trial Brief ("Schein's Approach to Centralized Purchasing Partnerships"). *See* Schein Post-Tr. Br. at 13.

[925] Schein's argument makes no sense. As Schein and other witnesses testified at trial, buying groups by definition do not control purchasing or make contractual volume commitments on behalf of their members, because they are comprised of independent dental practices. CCFF ¶¶ 72-76. Schein's contemporaneous documents support this, and show that Schein distinguished buying groups from DSOs and MSOs because DSOs and MSOs have centralized control over purchasing, while buying groups do not. CCRF (Schein) ¶ 87 (CX2764 at 004) (internal Schein document that distinguished DSOs and MSOs from GPOs, based on the lack of centralized purchasing and management in GPOs)); *see also* CCFF ¶ 72 (quoting Foley, Tr. 4512-4513 ("Q. [D]o you agree that DSOs and MSOs make the purchasing decisions for dental practices while buying groups do not? A. Yes.")).

[926] Schein Post-Tr. Br. at 16.

Prior to 2011, Sullivan did not instruct Schein's sales force not to work with buying groups, and Schein did not have a no buying group policy. Schein's salesforce did not refer to any such instructions from Sullivan before 2011.[927] In fact, Sullivan approved buying groups like Smile Source in 2010, even though he was concerned about it leading to a "huge price war," because of the opportunity to gain incremental profits.[928] On February 23, 2011, Sullivan explained to Smile Source that he was very excited about Smile Source's "business model."[929] In early 2011, when a buying group approached Schein, Schein's Special Markets division passed it along to Sullivan's division, HSD. Schein's executives did not refer to instructions or a policy against buying groups (as they did during the conspiracy), despite a Schein executive expressing fear of buying groups leading to margin erosion in the dental industry.[930] Schein worked with several buying groups before the conspiracy began, such as Smile Source, the Dental Cooperative, Long Island Dental Forum, and Dentists for a Better Huntington.[931]

1. Schein's Contemporaneous Documents Show that During the Conspiracy Period Sullivan Began to Instruct Schein's Salesforce to Categorically Reject Buying Groups.

By July 2011, Sullivan's position had changed. In spite of Sullivan's previous enthusiasm for working with the buying group Smile Source, Sullivan informed his bosses, "I don't think you will ever see a full service dealer get involved with GPOs."[932] Schein's contemporaneous documents, written by Sullivan and other Schein executives, show that

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[927] Schein points to an email from 2002, 9 years before the conspiracy, in which Schein Special Markets President Hal Muller described the threat of margin erosion from buying groups, and expressed that Schein was avoiding working with them. Schein Post-Tr. Br. at 19-20. Yet this email is not relevant to disprove of evidence of agreement in 2011. Buying groups were not common in the dental industry in 2002 when Muller wrote this email, (CCFF ¶¶ 134-137) and Schein began working with them years later when buying groups became more prevalent, such as The Dental Cooperative in 2007 and Smile Source in 2008. CCFF ¶¶ 432-453.

[928] CCFF ¶¶ 432-439 (quoting CX2113). In September 2010, Sullivan explained to his boss, Jim Breslawski, that he thought the benefits of working with buying groups outweighed the risks.

[929] CCFF ¶ 696 (quoting CX2899 at 001 ("I remain very excited about our future together and the business model you have created. As we discussed, your approach to your members lines up extremely well with our approach to them as customers.")).

[930] CCRF (Schein) ¶¶ 446-447.

[931] CCFF ¶¶ 440-444.

[932] CCFF ¶ 705 (quoting CX0185 at 001); *see also* CCFF ¶¶ 701-704, 706.

Sullivan began instructing Schein employees to categorically reject buying groups beginning in late 2011. As a result of these instructions, both divisions at Schein—Henry Schein Dental ("HSD," which serviced private practices) and Special Markets (which serviced DSOs, institutions, and other non-traditional practices)[933]—categorically rejected buying groups.[934]

The record is replete with examples of these directives from Sullivan throughout the conspiracy period. In December 2011, Sullivan wrote to his employees that he believed Schein did "NOT want to lead in getting [buying groups] started in dental."[935] He explained that buying groups were "a very slippery slope."[936] He also informed his employees in December 2011 that he did not want to "be the first company to open the floodgates to the dangerous world of GPOs."[937] By February 2012, Sullivan wanted to know "what we can do to KILL the buying group model!!"[938] In September 2014, he wrote: "I still believe [buying groups are a] slippery slope . . . and don't plan to take the lead role."[939] Moreover, Sullivan personally directed employees to refuse buying groups that were elevated to him.[940]

Schein's sales force got the message. In February 2012, Schein executive Foley, referring to his conversation with Sullivan about buying groups, told his direct report: "Tim Sullivan is happy that we are less one more [buying group]," and "[s]o, this is a corporate decision, not to participate in these."[941] In July 2012, Schein executive Jake Meadows stated that

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[933] As Schein concedes, HSD focuses on serving independent dentists, while Special Markets "primarily serves customers other than independent dentists, such as federal and state government purchasers, dental schools, community health centers ("CHCs"), other institutions, and Dental Support Organizations ('DSOs')." *See* SF ¶ 5, 20.

[934] HSD had responsibility for buying groups throughout the conspiracy, though buying group opportunities approached both divisions. CCRF (Schein) ¶¶ 4, 23, 184, 237. Both rejected them categorically. CCFF ¶¶ 733-954. HSD and Special Markets coordinated strategy, and Sullivan was always involved in decisions relating to buying groups. CCRF (Schein) ¶¶ 4, 23, 184; CCFF ¶¶ 738-739. As a result, Sullivan was involved in the decision-making process concerning buying groups in both HSD and Special Markets. CCFF ¶¶ 738-739.

[935] CCFF ¶ 709 (quoting CX2456 at 001).

[936] CCFF ¶ 709 (quoting CX2456 at 001); *see also* CCFF ¶ 711.

[937] CCFF ¶ 713 (quoting CX2458 at 001); *see also* CCFF ¶¶ 712, 714-716.

[938] CCFF ¶ 729 (quoting CX0199 at 001). Sullivan claimed that he meant to write "KILL [their] buying group model," referring to the buying group Smile Source. (Sullivan, Tr. 4146.)

[939] CCFF ¶ 809 (CX2469 at 002).

[940] CCFF ¶¶ 795, 799, 801.

[941] CCFF ¶¶ 756 (quoting CX0238 at 001), 758 (quoting CX0238 at 001).

selling to a buying group was "against what Tim Sullivan has directed us to do in regards to supporting Buying groups. We do not want our customers organizing and creating what are known as GPOs it takes the value away from the distributor."[942] In another instance, Meadows noted to another Schein executive that "[Tim Sullivan] was going off about how we do not have any buying group agreements and that we will not do them. Soap boxing about HSD [Henry Schein] and buying groups."[943] Yet another Schein employee wrote, "from Tim S., HSD does not want to enter the GPO world."[944] Similarly, another employee informed her colleagues that "Tim [Sullivan] was not in favor of" a buying group agreement,[945] and that a buying group prospect "went to Tim [Sullivan] and he shot it down. I think the meta msg is officially, GPO's are not good for Schein."[946] Yet another Schein employee wrote in August 2014, referring to Sullivan's rejection of a buying group: "no GPOs which is I think a good rule."[947]

Dozens of Schein's documents confirm that Schein enforced a policy against buying groups, just like Benco and Patterson.[948] In its Post-Trial Brief, Complaint Counsel highlighted over thirty examples of Schein's contemporaneous documents evidencing a policy against buying groups during the conspiracy, though the record includes many more.[949] For example:

- December 21, 2011: Randy Foley, Director of Sales for Special Markets, rejected buying group Unified Smiles, stating, "[U]nless you have some 'ownership' of your practices Henry Schein considers your business model as a Buying Group, and we no longer participate in Buying Groups."[950]

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[942] CCFF ¶ 773 (CX0170 at 001).

[943] CCFF ¶ 850 (quoting CX0176 at 001).

[944] CCFF ¶ 806 (quoting CX2211 at 001). Schein attempts to explain away this statement, written by Schein Regional Manager Kevin Upchurch, by citing testimony from Kathleen Titus interpreting Upchurch's statement. *See* Schein Post-Trial Brief, at n. 31. Schein did not call Upchurch as a witness at trial. Titus is not the author of the quoted statement, and therefore her "interpretation" lacks foundation and carries no weight.

[945] CCFF ¶ 795 (quoting CX2219 at 001); *see also* CCFF ¶¶ 796, 798.

[946] CCFF ¶ 799 (quoting CX2235 at 001); *see also* CCFF ¶¶ 801-802.

[947] CCRF (Schein) ¶ 142 (quoting CX2441 at 001).

[948] *See* Attachment C to Complaint Counsel's Post-Trial Brief for additional examples of documents evidencing Schein's no buying group policy during the conspiracy; CCFF ¶¶ 700-954.

[949] *See* Attachment C to Complaint Counsel's Post-Trial Brief for additional examples of documents evidencing Schein's no buying group policy during the conspiracy.

[950] CCFF ¶ 719 (quoting CX2062 at 001); *see also* CCFF ¶¶ 720, 723, 743.

- January 26, 2012: Western Zone Manager Joe Cavaretta wrote to sales representatives, "It is dangerously close but I told him we would not do business with a GPO."[951]

- February 20, 2012: Foley wrote to his direct report, Strategic Account Manager Debbie Torgersen-Foster, "Honestly, within Schein we have a few buying groups (BG) that we wish we didn't have . . . So, this is a corporate decision, not to participate in these."[952]

- June 8, 2012: Regional Account Manager Andrea Hight wrote to her boss, Foley and Zone Manager Kathleen Titus: "I explained that we do not accommodate GPOs . . . ."[953]

- May 29, 2013: Cavaretta wrote to two Schein employees, "We try to avoid buying groups at all costs and therefore don't really recognize them."[954]

- December 20 2013: Foley told his counterpart at Colgate, one of Schein's manufacturer partners: "It's a buying group that we do not participate with, as with all buying groups."[955]

- October 8, 2014: a regional manager wrote to Titus, Schein's Director of Group Practices: "I recently had a conversation with Kathleen regarding this group and they are nothing more than a GPO. It is my understanding that this violates our policy as we do not engage with GPOs."[956]

- November 5, 2014: Eastern Area Sales Director Jake Meadows wrote to a Regional Manager: "We do not currently participate with GPOs. . . ."[957]

- December 2014: Sullivan to Cavaretta, "The Dec 'offsite' last year I left with a goal to see if we could get Hal [Muller] to shut [Dental Gator] down . . . ."[958]

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[951] CCFF ¶¶ 750 (quoting CX0168 at 001).

[952] CCFF ¶¶ 754 (quoting CX0238 at 001), 756 (quoting CX0238 at 001), 758.

[953] CCFF ¶ 771 (quoting CX2423 at 004).

[954] CCFF ¶¶ 785 (quoting CX2509 at 001), 787; CCRF (Schein) ¶ 236.

[955] CCFF ¶¶ 788 (quoting CX2073 at 001), 789.

[956] CCFF ¶¶ 811, 812 (quoting CX0260 at 002), 813.

[957] CCFF ¶ 828 (quoting CX2358 at 001); *see also* CCFF ¶¶ 827, 829-834.

[958] CCFF ¶¶ 836 (quoting CX0246 at 001); *see also* 837-838. Dental Gator was a buying group created by one of Schein's largest DSO customers, even though Schein's contract with the DSO prohibited the latter from forming a buying group. CCFF ¶¶ 1769-1783. Sullivan and Schein executives tried to end the Dental Gator relationship (CCFF ¶ 1806), and told Dental Gator it could not advertise itself as a buying group. CCFF ¶¶ 1812-1817. Dental Gator ceased operations in 2018. CCFF ¶ 1823.

Contemporaneous documents such as these confirm that Schein had a policy of refusing buying groups, contrary to any claim that it was a buying group "industry leader" during the conspiracy.[959] Benco and Patterson's internal, contemporaneous documents show that their executives knew, understood, and instructed their salesforces that Schein did not work with buying groups, despite occasionally learning of market rumors to the contrary.[960] Tellingly, out of the millions of pages of documents produced by Schein in this litigation, it fails to point to a single document during the conspiracy where Sullivan approved or supported a buying group. Instead, the only document Schein can point to is a single email from November 20, 2015, introduced at trial, purporting to show Sullivan and Schein had "nothing against Buying Groups per se."[961] Not only does this email post-date the conspiracy, it is transparently a manufactured-for-litigation email crafted and sent to Schein's trial counsel in hopes of avoiding liability. Sullivan admitted that he sent the email to his trial counsel knowing full well that Schein's refusal to do business with buying groups was a "sensitive topic" that was at the center of multiple antitrust lawsuits and government investigations.[962] On this record, Schein's meritless claims about a lack of a parallel conduct should be disregarded.

2. Schein Did Not Distinguish Between "Price-Only" Buying Groups and Other Types of Buying Groups.

Schein argues that it only rejected certain types of buying groups—so-called "price-only" buying groups that focus on price.[963] This argument finds no support in (and is contradicted by) Schein's contemporaneous documents and the testimony of its executives. The record shows that Schein executives never distinguished between types of buying groups during the conspiracy, or "price-only" and other buying groups. Rather, they rejected buying groups categorically.

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[959] Kass, Tr. 89 ("In fact, we are the leader in dealing with buying groups.").
[960] CCFF ¶¶ 549-553, 675-684; CCRF (Schein) ¶ 133.
[961] CCRF (Schein) ¶ 154 (quoting RX2360 at 001), 1362.
[962] CCRF (Schein) ¶¶ 154, 1362.
[963] Schein Post-Tr. Br. at 15-16.

Schein executive Jake Meadows, a former Vice President of Sales in HSD, testified that he does not recall ever hearing of the term "price-only buying group."[964] Hal Muller, Schein's President of Special Markets, testified that *all* buying groups are "primarily just price," and that this is the main distinction between buying groups and MSOs:

> Q. And what's the difference between an MSO and a buying group?
>
> A. An MSO has a lot of the management elements; HR, payroll, training, all those elements, *as opposed to a buying group that is primarily just price*.[965]

Sullivan similarly testified that he understands buying groups to be "purchasing organization[s] based on the concept of leveraging the purchasing power of independent dental practices to *negotiate discounts* with suppliers."[966] Nor did Sullivan ever distinguish between types of buying groups in instructing Schein's salesforce. Sullivan warned his team about buying groups broadly: "I still believe [buying groups are] a slippery slope . . . and don't plan to take the lead role."[967] Sullivan's only inquiry was whether the customer was a buying group (which should be rejected) or a DSO/MSO (which should be embraced): "If these convert to ownership office I would not put in to the straight up GPO bucket."[968] Indeed, Sullivan wrote in 2013: "Our first reaction to this was it was simply a buying group and we were going to walk away."[969]

Schein's executives followed Sullivan's lead, and categorically rejected buying groups. They did not analyze whether a buying group was "price-only." Nor did they analyze volume

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[964] CCRF (Schein) ¶ 112 (CX8016 (Meadows, Dep. at 52)). Consistent with this, Brian Brady, Schein's Former Director of Group Practices, testified that he used the term "buying group" in reference to buying groups broadly, and not to a specific type. CCRF ¶ 112.

[965] CCRF (Schein) ¶ 112 (quoting CX0309 (Muller, IHT at 141)).

[966] CCFF ¶ 67 (quoting Sullivan, Tr. 3941). Thus, Schein's attempt to now distinguish so-called "price only" buying groups is meaningless. Schein executives called groups of independent dentists that sought to leverage collective volume for discounts just "buying groups," and referred to them as such throughout the conspiracy.

[967] CCFF ¶ 809 (quoting CX2469).

[968] CCFF ¶ 1803 (quoting CX2761 at 001).

[969] CCFF ¶ 1097 (quoting CX2021 at 013).

opportunities or other specific factors, as Schein now claims. Meadows, Eastern Area Director of Sales in HSD, instructed a Schein employee in 2014: "Just for clarity, we are NOT participating in *any GPOs* regardless of what they promise to bring us."[970] Another Schein employee wrote: "Neither HSD or [sic] Special Markets will participate in *buying groups of any kind*."[971] Yet another wrote: "It's a buying group that we do not participate with, *as with all buying groups*."[972] Foley, Special Markets Director of Sales, wrote in 2014 of a buying group: "It's a buying group so we walked away from them—did not bid on the business."[973] Put simply, Schein refused to bid on customers if they were buying groups.

Further evidencing Schein's blanket policy, its internal documents defining "buying group" or "GPO" do not mention "price-only" buying groups. A 2012 sales presentation defined: "Definition of a Buying Group: NEITHER SM [Special Markets] NOR HSD [Henry Schein Dental] WOULD TAKE ON: An organization or group [o]f dentists that get together to leverage better pricing from a distributor . . . ."[974] Another from April 2015 defined group purchasing organization as any entity created to "leverage the purchasing power of individual and autonomous private practices to obtain discounts from vendors based on the collective buying power of the GPO members. . . ."[975] At trial, Schein executives admitted that they never used the term "price-only" buying group in contemporaneous documents and emails. Rather, they referred categorically to buying groups, without distinction, when communicating Schein's

[970] CCFF ¶ 816 (quoting CX2354 at 001 (emphasis in original)).
[971] CCFF ¶ 767 (quoting CX2003 at 001).
[972] CCFF ¶ 788 (quoting CX2073 at 001).
[973] CCFF ¶ 945 (quoting CX2697 at 001).
[974] CCFF ¶ 761 (quoting CX2065 at 002) (emphasis in original)).
[975] CCRF (Schein) ¶ 87 (quoting CX2764 at 004). This Schein internal document circulated among executives, entitled "Business Segment Definitions," distinguished GPOs from MSOs/DSOs, based on the lack of centralized purchasing and management in GPOs. In defining MSO, it stated, "Key differentiation from GPO is the authority to make decisions for the practices under management, and require compliance to a designated prime vendor relationship." By contrast, it stated, "the GPO has no authority or oversight in its members [sic] purchasing decisions." Thus, Schein recognized that GPOs did not control purchasing or make volume commitments. It distinguished GPOs and buying groups (which it boycotted) from DSOs and MSOs (which it worked with) on this basis. *See also* CCFF ¶¶ 72-76.

policy to Schein's sales force, to manufacturer partners, to potential customers, and to each other:

- **Q**. This is an e-mail to Unified Smiles where you tell Ms. Knysz "we no longer participate in Buying Groups"; right?
  A. That is correct.
  Q. Where do you use the term "price-only buying group" in this e-mail?
  A. I do not use it.[976]

- **Q.** And toward the bottom you say, "As with other buying groups we continue to say no." Do you see that?
  A. Yes.
  Q. Do you use the term "price-only buying group" anywhere on this page?
  A. No.[977]

- **Q**. This [email] is also about Unified Smiles; correct?
  A. That is correct.
  Q. Do you use the term "price-only buying group" in this e-mail?
  A. No.[978]

- **Q.** This is an e-mail with your direct report, right?
  A. That's correct.
  Q. Do you use the term "price-only buying group" anywhere here?
  A. No.[979]

3. Schein Witnesses Have Offered Inconsistent and Contradictory Testimony about their Statements in Contemporaneous Documents.

Schein's witnesses have offered contradictory, inconsistent, and changing testimony about their statements in contemporaneous documents that Schein did not work with buying groups. These explanations cannot be credited.

For instance, VP of Sales Jake Meadows wrote on October 25, 2014: "Just for clarity, we are NOT participating in any GPOs regardless of what they promise to bring us."[980] After first testifying he did not know what he meant,[981] Meadows later changed his testimony to state that

[976] CCRF (Schein) ¶ 173 (quoting Foley, Tr. 4736-4737).
[977] CCRF (Schein) ¶ 173 (Foley, Tr. 4739-4740).
[978] CCRF (Schein) ¶ 173 (Foley, Tr. 4738-4739).
[979] CCRF (Schein) ¶ 173 (Foley, Tr. 4739).
[980] CCFF ¶ 816 (CX2354 at 001 (emphasis in original).
[981] CCFF ¶ 825.

he meant that HSD was supposed to bring buying groups to Schein's Special Markets Division.[982] But this new testimony is contradicted by other Schein witness testimony and evidence that HSD had responsibility for buying groups at the time,[983] and by Schein's own proposed findings of fact that Special Markets only had responsibility for buying groups before 2014.[984] Meadows referred to Schein's policy against buying groups another time in 2012, and wrote: "I have to tell you Ron and Dan made a decision that is against what Tim Sullivan has directed us to do in regards to supporting Buying groups. We do not want our customers organizing and creating what are known as GPOs it takes the value away from the distributor."[985] Again, his testimony changed. Meadows first testified that he meant that the Schein employees had a made a decision on a buying group without getting authorization from Meadows first, and that he did not recall any direction from Sullivan with regard to buying groups.[986] At trial, Meadows testified that he was referring to a direction from Sullivan to send buying groups to Special Markets.[987] When Sullivan was asked about Meadows' statement at his investigational hearing, Sullivan did not testify to any such direction to send buying groups to Special Markets.[988] In fact, Sullivan testified at trial that he was involved in the decisions about all buying groups, including those relating to Special Markets.[989]

Other Schein witnesses gave completely different, yet inconsistent, explanations for their statements. On May 29, 2013, VP of Sales Joe Cavaretta wrote: "We try to avoid buying groups at all costs and therefore don't really recognize them."[990] Cavaretta testified that he meant that

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[982] CCRF (Schein) ¶¶ 1358-1359. (Meadows, Tr. 2428-2429).
[983] CCRF (Schein) ¶ 4, 237 (Steck, Tr. 3735-3737) (testifying that HSD had primary responsibility for buying groups beginning in 2010 or 2011); CCRF (Schein) ¶ 237 (Special Markets President Hal Muller testified that buying groups of private practices were directed toward HSD, including prior to 2014).
[984] SF ¶ 237. Schein's claim that Special Markets only had responsibility for buying groups *prior* to 2014 is inconsistent with Meadow's testimony, since he wrote his statement in October 2014).
[985] CCFF ¶ 773 (quoting CX0170 at 001).
[986] CCRF (Schein) ¶¶ 1358-1359 (CX8016 (Meadows, Dep., at 135-137)).
[987] CCRF (Schein) ¶¶ 1358-1359 (Meadows, Tr. 2638-2639).
[988] CCRF (Schein) ¶¶ 1358-1359 (CX0311 (Sullivan, IHT at 242-244)).
[989] CCFF ¶ 738.
[990] CCFF ¶ 785 (CX2509 at 001).

neither HSD nor Special Markets would deal with buying groups: "from a business standpoint, it didn't make sense. And we weren't really doing business with buying groups at that time, so and in not really recognizing them, they didn't fit either in HSD at that time or special markets. . . "[991] This testimony undermines Meadows' testimony that he was only referring to a practice of sending buying groups to Special Markets.[992]

Schein witnesses, such as Randy Foley, could not provide *any* explanations for their contemporaneous statements that Schein did not deal with buying groups when asked about them at their deposition. On December 20, 2013, Foley told one of Schein's manufacturer partners regarding Unified Smiles: "It's a buying group that we do not participate with, as with all buying groups."[993] At his deposition, Foley testified, "I don't understand why I said that" when asked about this statement.[994] On September 14, 2014, Foley wrote "[a]s with other buying groups we continue to say no (at least try to)."[995] Again, Foley testified at deposition "I'm not sure what I was trying to convey at that time by making that statement," and that he could not think of anything that would refresh his recollection as to what he meant. [996] At trial, Foley changed his testimony to claim he was referring to price-only buying groups.[997]

4. Schein's Claim that Buying Groups were not Profitable Opportunities is Contradicted by the Evidence.

Schein lists what it now claims are numerous "risks and disadvantages of dealing with buying groups," even though it currently works with buying groups and argues it always pursued them.[998] The record, however, shows that buying groups were profitable opportunities for

[991] CCRF ¶ (Schein) 236.
[992] Cavaretta too, later changed his testimony at trial to provide a different explanation, claiming that he was only referring to buying groups that take title to supplies. CCRF ¶ (Schein) 236. This explanation makes no sense, since Cavaretta's contemporaneous documents confirm that he was not aware of the existence of any such entities.
[993] CCFF ¶ 788.
[994] CCRF (Schein) ¶¶ 1358-1359 (CX8003 (Foley, Dep. at 262)).
[995] CCFF ¶ 810.
[996] CCRF (Schein) ¶¶ 1358-1359 (CX8003 (Foley, Dep. at 287-289)).
[997] CCRF (Schein) ¶ 173.
[998] Schein Post-Tr. Br. at 17-19.

Schein pre- and post-conspiracy, and that Schein gained new customers and increased business with existing customers through buying groups. Prior to 2011, Sullivan expressed his belief that the benefits of working with buying groups like Smile Source outweighed the risks, despite his concerns about a "price war" with competitors.[999]

Schein's "business with [Dental Co-op] was growing" when it did business with the buying group in 2009, and by July 2011, Muller recognized the Dental Co-op of Utah as "one of the largest HSD account (over $1M)."[1000] Schein's Special Markets relationship with Smile Source pre-conspiracy was profitable and resulted in $3 million in sales, half of which came from Schein's competitors.[1001] In 2010, Sullivan identified the Smile Source account as an account he did not "want to lose" because it was "$1 million and growing."[1002] Dental Gator, a buying group that Sullivan tried to terminate in 2014, brought Schein new customers from competitors and lead to increased purchasing volume from existing customers.[1003] Schein's post-conspiracy relationships have also benefitted Schein. Brian Brady, Schein's former Director of Group practices, testified that Schein's work with buying group has led to increased revenue and contributed to Schein's profitability.[1004] [redacted].[1005] In light of the evidence that Schein viewed buying groups as profitable opportunities, and benefitted from them before and after the agreement, Schein's after-the-fact claims about why it avoided buying groups during the conspiracy carry no weight.

[999] CCFF ¶¶ 432-439. In September 2010, Sullivan explained that he would support working with a buying group account because it provided an opportunity to increase overall gross profit for Schein. CCFF ¶ 438.
[1000] CCFF ¶ 1701 (quoting CX2505 at 002).
[1001] CCFF ¶ 447 (quoting CX2469 at 001).
[1002] CCFF ¶¶ 448-450 (quoting CX2113 at 001).
[1003] CCRF (Schein) ¶ 675.
[1004] CCRF ¶ 183.
[1005] CCFF ¶ 1725.

B. Schein Obfuscates its Relationships With Buying Groups in its "Chronological History of Schein's Buying Group Interactions."[1006]

Schein obfuscates its history of working with buying groups in an unsuccessful effort to establish that Sullivan approved buying groups during the conspiracy period.[1007] As demonstrated below, aside from four buying groups, all of the groups Schein identifies are either (1) not buying groups, (2) pre-conspiracy "legacy" relationships, or (3) post-conspiracy relationships. Thus, while Schein's "Chronological History" references numerous organizations, the overwhelming majority provide no evidence that Schein worked with any buying groups during the conspiracy period, as illustrated in this table:

[1006] Section II.B of Complaint Counsel's Reply Brief responds to arguments in Section B of Schein's Post-Trial Brief ("A Chronological History of Buying Group Interactions"). *See* Schein Post-Tr. Br. at 19.

[1007] Schein Post Tr. Br. at 27, 38 n. 22, 59. Schein also asserts new groups for the first time in its post-trial briefing, for which there is no evidence in the record of any buying agreement. *See* CCRF (Schein) ¶ 757.

Schein's Asserted Buying Groups[1008]

Non Buying Groups	"Legacy" and post-Conspiracy Buying Groups	**Conspiracy Buying Groups**
• Alpha Omega[1009] • Breakaway[1010] • Comfort Dental[1011] • Corydon Palmer Dental Society[1012] • Dental Associates of Virginia[1013] • Dental Partners of Georgia[1014] • Floss Dental[1015] • Intermountain Dental Associates[1016] • OrthoSynetics[1017] • Stark County Dental Society[1018] • Sunrise Dental[1019]	• Advantage Dental[1021] • Dentists for a Better Huntington[1022] • Khyber Pass[1023] • Klear Impakt[1024] • Long Island Dental Forum[1025] • Pugh Dental Alliance[1026] • Smile Source[1027] • Steadfast Medical[1028] • The Dental	• Schulman Group[1030] • Dental Gator[1031] • Merit Dent[1032] • Dental Alliance[1033]

[1008] *See* Schein Post-Tr. Br. at 87-88.

[1009] CCRF (Schein) ¶¶ 395-398. Alpha Omega is a dental fraternity, not a buying group. Even if Alpha Omega were a buying group, the record evidence shows that Schein's discounting arrangement with Alpha Omega as an entity began in 2003 or 2004, well before the conspiracy began, and ceased in 2005. Moreover, to the extent sales or discounts continued into the conspiracy period, the record evidence shows that such sales or discounts were extended to individual members of Alpha Omega, not as a result of any discounting arrangement with the entity. CCRF (Schein) ¶ 397.

[1010] CCFF ¶¶ 1756-1757. In August 2015, Cavaretta assured Sullivan: "Break away is a DSO/MSO combo with complete control of the check book." CCFF ¶ 1755 (quoting CX2482 at 001); CCRF (Schein) ¶¶ 402-445.

[1011] CCFF ¶¶ 1098-1099, 1759, 1803. Comfort Dental is a customer that Schein considers to be an elite DSO, is one of Schein's largest customers, and is handled through Schein's Special Markets division. CCFF ¶ 1759 (quoting Sullivan, Tr. 3969 ("Q. Comfort Dental was an elite DSO? A. It was.")); CCRF (Schein) ¶¶ 493-511.

[1012] CCFF ¶¶ 1764-1766 (Baytosh, Tr. 1888-1890 (Corydon Palmer Dental Society is not a buying group)); CCRF (Schein) ¶¶ 512-547.

[1013] CCRF (Schein) ¶¶ 572-580 (Dental Associates of Virginia a DSO).

[1014] CCRF (Schein) ¶¶ 676-689 (Dental Partners of Georgia an MSO, and Schein's agreement with it required it to have ownership in or management over the dental practices).

[1015] CCRF (Schein) ¶ 757. Schein raises Floss Dental *for the first time* in post-trial briefing, and there is no evidence of any agreement in the record. Moreover, Schein concedes that Floss Dental is a DSO. Schein Post-Tr. Br. at 61 n.43. Schein elicited no testimony at trial or otherwise about a purported buying group relationship, and there is no evidence of an agreement on any Exhibit List. *See* CCRF (Schein) ¶ 757. Moreover, Schein cites a 2014 email describing Floss Dental's plans to potentially establish a management (MSO) model, not a buying group. CCRF (Schein) ¶ 761 (RX2105 at 001 (referring to Floss Dental wanting to establish an "MSO model")).

[1016] CCFF ¶¶ 750-751. Schein considered IDA to be a DSO with centralized purchasing, and Schein executives stated that they would not work with IDA if it were a buying group/GPO. CCFF ¶ 751; CCRF (Schein) ¶¶ 732-748.

[1017] CCRF (Schein) ¶¶ 1026-1037 (OrthoSynetics an MSO).

[1018] CCRF (Schein) ¶¶ 1187-1198 (same arrangement as Corydon Palmer Dental Society, not a buying group).

Non Buying Groups	"Legacy" and post-Conspiracy Buying Groups	**Conspiracy Buying Groups**
• The Denali Group[1020]	Cooperative[1029]	

With respect to the four buying groups that originated during the conspiracy (Dental Gator, Schulman Group, Merit Dent, and Dental Alliance), as discussed below none of these were approved by Sullivan, as Schein claims.[1034] Sullivan tried to shut them down (Dental Gator), was assured they were not buying groups (Schulman Group), instructed his team against a relationship (Merit Dent), or the relationship was formed without his awareness (Dental Alliance, Dental Gator). In fact, Schein cannot accurately cite a single document during the conspiracy where Sullivan instructed his team to work with a buying group. In any event, the fact that Schein originated four buying groups during the conspiracy, despite Sullivan's

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[1019] CCFF ¶ 771. Schein told Sunrise it did not work with buying groups and that Sunrise needed to be structured as a DSO with ownership. In June 2012, Schein Regional Account Manager Andrea Hight informed her bosses of her discussions with Sunrise Dental: "I explained that we do not accommodate GPOs" and "I have not budged of course on how a customer needs to be structured and very adamant about no GPO type situation." CCFF ¶ 771 (quoting CX2423 at 004); CCRF (Schein) ¶¶ 1243-1249. There is no evidence of any buying group agreement with Sunrise in the record. CCRF (Schein) ¶¶ 1243-1249.

[1021] CCFF ¶ 1752; CCRF (Schein) ¶¶ 377-394 (pre-conspiracy relationship that began in 2009).

[1022] CCFF ¶ 444; CCRF (Schein) ¶¶ 717-725 (pre-conspiracy relationship that began in 2009).

[1023] CCRF (Schein) ¶¶ 786-801 (pre-conspiracy relationship that began in 2009 or 2010).

[1024] CCFF ¶ 1398; CCRF (Schein) ¶¶ 802-838 (post-conspiracy relationship that began on August 17, 2015). Moreover, Sullivan did not know about Schein's work with Klear Impakt until being informed at a November 2, 2015 meeting. CCFF ¶¶ 848-853.

[1025] CCFF ¶ 441; CCRF (Schein) ¶¶ 937-949 (pre-conspiracy relationship that began in 2006).

[1026] CCRF (Schein) ¶¶ 1082-1092 (pre-conspiracy relationship that began in 2009).

[1027] CCFF ¶¶ 899, 728; CCRF (Schein) ¶ 1105 (pre-conspiracy relationship that began in 2008 and ended in or around January 2012).

[1028] CCRF (Schein) ¶¶ 1199-1242 (pre-conspiracy relationship that began in 2010); CCRF (Schein) ¶ 1202.

[1030] CCRF (Schein) ¶¶ 1093-1104.

[1031] CCFF ¶¶ 1768-1823; CCRF (Schein) ¶¶ 634-675.

[1032] CCFF ¶¶ 712-714; CCRF (Schein) ¶¶ 969-981.

[1033] CCRF (Schein) ¶¶ 1309-1335.

[1020] CCRF (Schein) ¶¶ 548-571. Schein considered Denali to be a consulting group, not a buying group. CCRF (Schein) ¶ 549 (CX8010 (Titus, Dep. at 184) ("Q. Did you view Denali as a GPO? A. No.")).

[1029] CCFF ¶¶ 442, 889; CCRF (Schein) ¶¶ 581-633 (pre-conspiracy relationship that began in 2007).

[1034] Schein Post Tr. Br. at 27 (asserting that "Sullivan approved the partnership" with Dental Alliance), 38 n. 22 (conceding that Sullivan was not aware of negotiations with the Schulman Group, but nonetheless asserting that after the deal had already been finalized "he became involved during the preparations for the roll-out, and approved of it"), 59 (claiming that Sullivan was responsible for "wresting [sic] the support of his area Vice Presidents" for Dental Gator relationship).

instructions, does not negate the agreement—it merely shows Schein's compliance was imperfect.[1035]

Schein attempts to give the illusion that it has a long history of evaluating and discounting to buying groups by listing 21 subsections in its "Chronological History." But this chronology further corroborates other direct and unambiguous evidence of conspiracy discussed at length above: the chronology shows that Schein evaluated buying groups on an individual basis and discounted to some *before* the conspiracy, but shifted to a no buying group strategy in late 2011, leading to the repeated rejection of buying groups (such as Unified Smiles, PGMS, Kois), the termination of legacy buying groups (Dental Coop of Utah[1036] and Steadfast Medical[1037]), and the attempted termination of other buying groups (Dental Gator[1038]). Indeed, Schein even began inserting contractual clauses to prevent its existing customers from forming GPOs.[1039]

1. Schein's Treatment of Buying Groups Before and After the Conspiracy Shows its Change in Conduct and Supports Complaint Counsel's Allegations.[1040]

Schein's "chronological history" includes 21 individual sections detailing its buying group relationships before and after the conspiracy;[1041] yet, these facts simply support Complaint Counsel's allegations. Schein concedes that, prior to the conspiracy period, it entered into partnerships with some buying groups, such as the Dental Co-Op and Smile Source.[1042] This

[1035] *See infra*, Complaint Counsel's Reply to Schein Post-Tr. Br. § III.B.1.c ("Schein's Imperfect Compliance Does not Negate Evidence of Conspiracy.").
[1036] CCFF ¶ 893.
[1037] CCFF ¶ 880.
[1038] CCFF ¶ 1806. Schein's Zone Manager Dean Kyle told Cavaretta in 2014: "We really need to shut the Dental Gator down." CCFF ¶ 895 (quoting CX0175 at 001). Cavaretta responded: "I agree . . . as this is the second big GPO we will be shutting down. . . [Dental Co-op of Utah] is the other." CCFF ¶ 895 (quoting CX0175 at 001).
[1039] CCFF ¶¶ 861-869.
[1040] Section II.B.1 of Complaint Counsel's Reply Brief responds to arguments in Sections II.B.1, II.B.2, II.B.19 and II.B.21 of Schein's Post-Trial Brief. *See* Schein Post-Tr. Br. at 19-24, 61-63, 64-65.
[1041] Schein Post-Tr. Br. at 13-64.
[1042] Schein Post-Tr. Br. at 19, 24.

contrasts sharply with Schein's consistent and blanket policy during the conspiracy period, even if Schein may have declined certain opportunities to enter into partnerships in the pre-conspiracy period.

Schein claims that prior to 2010, it "contracted with a number of buying groups,"[1043] and that due to an early 2010 meeting it "adopted a middle-ground, case-by-case approach, which was consistent with Schein's pre-2010 buying group activities."[1044] These assertions are entirely consistent with Complaint Counsel's allegations—prior to the 2011 conspiracy, Schein was willing to engage with buying groups, despite the fact that Schein executives recognized the threat such buying groups posed.[1045]

Schein attempts to obfuscate its relationship with the Advantage Dental (which had a DSO and buying group component) to suggest that it arose in July 2011,[1046] but the Advantage Dental relationship long pre-dated the conspiracy. As Schein concedes in its proposed findings of fact, it provided discounts to the Advantage Dental buying group at least as early as 2009.[1047] Moreover, during the conspiracy, Schein executives were unaware of the legacy buying group component to Advantage, and believed it was just a DSO.[1048] Schein signed an agreement with the Advantage Dental DSO (not a buying group) in 2011 that required Advantage to have ownership or management over its practices.[1049]

[1043] Schein Post-Tr. Br. at 20.

[1044] Schein Post-Tr. Br. at 21.

[1045] Schein weakly suggests that its 2010 "guidance" required buying groups to have "complete control of purchasing policy that would force the distributor purchases to Schein," Schein Post-Tr. Br. at 21, but this cannot be taken seriously, as Schein's brief abandons this assertion three pages later. *See* Schein Post-Tr. Br. at 24. Moreover, Schein recognized that buying groups did not control purchasing, and cannot force their members to purchase from a contracted distributor. CCRF ¶ 87.

[1046] Schein Post-Tr. Br. at 23.

[1047] *See* SF ¶ 380; *see also id.* ¶ 384 ("Schein began discussing a relationship with the Advantage Dental buying group as early as 2002.").

[1048] CCRF (Schein) ¶ 380 (CX2312 at 001 (February 21, 2016 email in which Hight discovers Advantage Dental's buying group component: "The [Prime Vendor Agreement] I put in place for Advantage some years ago was only for the Advantage owned offices. At that time we were specifically avoiding Buying Groups and the [Prime Vendor Agreement] language made that clear. So the metamorphosis described below and in their marketing piece has happened since my relationship.").

[1049] CCFF ¶ 863.

Schein's post-conspiracy conduct also does not negative evidence of agreement. Schein claims that by September 2015, Schein "was ready to launch its standardized buying group offering."[1050] This is not inconsistent with any of Complaint Counsel's allegations, and it does not in any way rebut the showing that Schein participated in a conspiracy existed prior to this time.

Schein suggests that it began to communicate with Klear Impakt in "Late 2014,"[1051] but Schein did not have any relationship or agreement with KlearImpakt during the conspiracy. Schein concedes that Schein did not enter a relationship with KlearImpakt until August 2015, after the conspiracy began to collapse.[1052] Moreover, as Sullivan testified at trial, he was not aware of KlearImpakt, or that it was a buying group, until November 2015.[1053] Evidence that Schein worked with KlearImpakt *after* the conspiracy does not undermine Complaint Counsel's allegations.[1054]

Schein's brief also notes that in 2016, after the conspiracy disintegrated, Schein created a new channel to service its new buying group customers.[1055] This fact is entirely irrelevant to the existence of the conspiracy, other than the fact that it demonstrates that Schein could have profitably grown and expanded by serving buying groups, had it not for so long adhered to the conspiracy.

2. Schein's Treatment of Buying Groups during the Conspiracy confirms its Policy against Buying Groups.

Schein argues at length in its Post-Trial Brief that it worked with buying groups during the conspiracy and it highlights a number of specific buying groups that it claims supports its

[1050] Schein Post-Tr. Br. at 60.
[1051] Schein Post-Tr. Br. at 61.
[1052] Schein Post-Tr. Br. at 62; SF ¶ 807; CCFF ¶ 1318.
[1053] CCFF ¶ 849; CCRF (Schein) ¶ 810.
[1054] Schein contends in its Post-Trial Brief that what Sullivan knew about KlearImpakt in 2015 is a "disputed fact." *See* Schein Post-Trial Brief, at 63 n.45. Sullivan, however, testified at trial and previously that he was unaware of KlearImpakt, or that it was a buying group, as of November 2015. CCFF ¶ 849; CCRF (Schein) ¶ 810.
[1055] Schein Post-Tr. Br. at 64-65.

arguments. The facts, however, support Complaint Counsel's allegation of a conspiracy targeting buying groups. As discussed below, Schein rejected buying groups during the conspiracy, terminated pre-conspiracy "legacy" buying groups, and tried to terminate others when it believed they were buying groups.

a. The Unified Smiles Rejection in December 2011 Shows that Schein Would "No Longer Participate in Buying Groups" Pursuant to Sullivan's Instructions.[1056]

On December 21, 2011, Randy Foley told Jan Knysz of Unified Smiles, a buying group: "[U]nless you have some 'ownership' of your practices Henry Schein considers your business model as a Buying Group, and we no longer participate in Buying Groups."[1057] Foley rejected Unified Smiles, pursuant to Schein's then-existing policy against buying groups. Foley was aware of Sullivan's instructions on buying groups at the time. Just two months later in February 2012, Foley informed his direct report, referring to his conversation with Sullivan about buying groups, that "this is a corporate decision, not to participate in these."[1058] Thus, Schein's argument that Foley was the sole decision-maker, and that he had no discussions with Sullivan about this particular group, does not matter.[1059] Moreover, Foley's December 2011 email confirms that Schein would not work with any groups in which there was no common ownership—which was the very definition of a buying group. It referred to "minimal requirements" of ownership or partial ownership in the practices.[1060] Schein tries to claim that Foley's statement in December 2011 to Unified Smiles was just "poorly worded" and not reflective of a change in conduct. This argument strains credulity. In fact, when Unified Smiles came up again in December 2013, Foley stated: "It's a buying group that we do not participate

[1056] Section II.B.2.a of Complaint Counsel's Reply Brief responds to arguments in Sections II.B.5 of Schein's Post-Trial Brief concerning Unified Smiles. *See* Schein Post-Tr. Br. at 27-29.
[1057] CCFF ¶¶ 719-721.
[1058] CCFF ¶ 756 (quoting CX0238 at 001).
[1059] Schein Post-Tr. Br. at 29; CCRF (Schein) ¶ 1301.
[1060] CCFF ¶¶ 723-726. Schein's refusal to deal with Unified Smiles continued throughout the conspiracy. On December 20, 2013, Foley wrote regarding Unified Smiles: "It's a buying group that we do not participate with, as with all buying groups." CCFF ¶ 788 (quoting CX2073 at 001).

with, *as with all buying groups*."[1061] Further, on December 22, 2011, the day after the Unified Smiles rejection, Sullivan instructed Schein's sales team to reject another buying group called Merit Dent. Schein's Vice President of Sales, Joseph Cavaretta, reported to other Schein employees that Sullivan had instructed against doing a deal with Merit Dent, as he did not "want to be the first company that opened the floodgates to the dangerous world of GPOs."[1062]

b. Schein Continued Rejecting Buying Groups During the Conspiracy (Kois, PGMS, Sunrise Dental).[1063]

Pacific Group Management Services ("PGMS") was a buying group that Schein rejected during the conspiracy period, pursuant to Sullivan's direction.[1064] Schein's Titus recognized the potential upside of a deal with PGMS, stating that it would provide "compliance, exclusivity and the opportunity to market Schein business solutions."[1065] Despite that recognition, Titus attempted to end discussions with the group: "I sent them some tough questions thinking it would scare them off, but alas, they raised the stakes by moving to Dir of Ops."[1066] It was elevated to Sullivan, and Sullivan rejected it.[1067] Following the rejection, Schein's Titus wrote: "We had a GPO prospect called PGMS. Very intriguing, willing to be exclusive. I created this and sent to Joe for review. It went to Tim and he shot it down. I think the meta msg is officially, GPO's are not good for Schein."[1068] Schein was unwilling to work with PGMS as a buying group, but Titus told PGMS that Schein would be open to a relationship if they became an MSO.[1069] Schein unpersuasively claims this rejection came from an executive underneath

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[1061] CCFF ¶ 788 (quoting CX2073 at 001).
[1062] CCFF ¶ 713.
[1063] Section II.B.2.b of Complaint Counsel's Reply Brief responds to arguments in Sections II.B.8, II.B.15 and II.B.16 concerning Kois, PGMS, and Sunrise Dental. *See* Schein Post-Tr. Br. at 35, 50-56.
[1064] CCFF ¶ 800.
[1065] CCFF ¶ 794 (quoting CX2809 at 002).
[1066] CCFF ¶ 794 (quoting CX2809 at 002).
[1067] CCFF ¶¶ 799, 801. Schein told PGMS that it would be willing to work with it if became an MSO. CCFF ¶ 798.
[1068] CCFF ¶ 799 (quoting CX2235 at 001).
[1069] CCFF ¶ 798.

Sullivan, not from Sullivan himself.[1070] But the evidence shows the rejection came from Sullivan himself.[1071] Indeed, Titus testified that she learned from Cavaretta that Sullivan had rejected the deal, and the contemporaneous documents corroborate this.[1072] Moreover, at trial, Sullivan was asked about Titus' statements that Sullivan rejected PGMS, and did not dispute them.[1073]

Schein also refused to work with the Kois Buyers Group during the conspiracy. Schein again attempts to provide reasons other than its no buying group policy for Sullivan's rejection of Kois Buyers Group. It claims Kois decided to go with Burkhart before Schein had an opportunity to put together a bid in October 2014, and that Sullivan never determined it did not want to partner with Kois.[1074] But the contemporaneous documents flatly contradict Schein's claims.

In September 2014, over one month before Kois ever approached Schein, Sullivan learned that Kois was considering Schein, Benco, and Patterson for a distribution agreement.[1075] Sullivan internally assured Schein executives that he had no interest in working with Kois or other buying groups: "I still believe this is slippery slope . . . and don't plan to take the lead role. Watching closely"[1076]; and, referring to Kois: "I don't think we want to be the first in this game."[1077] In October 2014, after Kois approached Sullivan with a proposal, Sullivan was still not interested in any engagement if Kois was a buying group: "I would never sign us up for straight out GPO model."[1078] These documents show Sullivan had no interest in Kois (or any

[1070] Schein Post-Tr. Br. at 71.
[1071] CCFF ¶¶ 795, 799.
[1072] CCFF ¶¶ 795-799, 801.
[1073] CCRF (Schein) ¶ 1046.
[1074] Schein Post-Tr. Br. at 52. Schein claims that Kois declined to provide it with additional information about its proposal, and elected to contract with Burkhart before discussions could progress.
[1075] CCRF (Schein) ¶ 893.
[1076] CCFF ¶ 809 (quoting CX2469 at 002).
[1077] CCFF ¶ 1750 (quoting CX2470 at 001).
[1078] CCRF (Schein) ¶ 893.

buying group) from the outset, even a month before Kois approached Schein, and belies any claim that Schein simply had no time to bid.[1079]

Schein attempts to claim that Sunrise Dental "was a buying group" that it worked with.[1080] But Schein told Sunrise it did not work with buying groups, and that Sunrise needed to be structured as a DSO with ownership.[1081] In June 2012, Schein Regional Account Manager Andrea Hight informed her bosses of her discussions with Sunrise: "I explained that we do not accommodate GPOs" and "I have not budged of course on how a customer needs to be structured and very adamant about no GPO type situation."[1082] In August 2013, Foley confirmed that Schein would not work with Sunrise if it were a buying group: "No on sunrise as they r [sic] more of a buying group. Andrea has been working with as they have been talking more about ownership."[1083] There is no evidence that Schein worked with Sunrise Dental during the conspiracy or that it was a buying group, and Schein cites no evidence of any buying group agreement.[1084] The Sunrise evidence further corroborates Schein's anti-buying group strategy in 2012.

c. Schein Terminated Pre-Conspiracy "Legacy" Buying Groups During the Conspiracy.[1085]

During the conspiracy, Schein terminated legacy buying groups that pre-dated the conspiracy. Schein acknowledges that shortly after Kathleen Titus joined HSD from Special Markets as Director of Group Practices for the Mid-Market division, Titus began targeting buying groups for termination.[1086] Titus understood Sullivan's instructions on buying groups,[1087]

[1079] CCRF (Schein) ¶ 893. Schein rejected other buying groups throughout the conspiracy; examples include Synergy Dental Partners, Academy of General Dentistry buying group, Pearl Network at NYU, and Tralongo. CCFF ¶¶ 925-954.

[1080] Schein Post-Tr. Br. at 36.

[1081] CCRF (Schein) ¶ 1243.

[1082] CCFF ¶ 771.

[1083] CCRF (Schein) ¶ 1243.

[1084] CCRF (Schein) ¶ 1243.

[1085] Section II.B.2.c of Complaint Counsel's Reply Brief responds to Schein's arguments in Sections II.B.13, II.B.14 and II.B.20. *See* Schein Post-Tr. Br. at 45-50, 63-64.

[1086] CCFF ¶ 873.

and flagged the buying group Steadfast as a target for termination.[1088] Steadfast was a legacy buying group that Schein began working with by 2010, before the conspiracy.[1089] Before doing any further diligence on Schein's history with the customer, Titus flagged it as a buying group and asked whether it should be shut down: "Buying Group STEADFAST DENTAL, do we shut this down?"[1090] After Titus received permission to terminate the relationship,[1091] she informed Steadfast: "After examination of your GPO business model we have concluded that continuation of our current relationship is counter to our business practices."[1092] Schein's Cavaretta praised Titus for shutting down a GPO.[1093] Schein attempts to spin this episode to provide reasons for Schein's termination of Steadfast. These claims do not matter—indeed, Schein participated in the agreement with Benco and Patterson because it wanted to avoid buying groups. But, absent an agreement, competition would have caused Schein to retain these retain these customers. Even if some of Schein's refusals to deal with buying groups were supported by reasons other than a desire to adhere to the conspiracy, this neither undermines nor disproves Schein's conscious commitment to a common scheme.

As with Steadfast, Titus also discovered that the Dental Co-Op of Utah (the "Dental Cooperative") was a legacy buying group, and targeted it for termination. In a July 2014 email about the Dental Cooperative, Kevin Upchurch, a Zone Manager, told Cavaretta and Titus "from Tim S., HSD does not want to enter the GPO world."[1094] Although Schein was doing over $1 million in sales with this group,[1095] Schein terminated the relationship.[1096] Highlighting

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[1087] CCFF ¶ 799. Referring to Sullivan's rejection of a buying group in 2014, Titus wrote: "I think the meta msg is officially, GPO's are not good for Schein." (quoting CX2235 at 001).
[1088] CCFF ¶¶ 874-877.
[1089] CCRF (Schein) ¶ 1202. Schein claims that the record is "unclear" when it began working with Steadfast, but the evidence shows that Schein's sales to Steadfast began in 2010. CCRF (Schein) ¶ 1202.
[1090] CCFF ¶¶ 874-875.
[1091] CCFF ¶¶ 880-884.
[1092] CCFF ¶¶ 878-881.
[1093] CCFF ¶ 885.
[1094] CCFF ¶ 806 (quoting CX2211 at 002).
[1095] CCFF ¶ 894.
[1096] CCFF ¶¶ 892-893.

Schein's change in policy, Titus acknowledged that Schein's decision "to treat them as a GPO is a legacy decision that I do not believe, if presented with the same circumstances today, HSD would have embraced."[1097] Just as with Steadfast, Schein's brief attempts to justify Schein's termination of its relationship with The Dental Cooperative. But even if any particular termination of (or refusal to engage with) a buying group might be justified based on facts specific to the group, each termination (or refusal to engage) is consistent with, and does not undermine, the agreement between Schein and its rivals.

Schein also tried to shut down other customers like Dental Gator[1098] and threatened to terminate Breakaway when it suspected Breakaway of wanting to move toward a buying group.[1099] In June 2015, Special Markets President Hal Muller wrote: "Last I heard about Breakaway, [Titus] was going to close them down as a buying group."[1100] Schein subsequently learned that it was not a buying group, but an MSO that controlled purchasing. In July 2015, Cavaretta told Sullivan: "We did discuss shutting [Breakaway] down but once [Titus] visited their facility, it was not a small buying group at all…more of a MSO."[1101] Tellingly, Schein's June 2015 agreement with Breakaway prohibited it from using the agreement "to grow any Group Purchasing Organization (GPO) type relationship."[1102]

Notably, Schein only targeted and/or terminated buying groups or suspected buying groups during the conspiracy.[1103] Kathleen Titus, who was involved in terminating many buying groups, testified that she had previously never terminated relationships with any customer before moving to Sullivan's division, HSD, and terminating Steadfast and Dental Coop of Utah.[1104]

[1097] CCFF ¶ 886. Shortly after Schein terminated the Dental Cooperative, Benco's Ryan reported it to Cohen: "Schein just dumped the last GPO they had. In Utah." CCFF ¶ 1745.
[1098] *See infra*, Complaint Counsel's Reply to Schein Post-Tr. Br. § II.B.2.d.1 ("Dental Gator").
[1099] CCRF (Schein) ¶ 402.
[1100] CCRF (Schein) ¶ 402 (quoting CX2133 at 002).
[1101] CCRF (Schein) ¶ 402 (quoting CX0246 at 002).
[1102] CCRF (Schein) ¶ 402 (quoting RX2348 at 001).
[1103] CCFF ¶ 896.
[1104] CCFF ¶¶ 896-897.

d. The Four Buying Groups that Appear During the Conspiracy do not Negate Evidence of Agreement. [1105]

Out of its long list of asserted buying groups, only four are buying groups that Schein began discounting to during the conspiracy: Dental Gator, Schulman Group, Merit Dent, and Dental Alliance.[1106] None of these were approved by Sullivan, as Schein claims. [1107] The facts surrounding these four buying groups confirm Sullivan's anti-buying group stance during the conspiracy. Further, the fact that Schein originated four buying groups during the conspiracy, despite Sullivan's instructions, does not negate agreement—it merely shows Schein's compliance was imperfect.[1108]

(1) Dental Gator.

Schein claims that its arrangement with the buying group Dental Gator shows that Sullivan was in favor of buying groups during the conspiracy. But the facts show the exact opposite. Schein never bid for Dental Gator; instead, Dental Gator was a buying group covertly set up by one of its top DSO accounts, MB2 Dental Solutions ("MB2"), without Schein's knowledge or consent.[1109] Schein and Sullivan did everything they could to kill it. [1110]

First, Schein tried to kill Dental Gator in its infancy after learning MB2 might create a buying group. Schein inserted provisions into its 2014 supply agreement with MB2 to prevent MB2 from forming a buying group, [1111] as Sullivan was assured.[1112] Next, Schein told MB2 it

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[1105] Section II.B.2.d of Complaint Counsel's Reply Brief responds to arguments about Universal Dental Alliance, Merit Dent, Schulman Group, and Dental Gator in Sections II.B.4, II.B.7, II.B.10, and II.B.17 of Schein's Post-Trial Brief. *See* Schein Post-Tr. Br. at 26-27, 34-36, 37-38, 56-59.

[1106] CCRF ¶¶ 634, 972, 1095, 1319.

[1107] Schein Post-Tr. Br. at 27, 38 n. 22, 59.

[1108] *See infra*, Complaint Counsel's Reply to Schein Post-Tr. Br. § III.B.1.c ("Schein's Imperfect Compliance Does not Negate Evidence of Conspiracy").

[1109] CCFF ¶¶ 1768-1783, 1795.

[1110] Schein ultimately succeeded in killing Dental Gator. By 2018, Dental Gator has no customers, and was forced to dissolve. CCFF ¶ 1823.

[1111] CCFF ¶ 1793 (quoting CX2665 at 002) (Foley stated in April 2014: "There is also concern that in addition to the $2M for the practices owned by MB2, that they are also trying to expand their presence as a Buying Group. We added stipulations in their agreement to prevent this."). The 2014 Agreement between MB2 and Schein stated that "[t]his agreement may not be used to grow any Group Purchasing Organization (GPO) type relationship." CCFF ¶ 868 (quoting CX4001 at 002).

did not deal with buying groups, and threatened that "if it looks at any time like a GPO we will disenroll."[1113] Schein sought assurances from Dental Gator that it would not act as a buying group or GPO, but instead as an MSO or that MB2 would acquire ownership in the practices.[1114]

When this proved unsuccessful, Sullivan and Schein executives tried to terminate the relationship.[1115] Sullivan approached Hal Muller, President of Special Markets, to discuss shutting it down at an offsite meeting in December 2014.[1116] Sullivan and Muller disagreed about how to handle Dental Gator—Sullivan wanted to terminate it, while Muller was concerned about losing MB2's DSO business.[1117] Concerned about losing its lucrative DSO customer, Schein ultimately decided not to terminate Dental Gator.[1118] Indeed, Muller admitted that Schein would never have worked with Dental Gator, but for its concern about losing MB2.[1119]

Since Schein did not want to lose MB2, it moved to keep Dental Gator a secret. Schein told Dental Gator it could not advertise itself as a buying group.[1120] At Schein's behest, Dental Gator modified its website in February 2015 (shortly after Schein decided not terminate it) stating that it was not a buying group.[1121] Schein also cut discounts to Dental Gator in February 2015, which hurt its membership and growth.[1122] Dental Gator eventually ceased operations and

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[1112] CCFF ¶¶ 1792-1793. In October 2014, Foley assured Sullivan and other Schein executives: "MB2 is a $2M plus merchandise customer . . . [i]n our prime vendor agreement we spelled out specific terms and restrictions about these consulting offices to prevent Dental Gator from being a typical GPO . . . ." CCFF ¶ 1793. Dental Gator belonged to one of Schein's top DSO customers and was technically under the purview of Special Markets. As with all buying groups, however, Sullivan was involved in decisions concerning Dental Gator, because the members were private practice dentists. CCFF ¶¶ 1784, 1808.

[1113] CCFF ¶ 1797 (quoting CX2427 at 001).

[1114] CCFF ¶¶ 1788, 1798-1800.

[1115] CCFF ¶¶ 1799, 1806.

[1116] CCFF ¶ 1806. The record shows that Sullivan sought to terminate the relationship with Dental Gator, even though Schein's relationship with Dental Gator in 2014 brought Schein new customers from competitors and lead to increased purchasing volume from existing customers. CCRF (Schein) ¶ 675.

[1117] CCFF ¶¶ 1805, 1807.

[1118] CCFF ¶¶ 1805, 1810-1811.

[1119] CCFF ¶ 1810.

[1120] CCFF ¶¶ 1812-1817.

[1121] CCFF ¶¶ 1814-1816.

[1122] CCFF ¶¶ 1819-1821.

was legally dissolved in late 2018.[1123] Schein's contemporaneous documents belie Schein's suggestion that it willingly worked with Dental Gator (or any other buying groups):

- In July 1, 2015, Sullivan wrote: "The Dec 'offsite' last year I left with a goal to see if we could get Hal [Muller] to shut it down, but knew that could be a challenge due to the parent company being a EDSO of ours in [Special Markets]."[1124]

- In October 2014, Vice President of Sales Joe Cavaretta informed Sullivan that Dental Gator was a buying group: "This is a straight up GPO and if we allow, I'm not sure how we say no to other GPOs . . . ."[1125]

- In January 2015, Muller stated: "I don't believe we have an Agreement on these offices – and that they were introduced to us without our choice. . . our arrangement with MB2 was never predicated on a buying group and it is against what we want to do as a Company."[1126]

- On June 9, 2014, Andrea Hight, an HSD Area Director for Managed Group Practice and Community Health, drafted a letter to send to MB2 regarding Dental Gator, which stated: "As you know, we discussed how very important Schein's position is in that we do not support nor contract with GPOs. To that end, we also included GPO language in the prime vendor agreement."[1127]

- In June 2014, Hight told Cavaretta of her phone call with MB2 about Dental Gator, and wrote: "[T]hey will make sure they do not represent in their marketing anything that looks like a GPO and that they will focus on practice management. . . . I did in process of conversation let them know we had identified a couple of GPO models in Texas and were in the process of closing those down."[1128]

Schein cites a January 2015 email as evidence of Sullivan's "approval," following Sullivan's disagreement with Muller over whether to terminate the Dental Gator relationship.[1129] Sullivan told the CEO of Henry Schein, Inc., Jim Breslawski: "Just us. I am going to approve moving forward with [Muller's] proposal, but then we are 'in' on approving Buying Groups."

[1123] CCFF ¶ 1823.
[1124] CCFF ¶ 1806 (quoting CX0246 at 001); CCRF (Schein) ¶¶ 122, 634 (Muller testified that while he does not recall this discussion with Sullivan, he had no reason to doubt that Sullivan approached him about shutting down Dental Gator).
[1125] CCFF ¶ 1802 (quoting CX2761 at 001).
[1126] CCFF ¶ 1796 (quoting CX2641 at 002).
[1127] CCFF ¶ 1799 (quoting CX2431 at 001-002).
[1128] CCFF ¶ 1800 (quoting CX2425 at 001).
[1129] Schein Post Tr. Br. at 59 (citing CX2144).

Sullivan went on to warn: "This won't stop with Dental Gator."[1130] This was not Sullivan approving a buying group. Rather, it capped Sullivan's disagreement with Muller about whether to terminate Dental Gator, and was after Sullivan sought to terminate it.[1131] Indeed, Sullivan's statement that if he approved the Dental Gator deal, "then we are 'in' on approving Buying Groups," belies Schein's entire narrative that Sullivan had always approved buying groups during the conspiracy. Why would Sullivan have written "then we are 'in' on approving Buying Groups" in January 2015 if Schein and Sullivan had been approving them all along?

(2) Schulman Group.

While Schein's post-trial brief labels the Schulman Group a "buying group,"[1132] Sullivan was assured precisely the opposite in April 2013; when he approved the Schulman relationship, he was told the Schulman Group was "*[n]ot a buying group.*[1133] Indeed, this email only underscores Sullivan's adherence to the anti-buying group agreement: Sullivan was at first concerned that this was a buying group, but responded "[a]ll sounds good" after being informed that it was not.[1134]

(3) Merit Dent.

Schein claims that its partnership with Merit Dent in February 2012 weighs against a finding of conspiracy.[1135] But the facts show that Sullivan instructed Schein's sales force *against* working with this entity because it was a buying group. In December 2011, Schein's Vice President of Sales, Joe Cavaretta, reported to other Schein employees that Sullivan had instructed against doing a deal with Merit Dent, as Sullivan did not "want to be the first company to open

[1130] SF ¶ 308 (quoting CX2144).
[1131] CCFF ¶¶ 1808-1812.
[1132] Schein Post-Tr. Br. at 37.
[1133] CCRF (Schein) ¶ 1101.
[1134] CCRF (Schein) ¶ 1101. Schein also claims that there was no conspiracy, because Cohen never contacted Sullivan about the Schulman Group in an effort to enforce the agreement. Schein Post-Tr. Br. at 38. Yet there is no evidence, and Schein cites none, that Cohen ever learned about any relationship between Schein and the Schulman Group. Instead, Schein cites CX1104, which reflects Benco's Ryan telling a Benco employee not to bid for the business. *See* SF ¶ 1103.
[1135] Schein Post-Tr. Br. at 34-35.

the floodgates to the dangerous world of GPOs."[1136] Cavaretta also remarked that he would: "explain again to [Merit Dent dentist] that the one price fits all strategy doesn't translate well in our world."[1137] Schein cites Sullivan's trial testimony about Merit Dent,[1138] but Sullivan never testified that he approved Merit Dent or had anything to do with the negotiations.[1139] The December 2011 email shows that the Merit Dent agreement in February 2012 was against Sullivan's instructions. Moreover, Schein offers no explanation for Sullivan's statement that he did not "want to be the first company that opened the floodgates to the dangerous world of GPOs."

(4) Universal Dental Alliance ("Dental Alliance").

Schein twists the facts to claim that Sullivan "approved the partnership" with Universal Dental Alliance ("Dental Alliance") buying group in 2011.[1140] In fact, as Schein concedes, Schein's partnership with Dental Alliance began in May 2011,[1141] before Sullivan began instructing Schein employees to categorically reject buying groups in late 2011. Sullivan was made aware of Dental Alliance for the first time in October 2011,[1142] months *after* Schein had already entered into a three-year contract.[1143]

Evidencing the conscious commitment between Benco and Schein, when Benco's Cohen learned that Schein might have been working with the Dental Alliance in 2013, he confronted

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[1136] CCFF ¶ 713.

[1137] CCRF (Schein) ¶ 973. Moreover, in March 2012, Cavaretta remarked of Merit Dent: "we didn't want an exclusive anyway. I want to avoid a GPO situation." CCFF ¶ 766 (quoting CX2563 at 001).

[1138] Schein Post-Tr. Br. at 35.

[1139] CCRF (Schein) ¶ 972.

[1140] Schein Post-Tr. Br. at 27.

[1141] Schein Post-Tr. Br. at 26 ("Schein's Partnership with Universal Dental Alliance in May 2011"); *see* SF ¶ 1313 (Schein cites RX2612 at 017, which supports that the Dental Alliance buying group dates back to May 2011).

[1142] SF ¶ 1325; Schein Post-Tr. Br. at 27; CCRF (Schein) ¶ 1319.

[1143] SF ¶ 1319; CCRF (Schein) ¶ 1319. Moreover, after being informed of the Dental Alliance agreement in October 2011, months after it had been consummated without Sullivan's knowledge, Sullivan wrote: "[w]e've got to undertake this." Sullivan himself testified at trial, upon being informed of the contract, Sullivan indicated only that he "wanted to understand what it was," not that he ever "approved" of it. CCRF (Schein) ¶ 1319.

Sullivan about it.[1144] Schein points out that Sullivan did not terminate Dental Alliance upon Cohen's confrontation, but, as Schein concedes, Sullivan mistakenly understood Cohen's text message to refer to another entity, Atlantic Dental Care.[1145] This explains why Sullivan took no action in response to Cohen's communications about Dental Alliance.

e. Schein Worked with DSOs and MSOs that it was Assured were Not Buying Groups.

Schein tries to point to a number of relationships with entities that are not buying groups,[1146] but instead are DSOs and MSOs that own or manage practices and control purchasing. Schein worked with these groups based on assurances that they were not buying groups. In fact, Schein began using contractual provisions that required its customers to have ownership or management in the practices as a way to assure that its customers were *not* buying groups. Schein internally referred to these as "Terms not to be a buying group"[1147] and "Rules to be DSO, not a Buying Group."[1148] Schein even used contractual provisions prohibiting its customers from forming buying groups, such as with MB2.[1149] It ceased including these provisions in its DSO agreements after the conspiracy.[1150]

Breakaway is a prime example of a DSO/MSO that Sullivan was assured was not a buying group. Schein's brief calls Breakaway "another buying group,"[1151] but its contemporaneous documents and testimony confirm that Schein recognized Breakaway was a DSO/MSO that centrally managed and controlled purchasing for its practices—not a buying group.[1152] Indeed, in August 2015, Cavaretta assured Sullivan that Breakaway was *not* a buying

[1144] CCFF ¶¶ 997, 999-1002.
[1145] Schein Post-Tr. Br. at n.58; SF ¶¶ 1328, 1546; CCRF (Schein) ¶¶ 1322, 1326-1327, 1331-1335.
[1146] Section II.B.2.e of Complaint Counsel's Reply Brief responds to arguments in Sections II.B.9 and II.B.20 of Schein's Post-Trial Brief. *See* Schein Post-Tr. Br. at 37, 63-64.
[1147] CCFF ¶ 864.
[1148] CCRF (Schein) ¶ 678.
[1149] CCFF ¶ 1792.
[1150] For instance, there is no similar provision in the most recent version of MB2's agreement with Schein, signed in November 2016 for the period of January 1, 2017 through the end of 2019. CCFF ¶ 1792.
[1151] Schein Post-Tr. Br. at 63.
[1152] CCFF ¶¶ 1755-1756.

group, but a "DSO/MSO combo with complete control of the check book," which meant that Breakaway owned or controlled its practices.[1153] In fact, Schein's agreements with Breakaway prohibited it from forming a buying group,[1154] and Schein executives discussed shutting it down when they suspected Breakaway of moving toward a buying group.[1155] In July 2015, Cavaretta told Sullivan: "We did discuss shutting [Breakaway] down but once [Titus] visited their facility, it was not a small buying group at all…more of a MSO."[1156]

Schein also claims it had buying group agreement with OrthoSynetics, which it began working with in 2009,[1157] and that it entered into a "written buying group contract" with Dental Partners of Georgia in May 2012.[1158] Schein, however, classified these as DSOs/MSOs, and Schein's agreements with Dental Partners of Georgia and OrthoSynetics required ownership or management in the practices.[1159] Indeed, Schein concedes that Dental Partners of Georgia was able to contractually guarantee purchasing, which buying groups do not do.[1160] Schein's Foley described OrthoSynetics as "much more than a Buying Group. All merchandise orders go through a procurement software . . . They handle all staffing needs and also host the doctors' practice management system on a centralized server . . . This is completely different from Mari's List [post-conspiracy buying group Schein asserts in SF ¶ 963]").[1161]

[1153] CCFF ¶¶ 1755-1756.
[1154] CCRF (Schein) ¶ 402 (quoting RX2348 at 001).
[1155] CCRF (Schein) ¶ 402.
[1156] CCRF (Schein) ¶ 402 (quoting CX0246 at 002).
[1157] SF ¶ 1029.
[1158] Schein Post-Tr. Br. at 37.
[1159] CCRF (Schein) ¶¶ 678 (Dental Partners of Georgia) 1026 (OrthoSynetics).
[1160] Schein Post-Tr. Br. at 37; *see also* CCFF ¶ 76 (Buying groups do not make purchasing decisions for their members).
[1161] SF ¶ 1026.

3. Schein's Treatment of Smile Source is Consistent with Complaint Counsel's Allegations.

a. Schein's Conduct toward Smile Source in 2011 and 2012 Confirms its Change in Conduct.

As Schein's brief concedes, Schein's relationship with Smile Source began in 2008, and thus pre-dated the conspiracy.[1162] Schein executives testified that the pre-conspiracy relationship was very profitable and brought new customers to Schein from its competitors,[1163] [redacted].[1164] In 2010, Sullivan did not want to lose Smile Source as an account, and referring to discussions with Muller, he wrote: "[N]either of us wants to lose [Smile Source] as an account. They are $1 million and growing."[1165] This evidence supports Complaint Counsel's case.

Schein's brief argues at length that Smile Source "fired" Schein, as if to suggest that Smile Source's decision to switch to Burkhart had nothing to do with Schein's conduct.[1166] The party that ended the relationship is not the point. Instead, the evidence shows that Schein's conduct towards Smile Source in late 2011 and early 2012 was fully consistent with Schein's shift to a no buying group strategy. Schein's arrangement with Smile Source ended shortly after Schein began instructing its employees to categorically reject buying groups. Despite the fact that Schein's pre-conspiracy relationship with Smile Source was profitable, [redacted].[1167] Smile Source's Dr. Goldsmith testified at trial that [redacted]

[1162] Schein Post-Tr. Br. at 24. Section II.B.3 of Complaint Counsel's Reply Brief responds to arguments in Sections II.B.3, II.B.6, and II.B.11 of Schein's Post-Trial Brief. *See* Schein Post-Tr. Br. at 24-26, 29-34, 38-43.
[1163] CCFF ¶¶ 447-451.
[1164] CCFF ¶ 1687.
[1165] CCFF ¶¶ 691-692.
[1166] Schein Post Tr. Br. at 29-34.
[1167] CCFF ¶¶ 903-913; CCRF (Schein) ¶ 1108.

[redacted].[1168] [redacted],[1169] and the contemporaneous documents support [redacted].[1170] Indeed, Schein's own executives' contemporaneous show that Smile Source left Schein because "HSD did not give Smile Source the love that [Special Markets] provided."[1171]

Moreover, while Sullivan was concerned about keeping Smile Source's business pre-conspiracy,[1172] after the conspiracy began he was *pleased* when Smile Source terminated Schein,[1173] and was more concerned with "what we can do to KILL the buying group model!" than the lost revenues from the Smile Source account.[1174] This shows that Sullivan was anything but interested in pursuing this buying group opportunity as of February 2012—a change from his prior position. In fact, Sullivan admitted that if Schein lost a customer that it *did* want to win back, he would not have told his team to "kill" the customer's model,[1175] but would instead "work our tail off to show them our value, price being a component of value, to earn their business back."[1176] The fact that Sullivan was pleased by the termination of a profitable relationship and had no plans to win the customer back, confirms that Schein had a no buying group policy during this time frame.

[1168] CCFF ¶ 915. Indeed, even after the relationship ended, [redacted]. CCRF (Schein) ¶¶ 1117-1118.
[1169] CCRF (Schein) ¶¶ 1108-1109.
[1170] CCFF ¶¶ 903-913.
[1171] CCFF ¶ 917.
[1172] CCFF ¶¶ 447-451, 692 (Sullivan wrote in 2010, "[N]either of us wants to lose [Smile Source] as an account. They are $1 million and growing.")
[1173] CCFF ¶¶ 918, 923 (Foley wrote in February 2012 of Smile Source: "Tim Sullivan is happy that we are less one more BG.").
[1174] CCFF ¶ 924.
[1175] CCRF (Schein) ¶ 1144.
[1176] CCRF (Schein) ¶ 1144.

b. Schein's Proposal to Smile Source in 2014 was an Unsuccessful Attempt to Cheat on the Agreement.

In 2014, Smile Source reached out to Schein (not the other way around), [redacted].[1177] Schein made a proposal to Smile Source in early 2014 in an unsuccessful attempt to cheat on the agreement.[1178] Indeed, the facts of Schein's bid show that Sullivan understood he was not operating in the same competitive market as pre and post conspiracy. Schein's offer to Smile Source in 2014 was nowhere close to its offer to this same buying group before and after the conspiracy. While Schein offered Smile Source a least [redacted] off of catalog price before and after the conspiracy,[1179] Schein offered only [redacted] off catalog during the conspiracy.[1180] Sullivan explicitly stated he was "*not interested*" in offering [redacted] discount to Smile Source in 2014, even though Schein offered just that before and after the conspiracy.[1181] Schein has offered no explanation for its dramatic change in discount offer to Smile Source during the conspiracy. Tellingly, throughout 2014, Sullivan and other executives continued instructing Schein's sales force against buying groups before and after the proposal.[1182] In Sullivan's own words in 2014, "I still believe this is a slippery slope . . . don't plan to take the lead role."[1183]

The evidence shows that Schein knew it was not competing with Benco or Patterson for the Smile Source business in 2014. In October 2013, a few months prior to Schein's attempted cheating, Benco's Ryan informed Schein's Randy Foley, Vice President of Sales for Special

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[1177] CCFF ¶ 1824.

[1178] Kahn, Tr. 61. Complaint Counsel does not contend that Schein's 2014 bid represented a sham bid, as Schein suggests.

[1179] CCFF ¶¶ 1392-1395,

[1180] CCFF ¶¶ 1830-1831. Schein argues that it later increased the amount of the discount it was offering to Smile Source in 2014. Schein Post Tr. Br. at 41 n.24. This claim is unsupported and is contradicted by evidence. None of Schein's witnesses who testified at trial had personal knowledge of any increased offer. CCFF ¶ 1842. [redacted]. CCFF ¶ 1841.

[1181] CCFF ¶ 1849. [redacted]. CCFF ¶¶ 1830-1840.

[1182] CCFF ¶¶ 790-860.

[1183] CCFF ¶ 809 (quoting CX2469 at 002).

Markets, that Benco would not bid on Smile Source.[1184] As Schein admits, Foley discussed the Smile Source proposal with HSD in 2014, after Foley's call with Ryan.[1185] There is also no evidence that Benco or Patterson ever discovered Schein's proposal to Smile Source.[1186] Indeed, the meeting with Smile Source was private, took place on Schein's premises, and only involved the heads of Schein and Smile Source.[1187]

Schein argues its conduct can be considered cheating "only if you first assume a conspiracy."[1188] But the existence of the conspiracy is not based on an assumption; rather, it is based on the evidentiary record explained at length in this reply brief and Complaint Counsel's Post-Trial Brief. The point is that after establishing the conspiracy through unambiguous evidence, Schein cannot avoid liability by pointing to its 2014 Smile Source proposal. As discussed below,[1189] it is well established that "the agreement itself, not its performance, is the crime of conspiracy, [and] the partial non-performance of [defendant] does not preclude a finding that it joined the conspiracy."[1190]

4. Schein's "Creation of the Mid-Market Group" Is Entirely Consistent With Complaint Counsel's Allegations.

Schein's post-trial brief discusses the "Mid-Market" group, but fails to suggest how this organizational anecdote contradicts Complaint Counsel's allegations.[1191] First, there is no evidence that the Mid-Market group was launched because of buying groups, or that the Mid-

[1184] CCFF ¶¶ 1005-1021.
[1185] SF ¶ 1173.
[1186] CCRF ¶ (Schein) 1156.
[1187] CCFF ¶ 1826; CCRF (Schein) ¶ 1156. [redacted]. (Schein Post-Tr. Br. at 3, 38). [redacted]. CCRF ¶ (Schein) 1164.
[1188] Schein Post-Tr. Br. at 41.
[1189] *See infra*, Complaint Counsel's Reply to Schein Post-Tr. Br. § III.B.1.c ("Schein's Imperfect Compliance Does not Negate Evidence of Conspiracy.").
[1190] *Foley*, 598 F.2d at 1333.
[1191] Section II.B.4 of Complaint Counsel's Reply Brief responds to arguments in Sections II.B.12 and II.B.18 of Schein's Post-Trial Brief. *See* Schein Post-Tr. Br. at 43-44, 59-61.

Market group deviated from Schein's no buying-group policy during the conspiracy period. In fact, Schein witnesses testified that the Mid-Market group was formed to serve small DSOs, group practices, and community health centers.[1192] Brian Brady, Schein's Director of Group Practices for the Mid-Market Group testified that he does not recall Schein having any buying groups in the Mid-Market group when he took over in January 2015.[1193] Indeed, the individuals on the "front lines,"[1194] recognized in July 17, 2014 that Sullivan clearly communicated the "meta" message that "officially, GPO's are not good for Schein."[1195] And, as discussed above,[1196] the evidence is clear that Schein executives maintained a policy of not engaging with buying groups during the conspiracy period.[1197]

Moreover, Schein makes much of Schein's post-conspiracy development of buying group plans.[1198] Brady, who developed protocols for engaging with buying groups that came to being in September 2015 (after the agreement began to fall apart), testified that this was a "sidebar task" that "didn't have to do with my—my main focus, the majority focus of my job" which was to work with Mid-Market group practice customers, not buying groups.[1199] Brady's September 2015 email about engaging with buying groups stated: "[t]raditionally, Schein has rarely engaged with these groups, but times are changing rapidly . . . and we must begin to engage."[1200] This is consistent with Complaint Counsel's allegations that Schein did not work with buying groups during the conspiracy.

[1192] CCRF (Schein) ¶¶ 244-245.
[1193] CCRF (Schein) ¶¶ 244-245.
[1194] Schein Post-Tr. Br. at 44.
[1195] CCFF ¶ 799; *see also* CCFF ¶¶ 801-802.
[1196] *See supra*, Complaint Counsel's Reply to Schein Post-Tr. Br. § II.A.1 ("Schein's Contemporaneous Documents Show that During the Conspiracy Period Sullivan Began to Instruct Schein's Salesforce to Categorically Reject Buying Groups.").
[1197] *E.g.*, CCFF ¶¶ 771, 790, 794-802.
[1198] Schein Post-Tr. Br. at 60-61.
[1199] CCRF (Schein) ¶¶ 244-245.
[1200] CCRF (Schein) ¶¶ 244-245.

C. Benco-Schein Communications.

Schein's communications with Benco are discussed above in Complaint Counsel's Reply to Benco's Post-Trial Brief,[1201] and in Complaint Counsel's Post-Trial Brief.[1202] As noted above, neither Benco nor Schein offers any procompetitive explanation for these communications.

D. The Economic Evidence Supports a Finding of Conspiracy.

Relying on its economic expert, Dr. Carlton, Schein argues that the economic evidence does not support a finding of an unlawful agreement. But Complaint Counsel's evidence of agreement is based on the factual record and documentary evidence. This, standing alone, is sufficient to establish agreement. Dr. Carlton does not act as a fact-finder, his analyses of the factual record are deeply flawed, and his opinions do not negate evidence of agreement and deserve no weight as "economic evidence." Schein also criticizes Dr. Marshall's analyses, but these are consistent with the factual record of evidence that support Complaint Counsel's allegations.

1. Dr. Carlton's Opinions Regarding Parallel Conduct are Fundamentally Flawed.

Schein relies on Dr. Carlton to claim there is no economic evidence of parallel conduct.[1203] This effort fails, as Complaint Counsel's evidence of parallel conduct comes straight from the record of Respondents' contemporaneous documents: Respondents' executives instructed their sales forces not to deal with buying groups, and Respondents rejected buying groups as a result.[1204] Dr. Carlton never analyzes this conduct, and failed to account for the

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[1201] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. §§ I.A ("There is Direct and Unambiguous Evidence of Agreement"), I.C. ("Inter-firm Communications Establish That Benco Exchanged Assurances With Both Schein and Patterson That Respondents Would Not Discount to Buying Groups").

[1202] *See* Complaint Counsel's Post-Tr. Br. § I.G.

[1203] Schein Post-Tr. Br. at 74-76.

[1204] CCFF ¶¶ 733-870 (Schein), 630-652 (Patterson), 394-431 (Benco).

evidence in the factual record showing that Schein categorically rejected buying groups.[1205] Dr. Carlton simply ignores it.

Instead of addressing the evidence on which Complaint Counsel's case relies, Schein tries to show no parallel conduct by identifying its purported sales to buying groups during the conspiracy.[1206] Here, too, Schein fails.

First, Schein's numbers do not represent Schein's actual buying group sales during the conspiracy. Schein's purported buying group sales figures are misleading and highly inflated: it skews its numbers by throwing in millions of dollars in sales to entities that are not buying groups.[1207] Thus, Schein's claims that its sales to buying groups ranged from [redacted], and increased every year, are simply baseless and come from a misleading and doctored chart.[1208] By way of example, Schein takes credit for sales to Comfort Dental [redacted] and Alpha Omega [redacted].[1209] As the factual record confirms, neither of these are buying groups.[1210] Schein likewise erroneously includes sales to other non-buying groups like Dental Associates of Virginia,[1211] Corydon Palmer Dental Society,[1212] Stark County Dental Society[1213] and Orthosynetics,[1214] which are also not buying groups.[1215] It also includes sales to

[1205] CCRF (Schein) ¶ 1598.

[1206] Schein Post-Tr. Br. at 75. Schein attempts to misrepresent Dr. Marshall's work, by claiming that the chart on Page 75 of its brief is "derived from Dr. Marshall's own report." Schein's chart is not supported by or anywhere to be found in any of Dr. Marshall's expert reports submitted in this matter. CCRF (Schein) ¶ 1627. [redacted]. CCRF (Schein) ¶ 1627. Dr. Marshall's *actual* chart showed that Schein's asserted buying groups sales figures are wrong and highly inflated, because they take into account significant non-buying group sales. CCRF (Schein) ¶ 1627.

[1207] CCRF (Schein) ¶¶ 1627-1629.

[1208] CCRF (Schein) ¶¶ 1627-1628.

[1209] Schein Post-Tr. Br. at 75.

[1210] CCRF (Schein) ¶¶ 395-398, 493-511. The evidence shows that Schein did not work with Alpha Omega as a buying group after 2005. But even if Alpha Omega is counted as a buying group, Schein's numbers are still inflated and misleading, because Schein counts many non-buying groups. CCRF (Schein) ¶¶ 1627-1628.

[1211] CCRF (Schein) ¶¶ 572-580.

[1212] CCRF (Schein) ¶¶ 512-547.

[1213] CCRF (Schein) ¶¶ 1187-1198.

[1214] CCRF (Schein) ¶¶ 1026-1037.

legacy buying groups that Schein terminated during the conspiracy,[1216] such as Dental Co-Op of Utah and Steadfast, post-conspiracy groups like KlearImpakt, which Schein began working with in August 2015,[1217] and buying groups like Dental Gator that Schein tried to terminate. Thus, Schein's attempts to use misleading sales figures as a proxy for parallel conduct should be disregarded.

Schein also relies on Dr. Carlton's Table 1, which purports to calculate Schein's buying group sales. Dr. Carlton's calculations suffer from the same fundamental flaws: Dr. Carlton used an improperly broad definition of a buying group in conducting his analysis, and erroneously included many non-buying groups (with high sales numbers) in his calculations.[1218] Dr. Carlton admitted that the "buying groups" in Appendix D of his expert report, which form the basis for his analysis in Table 1, include groups that are not comprised of independent dentists.[1219] As Dr. Marshall's analyses show, when non-buying groups are removed from Dr. Carlton's calculations, Schein's sales figures plummet.[1220] For instance, Dr. Marshall showed that Schein's claimed sales to buying groups decreases by more than *95 percent* if sales to admitted non-buying groups and contested groups are removed from Table 1.[1221]

In addition, Dr. Marshall's analyses show that Schein's sales to dentists in buying groups decreased considerably from 2013 to 2015, followed by a significant increase from 2016 to 2017.[1222] Contrary to Schein's claims, the economic evidence is consistent with Schein's participation in an agreement.

Schein also attacks Complaint Counsel's evidence of Schein's sporadic deviations from the agreement.[1223] Schein misleadingly cites Dr. Marshall's testimony in this regard, claiming

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[1215] CCRF (Schein) ¶¶ 572-580, 512-547, 1187-1198, 1026-1037; *see also* CCRF (Schein) ¶ 1627.
[1216] CCRF (Schein) ¶¶ 581-633, 1199-1242; *see also* CCRF (Schein) ¶ 1627.
[1217] CCRF (Schein) ¶¶ 802-838; *see also* CCRF (Schein) ¶ 1627.
[1218] CCRF (Schein) ¶¶ 1611-1612.
[1219] CCFF ¶ 2033; CCRF (Schein) ¶¶ 1615-1616.
[1220] CCRF (Schein) ¶¶ 1611-1612.
[1221] CCFF ¶ 2036; CCRF (Schein) ¶¶ 1611-1612.
[1222] CCFF ¶ 2037; CCRF (Schein) ¶¶ 1611-1612.
[1223] Schein Post-Tr. Br. at 76-77.

that Complaint Counsel has to assume the existence of a conspiracy to show that Schein's compliance was not perfect.[1224] Complaint Counsel has made no such assumption, and Marshall's testimony does not support Schein's argument: Dr. Marshall did not assume the existence of a conspiracy, as Schein suggests.[1225] Regardless, the factual record shows Schein's participation and compliance with the agreement throughout the conspiracy,[1226] with sporadic[1227] deviation in just four instances between 2011 and 2015.[1228]

2. Dr. Marshall's Analysis of Structural Breaks.

Schein parrots Benco and argues that Dr. Marshall's observed "structural breaks" are inaccurate.[1229] Although evidence of changed conduct is not required where the evidence goes beyond mere parallel conduct,[1230] Complaint Counsel has established Respondents' change in conduct as an additional "plus factor" based on the factual record,[1231] not based on Dr.

[1224] Schein Post-Tr. Br. at 76-77.

[1225] CCRF (Schein) ¶¶ 1634-1635.

[1226] *See supra*, Complaint Counsel's Reply to Schein Post-Tr. Br. § II.A.1 ("Schein's Contemporaneous Documents Show that During the Conspiracy Period Sullivan Began to Instruct Schein's Salesforce to Categorically Reject Buying Groups.").

[1227] Schein claims that the deviations were "pervasive," but the record belies this claim, and shows that Schein's deviations were sporadic—Schein can point to just four buying groups that originated during the conspiracy, despite Sullivan's instructions. CCRF (Schein) ¶ 376.

[1227] CCRF (Schein) ¶¶ 77-78.

[1228] *See supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.B.2.d ("The Four Buying Groups that Appear During the Conspiracy do not Negate Evidence of Agreement"). Schein claims that the deviations were "pervasive," but the record belies this claim, and shows that Schein's deviations were sporadic—Schein can point to just four buying groups that originated during the conspiracy, despite Sullivan's instructions. CCRF (Schein) ¶ 376.

[1229] CCRF (Schein) ¶¶ 1636-1642.

[1230] Evidence of plus factors is not necessary where direct evidence exists, rather than evidence of merely parallel conduct. *See United States v. Apple Inc.*, 952 F. Supp. 2d 638, 690 (S.D.N.Y. 2013), *aff'd*, 791 F.3d 290 (2d Cir. 2015) (explaining that plus factor evidence, including that of common motive, acts against economic self-interest, inter-firm communications, and change in conduct, is necessary if alleging parallel conduct); *In re Ins. Brokerage Antitrust Litig.*, 618 F.3d 300, 323 (3d Cir. 2010) ("[P]lus factors need be pled only when a plaintiff's claims of conspiracy rest on parallel conduct.").

[1231] *B&R Supermarket*, 2016 WL 57255010, at *7 (Defendants' coordinated, rather than staggered, roll-out of term regarding chargebacks was deemed a "deviation from prior rollouts [which] points a finger of plausible suspicion, and tends to show that the lock-step rollout in the United States flowed from conspiracy, not parallel conduct."); *In re Domestic Drywall Antitrust Litig.*, 163 F. Supp. 3d 175, 255-56 (E.D. Pa. 2016) (finding defendants' decision to eliminate job quotes, a feature in the drywall industry for decades, was shift in behavior sufficient to qualify as "traditional conspiracy evidence" pointing towards an agreement).

Marshall's expert opinion.[1232] Further, Schein misrepresents the purpose of Dr. Marshall's analysis of structural breaks. Dr. Marshall looked at observed structural breaks for purposes of determining whether the time period for the alleged conspiracy was reasonable,[1233] and as an indicator supporting collusive behavior rather than oligopolistic interdependence.[1234] Additionally, Dr. Marshall's quantitative analysis shows that Schein's business with buying groups decreased during the conspiracy,[1235] and this is consistent with a structural change showing an agreement targeting buying groups.[1236]

3. Dr. Marshall's Opinions Regarding Market Structure are Consistent with Evidence Established at Trial.

Schein claims that the Court should not infer collusion based on Dr. Marshall's opinions regarding market structure. As already discussed above in Complaint Counsels' Reply to Benco's Post-Trial Brief,[1237] Complaint Counsel does not rely on market structure to establish the conspiracy.[1238] Dr. Marshall does not opine that a conspiracy can be inferred from industry characteristics alone, but that the industry was "conducive to effective collusion."[1239] Dr.

[1232] *See* Complaint Counsel's Post-Tr. Br. at 64-66.

[1233] CCRF (Schein) ¶ 1640 (Marshall, Tr. 2889-2890 (looking at structural breaks to determine reasonableness of the start and end of conspiracy)).

[1234] CCFF ¶ 1625 (citing CX7100 at 190 (¶ 427) (Marshall Expert Report)); *see also* CCRF (Schein) ¶¶ 1640.

[1235] CCRF (Schein) ¶¶ 1611-1612, 1637.

[1236] CCRF (Schein) ¶¶ 1611-1612, 1637.

[1237] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.B.9 ("Benco Misconstrues Dr. Marshall's Opinions Regarding Market Structure.").

[1238] Nonetheless, courts look to such evidence of a concentrated market structure as one of the relevant pieces of evidence to finding a conspiracy. *See Gainesville*, 573 F.2d at 303 ("Economists recognize that when a market is concentrated it is easier to coordinate collusive behavior."); *HM Compounding Servs.*, 2015 WL 4162762, at *5 ("The highly concentrated nature of the . . . industry . . . supports an inference of conspiracy."); *Todd v. Exxon Corp.*, 275 F.3d 191, 208 (2d Cir.2001) ("Generally speaking, the possibility of anticompetitive collusive practices is most realistic in concentrated industries.")).

[1239] CCFF ¶ 1601 (citing CX7100 at 011 (¶ 12) (Marshall Expert Report)); CCRF (Schein) ¶ 1657 (citing RX2833 at 017 (¶ 27) (Wu Expert Report)).

Marshall's opinions are well supported,[1240] and consistent with that of Patterson's expert, Dr. Wu.[1241]

4. Dr. Marshall's Profitability Analysis is Reliable.

Evidence of Schein's actions against self-interest by categorically rejecting buying groups is another "plus factor" that is not needed to prove agreement, but which is nonetheless present here.[1242] Complaint Counsel's evidence of actions against self-interest comes from Respondents' own documents and testimony.[1243] Schein believed buying groups were an opportunity to win customers from its competitors and grow its profit margins, as evidenced by its buying group agreements before 2011,[1244] but nonetheless instructed its sales force to reject buying groups from late 2011 through 2015.[1245] Moreover, Respondents' refusal to deal with buying groups led to lost customers and sales, as evidenced by the factual record, including Respondents' own documents and testimony.[1246] Respondents communicated and exchanged their internal policies against discounting to buying groups and bidding, which was against their unilateral self-interests as competitors.[1247] For instance, in an attempt to avoid the perception of

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[1240] Dr. Marshall identified the following factors as relevant to his conclusion that the market structure was conducive to collusion: (1) high market concentration, (2) the low price elasticity of independent dentists' demand, (3) barriers to entry in full-service distribution, (4) low bargaining power of individual independent dentist buyers, and (5) manufacturers' low bargaining power. CCFF ¶¶ 1601-1623. Further bolstering Marshall's opinions, Respondents' own executives admit to their high market share. CCFF ¶¶ 1450, 1455-1458. Complaint Counsel has responded in more detail to Schein's unfounded criticisms of Dr. Marshall's analysis in CCRF (Schein) ¶¶ 1657-1659.

[1241] CCRF (Schein) ¶ 1657 (citing RX2833 at 017 (¶ 27) (Wu Expert Report)).

[1242] Evidence of plus factors is not necessary where direct evidence exists, rather than evidence of merely parallel conduct. *See Apple*, 952 F. Supp. 2d at 690 (explaining that plus factor evidence, including that of common motive, acts against economic self-interest, inter-firm communications, and change in conduct, is necessary if alleging parallel conduct); *In re Ins. Brokerage Antitrust Litig.*, 618 F.3d 300, 323 (3d Cir. 2010) ("[P]lus factors need be pled only when a plaintiff's claims of conspiracy rest on parallel conduct.").

[1243] CCFF ¶¶ 1256-1267, 1269, 1290, 1294-1296, 1301-1313, 1651-1661, 1664-1667, 1738-1742; *see also* CCFF ¶¶ 733-870, 925-954.

[1244] CCFF ¶¶ 687-659, 1256-1266; *see supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.A (discussing Schein working with buying groups prior to the conspiracy); *see also* Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.B (chart identifying Schein's pre-conspiracy buying groups agreements), *supra*.

[1245] CCFF ¶¶ 733-870, 925-954.

[1246] CCFF ¶¶ 1267, 1269, 1290, 1294-1296, 1310, 1655-1661, 1738-1742.

[1247] CCFF ¶ 1254.

cheating, Benco shared competitively sensitive information with Schein about its future plans to bid on a customer.[1248] By contrast, Distributors that discounted to buying groups during the conspiracy period profited at the expense of the Big Three.[1249]

Schein, like Benco and Patterson, attacks Dr. Marshall's analysis, as though it were the only evidence of acts against self-interest. As already set forth in Complaint Counsel's Reply to Benco's Post-Trial Brief, for the same reasons that Benco and Patterson's criticisms fail, so too do Schein's.[1250] Dr. Marshall's profitability analysis further corroborates that Respondents' policies against discounting to buying groups ran contrary to their unilateral economic interests.[1251]

First, Schein faults Dr. Marshall because his profitability analysis did not analyze the "but-for" world.[1252] This misses the mark. As discussed in response to Benco and Patterson,[1253] Dr. Marshall did not undertake to do so, and Respondents cite no authority requiring a plaintiff to do such an analysis.[1254] Dr. Marshall's analysis used the well-recognized method of analyzing natural experiments, [1255] a widely accepted method of analysis in antitrust cases,[1256] as Schein's

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[1248] CCFF ¶¶ 1061-1100.

[1249] CCFF ¶¶ 1301-1313, 1651-1654, 1664, 1666.

[1250] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.D.3.

[1251] CCFF ¶¶ 1537-1684; CCRF ¶ 1661.

[1252] Schein Post-Tr. Br. at 78.

[1253] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.D.3.

[1254] Schein Post-Tr. Br. at 94-95; Benco Post-Tr. Br. at 38-40; Patterson Post-Tr. Br. at 59-61. Moreover, Respondents cannot destroy the counterfactual world and then gripe when Dr. Marshall fails to study non-existent data. *Cf. United States v. Microsoft Corp.*, 253 F.3d 34, 79 (D.C. Cir. 2001) ("To require that Section 2 liability turn on a plaintiff's ability or inability to reconstruct the hypothetical marketplace absent a defendant's anticompetitive conduct would only encourage monopolists to take more and earlier anticompetitive action. . . . [N]either plaintiff nor the court can confidently reconstruct a product's hypothetical technological development in a world absent the defendant's exclusionary conduct. To some degree, 'the defendant is made to suffer the uncertain consequences of its own undesirable conduct.'") (quoting Areeda & Hovenkamp ¶ 651c).

[1255] CCFF ¶¶ 1637-1684; CCRF (Schein) ¶¶ 1715-1717. Dr. Marshall used the well-recognized method of analyzing natural experiments to determine the impacts on price, margin, and customer switching when distributors begin and/or stop working with a buying group as well as the price and margin impacts on independent dentist buying group members.

own expert Dr. Carlton concedes.[1257] Since Dr. Marshall's profitability analysis is based on reliable principles and methods, there was no need to do any "but-for" analysis.[1258]

Second, Schein argues that Dr. Marshall analyzed two non-representative buying group samples (Kois and Smile Source).[1259] As discussed previously,[1260] Dr. Marshall reviewed Kois and Smile Source because they were representative of the market in that they covered a broad geography of the country, a broad time span from 2012 through 2017, and they were varied in terms of size and stage of existence.[1261] [redacted][1262] This characteristic was important because Respondents claim it was against their self-interest to discount to buying groups that do not *contractually* require compliance.[1263] Dr. Marshall concluded that both buying groups do drive compliance.[1264]

[1256] *In re NCAA Athletic Grant-in-Aid Cap Antitrust Litig.*, No. 14-md-02541 CW, 2019 WL 1747780, at *13 (N.D. Cal. Mar. 8, 2019) (finding expert analysis based on natural experiments "reliable and persuasive"); *FTC v. ProMedica Health Sys., Inc.*, No. 3:11 CV 47, 2011 WL 1219281, at *14 (N.D. Ohio Mar. 29, 2011) (relying on "[r]eal-world natural experiments in the marketplace" to confirm that merging parties competed for significant number of patients); *FTC v. Penn State Hershey Med. Ctr.*, 838 F.3d 327, 345-46 (3d Cir. 2016) (relying on results of natural experiment); Merger Guidelines § 2.1.2 (Antitrust enforcement agencies "look for . . . 'natural experiments,' that are informative regarding the competitive effects" of mergers); *FTC v. Foster*, No. CIV 07–352 JBACT, 2007 WL 1793441, at *38 (D.N.M. May 29, 2007) ("Where available, the antitrust agencies rely extensively on natural market experiments . . . .").

[1257] *United States v. AT & T Inc.*, 310 F. Supp. 3d 161, 215 (D.D.C. 2018) ("Professor Carlton recognize[s] that empirical analysis of prior, similar transactions can be 'convincing evidence.'").

[1258] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.D.3. By contrast, such analyses are typically necessary in private antitrust actions where a plaintiff must show injury-in-fact and damages. *In re Ethylene Propylene Diene Monomer Antitrust Litig.*, 256 F.R.D. 82, 88 (D. Conn. 2009) ("[A]ntitrust injury-in-fact and damages are often determined by comparing the 'but-for' price—the price a customer would have paid in the absence of the conspiracy—and the actual price paid.").

[1259] Schein Post-Tr. Br. at 78, 94.

[1260] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.D.3.

[1261] CCFF ¶¶ 1642-1643; CCRF (Schein) ¶¶ 1689-1690; CCRF (Benco) ¶¶ 1038-1041; CCRF (Patterson) ¶ 716.

[1262] CCRF (Schein) ¶¶ 1689-1690 (Kois Sr., Tr. 181 ("[T]hey're free to purchase from whoever they want to."); [redacted]

[1263] *See* Schein Post-Tr. Br. at 14 (arguing that buying groups cannot guarantee volume).

[1264] CCFF ¶¶ 1647-1684; *see also* CCRF (Schein) ¶¶ 1689-1690.

Third, similar to Benco,[1265] Schein claims the analysis had "false positives," by identifying acts against self-interest outside the conspiracy period. Schein points to the fact that [redacted].[1266] Neither of these are a "false positive," as Schein contends, because these rejections were not pursuant to blanket policies against buying groups.[1267] Indeed, Patterson did not have a policy against buying groups prior to entering the agreement,[1268] and Benco began working with buying groups post-conspiracy such as EDA, and sought to get the Kois Buyers Group to join EDA,[1269] so any rejections were not a by-product of categorical rejection that was contrary to self-interest.[1270]

Fourth, Schein claims Dr. Marshall's analysis is incapable of distinguishing between conspiracy and oligopolistic behavior. As discussed, *supra*,[1271] this not a case of oligopolistic interdependence, because Respondents *communicated* with each other about buying groups—a fact missing in interdependence cases.[1272] Dr. Carlton's implausible conclusion that oligopolistic interdependence could explain Respondents' parallel conduct ignores that Schein began discounting to buying groups before entering into an agreement with Benco, [1273] and Patterson

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[1265] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.D.3.

[1266] Schein Post-Tr. Br. at 11 n.4; 78.

[1267] CCRF (Schein) ¶¶ 1662-1669.

[1268] CCFF ¶¶ 454-473.

[1269] CCFF ¶¶ 214-218, 232, 246-249; CCRF (Benco) ¶ 242 (CX1084 at 003 ("JLR and I convinced [EDA] that . . . we should bring in Seattle Study Club and Kois as additional partners, because of their broad market reach and strong brands."). As explained in Complaint Counsel's Reply to Benco's Post-Trial Brief, Benco may have adopted a no buying group policy pursuant to its self-interest before the conspiracy, but knew that it could not maintain the policy if its largest rivals began working with buying groups post-conspiracy. *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.B.7 ("Complaint Counsel Established that Benco Began Working with a Buying Group after the Agreement Began to Fall Apart"); § I.D.3 ("Dr. Marshall's Profitability Analysis is Well Supported").

[1270] CCRF (Schein) ¶¶ 1662-1669.

[1271] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.B.1 ("This is Not a Case of Oligopolistic Interdependence").

[1272] *In re Text Messaging Antitrust Litig.*, 782 F.3d 867, 875 (7th Cir. 2015) ("If any of these reflections [to follow the industry leader] persuaded the [] firm—***without any communication with the leader***—to raise their prices, there would be no conspiracy, but merely tacit collusion [or 'conscious parallelism']."); *Gainesville Utils. Dep't v. Fla. Power & Light Co.*, 573 F.2d 292, 300-01 (5th Cir. 1978) (refuting the notion of conscious parallelism where the record consisted of numerous exchanges of letters between high executives noting "[t]he record, however, indicates much more than just parallel activity").

[1273] Schein Post-Tr. Br. at 24 (doing business with Smile Source since 2008); CCFF ¶¶ 432-453.

was close to finalizing a buying group arrangement before joining the agreement.[1274] Contrary to Dr. Carlton's opinion, Schein never took a "wait and see" approach; it affirmatively changed its conduct from working with buying groups to instructing its sales team to refuse buying groups.[1275]

Fifth, Schein claims that Dr. Marshall's analysis shows there was no motive to conspire. This claim is based on an absurd argument—that a conspiracy would only make sense where 100% of competitors in the market participate. While Respondents' conspiracy would certainly be more effective if every full-service distributor in the country participated, this does not negate motive.[1276] Respondents' agreement accounted for "over 80%" of the market,[1277] and involved every national, full-service distributor (the Big Three). Evidence shows that buying groups prefer to work with national, full-service distributors.[1278] For instance, in 2011 [redacted].[1279]

[1274] CCFF ¶¶ 454-473.

[1275] CCRF (Schein) ¶¶ 1670-1674 (CX7101 ¶¶ 63-65; ¶ 63 ("Dr. Carlton does not explain how his client, Schein, came to its own spontaneous unilateral understanding to not bid.")). Indeed, Patterson argues in its Post-Trial Brief that Respondents competed vigorously for the business of independent dentists and DSOs (Patterson Post-Tr. Br. at 10-15) which further undermines any notion that the lack of competition between Respondents for buying groups was based on oligopolistic interdependence.

[1276] CCRF (Schein) ¶¶ 1678-1679.

[1277] CCFF ¶ 1458.

[1278] CCFF ¶ 1486.

[1279] CCFF ¶ 915.

Sixth, Schein criticizes Marshall for analyzing the profitability of Burkhart from working with buying groups, because Burkhart is a small, regional distributor with lower market share.[1280] But Dr. Marshall's analysis analyzed Burkhart's profitability in Washington State, where Burkhart had [redacted].[1282]

Schein makes a handful of other arguments that are easily disposed of. In addition to cannibalization, Schein contends that Dr. Marshall's profitability analysis fails to account for specific factors relating to Schein's refusals to work with a buying group, such as impacts on sales representatives, and internal conflicts. As Schein's own documents show, its rejection of buying groups was categorical.[1283] Dr. Marshall analyzed whether it was in Respondents'

[1280] Schein Post-Tr. Br. at 11. Schein argues that Dr. Marshall's decision to analyze Burkhart's buying group profitability was not appropriate, claiming that this underestimates the degree of cannibalization and over-estimates the incremental volume Schein would have experienced had it won the contracts. This is not true for reasons explained in CCRF (Schein) ¶¶ 1748-1752. Additionally, Dr. Marshall did perform two data-driven studies of incentives and losses for Schein itself: Dr. Marshall studied the end of Schein's relationship with Smile Source in 2012 and resumption of that relationship in 2017. Based on these Schein profitability data studies, Dr. Marshall found that it was in Schein's self-interest to partner with Smile Source in both 2012 and 2017. *See* CCRF (Schein) ¶¶ 1748-1749, *see also* CCRF (Schein) ¶¶ 1722, 1725, 1730-1735.

[1281] CCRF (Schein) ¶¶ 1748-1752.

[1282] CCRF (Schein) ¶¶ 1748-1752.

[1283] *See supra*, Complaint Counsel's Reply to Schein Post-Tr. Br. § II.A.1 ("Schein's Contemporaneous Documents Show that During the Conspiracy Period Sullivan Began to Instruct Schein's Salesforce to Categorically Reject Buying Groups").

unilateral self-interest to implement a *blanket* refusal to deal with buying groups, so concerns that are idiosyncratic to any particular decision were not relevant to Dr. Marshall's analysis.[1284]

Schein also claims that the profitability analysis is premised on the assumption that Schein did not try to compete for Smile Source or Kois.[1285] Not so. Dr. Marshall explained that these factual issues would not affect the conclusions he draws from the profitability studies, and that whether Schein terminated its discussions with Smile Source and Kois or vice versa had no bearing on Dr. Marshall's analysis.[1286] Schein also argues that the analysis was flawed, claiming that it shows that Schein's supplying Smile Source before 2012 and again in 2017 was unprofitable. This claim is misleading. It ignores Dr. Marshall's analysis showing that Schein lost profits over time following its split with Smile Source in early 2012, due to business leaving Schein for Smile Source's contracted distributors (Burkhart and Atlanta Dental).[1287] Thus, it was Schein's split from Smile Source in early 2012 (not its relationship with Smile Source) that was unprofitable for Schein.

Dr. Marshall's analysis of Schein's 2017 relationship with Smile Source proves that absent a conspiracy, Respondents bid against each other for buying group deals, even though such bidding left them collectively worse off, but the winner relatively better off.[1288] [redacted][1289]

[1284] CCRF (Schein) ¶¶ 1692-1693, 1715-1717. Schein relies heavily on an opportunity cost "formula" from its economic expert Dr. Carlton to support its assertions that these variables can be weighed and measured. CCRF (Schein) ¶¶ 1692, 1715-1717. However, this "formula" is unreliable and unsupported; Dr. Carlton failed to do any quantitative analysis to support his claim that these factors can be measured in a "formula." CCRF (Schein) ¶ 1692. Dr. Carlton never actually applied the formula to any data to support his assertion about Schein's opportunity costs in dealing with different buying groups. CCRF (Schein) ¶ 1692. Additionally, Dr. Carlton admitted that his "formula" is merely based on his memory of talking to Schein executives and that he never took notes during these discussions. CCRF (Schein) ¶ 1692. Dr. Carlton also never showed this equation to anybody at Schein or even asked if Schein uses this equation to make business decisions. CCRF (Schein) ¶ 1692.

[1285] Schein Post-Tr. Br. at 79, 94.

[1286] CCRF (Schein) ¶¶ 1697-1701, 1709-1712.

[1287] CCRF (Schein) ¶ 1722; CCRF (Schein) ¶¶ 1722, 1724-1725, 1729.

[1288] CCFF ¶¶ 1681-1683; CCRF ¶ 1732.

[1289] CCFF ¶¶ 1681-1683; CCRF ¶ 1732.

This proves that it was more profitable for Schein to win the Smile Source bid, then to lose the bid. The fact that Respondents are worse off in this competitive landscape than during the conspiracy is precisely the reason Respondents conspired, and precisely the result that Respondents sought to circumvent through an illegal agreement. This is proof, in hard cold numbers, that Respondents' executives were right that buying groups would lead to a "price war" and "race to the bottom." Further, Schein's own documents and witness testimony support that Schein's relationships with Smile Source before and after the conspiracy left it better off and benefitted Schein through new business and customers.[1290]

III. COMPLAINT COUNSEL HAS SHOWN DIRECT AND CIRCUMSTANTIAL EVIDENCE OF AN AGREEMENT AMONG THE BIG THREE.

Schein, like Benco and Patterson, argues that Complaint Counsel lacks either direct or circumstantial evidence of an agreement involving Schein. Contrary to Schein's claims, the inter-firm communications, in conjunction with the totality of the evidence in this case, establishes a meeting of the minds among Respondents by a preponderance of the evidence. The totality of the evidence shows a conscious commitment targeting buying groups among the Big Three—*including* Schein. As discussed in detail in Complaint Counsel's Reply to Benco's Post-Trial Brief,[1291] Complaint Counsel presents both direct and unambiguous circumstantial evidence of Schein's participation in an unlawful agreement, including direct evidence of communications about a refusal to do business with buying groups. *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. at § I.A.

Schein also claims, incorrectly, that Complaint Counsel alleges a "hub-and-spoke" conspiracy, and must therefore show that Patterson and Schein were aware of each other's participation in the agreement.[1292] First, Complaint Counsel does not allege a hub-and-spoke

[1290] CCFF ¶ 447 (quoting CX2469 at 001); CCFF ¶ 1725.

[1291] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. §. I.A ("Direct and Unambiguous Evidence Establishes Respondents' Unlawful Agreement").

[1292] Schein Post-Tr. Br. at 65, 79 n.61.

conspiracy, which involves both horizontal and vertical aspects; here, the allegations involve purely horizontal competitors, which courts distinguish from hub-and-spoke agreements.[1293]

In any event, Schein invents an improper legal standard for proving an overarching agreement among horizontal competitors: there is no requirement that Complaint Counsel show that all co-conspirators communicated with, or were aware of the participation of the others.[1294] To prove an overarching agreement among horizontal competitors, courts look at whether separate agreements can be "connected together" to show a common design or purpose.[1295] Here, it is well documented that, following the exchange of assurances, the Big Three had a common understanding of their collective refusal to do business with buying groups.[1296] A single conspiracy does not fragment into multiple conspiracies because a member does not "know every other member" or "know of or become involved in all of the activities in furtherance of the conspiracy."[1297] Complaint Counsel therefore need not prove communications

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[1293] Courts distinguish hub-and-spoke agreements, involving vertical competitors, from purely horizontal agreements. *See, e.g.*, *United States v. Apple Inc.*, 952 F. Supp.2d 638, 707 (S.D.N.Y. 2013) (courts distinguishing agreement at issue as "'horizontal price restraint' subject to *per se* analysis . . . it is not conspiracies"), *aff'd*, 791 F.3d 290 (2d Cir. 2015).

[1294] *Esco Corp. v. United States*, 340 F.2d 1000, 1006 (9th Cir. 1965) (no requirement "that each defendant or all defendants must have participated in each act or transaction; nor is proof required that each accused knew the identity and function of all his alleged co-conspirators or that all worked together consciously to achieve a desired end.") (internal quotations omitted); *United States v. Bibbero*, 749 F.2d 581, 587 (9th Cir. 1984) ("[A] single conspiracy may involve several subagreements or subgroups of conspirators."); *Interstate Circuit v. United States*, 306 U.S. 208, 227 (1939) ("It is elementary that an unlawful conspiracy may be and often is formed without simultaneous action or agreement on the part of the conspirators ."); *see also Blumenthhal v. United States*, 332 U.S. 539, 559 (1947) (finding that several agreements were "essential and integral steps" in forming a single conspiracy).

[1295] *Esco Corp. v. United States*, 340 F.2d 1000, 1005-06 (9th Cir. 1965) ("where several acts or transactions are alleged to constitute a single general conspiracy, there must be proof of a common purpose . . . ."); *United States v. Beachner Const. Co.*, 729 F.2d 1278, 1283 (10th Cir. 1984) (evidence that each participant shared "common objective" to eliminate price competition and ensure higher individual profits was sufficient to prove the existence of a single conspiracy); *In re Polyurethane Foam Antitrust Litig.*, 152 F. Supp. 3d 968, 996-97 (N.D. Ohio 2015) (evidence of a single conspiracy sufficient reach jury where there is evidence of a "common goal" among defendants).

[1296] CCFF ¶ 527 (Benco: "[a]ll of the major dental companies have said, 'NO', and that's the stance we will continue to take.") (quoting CX1149 at 002); CCFF ¶¶ 1194, 1138 (Schein: "The good thing here is that PDCO, Benco and us are on the same page regarding these buying groups/consortiums.") (quoting CX2106 at 001); CCFF ¶¶ 549, 1187 (Patterson: "Confidential and not for discussion . . . our 2 largest competitors stay out of [buying groups] as well.") (quoting CX0093 at 001) (bolded in original).

[1297] *Polyurethane Foam*, 152 F. Supp. 3d at 979 (internal quotation omitted).

between Schein and Patterson, or show that each was aware of the other's participation, to show an overarching conspiracy. Even though not needed, the record nonetheless shows that Schein and Patterson executives *did* communicate about buying groups: in January 2014, Schein's Vice President of Sales Dave Steck and Patterson's Vice President of Sales Dave Misiak spoke by phone about attending the Texas Dental Association ("TDA") annual meeting in response to its creation of a buying group.[1298] As discussed previously, this direct communication establishes that Schein and Patterson discussed a shared approach after the TDA sponsored a buying group, and that Patterson considered confronting Schein with a phone call when it appeared that Schein reneged.[1299] Further, both Schein and Patterson's internal documents demonstrate their awareness of an overarching agreement involving Respondents.[1300]

A. The Direct and Unambiguous Evidence Supports the Claim that Schein Agreed Not to Deal with Buying Groups.

Complaint Counsel's direct and unambiguous evidence of agreement against Schein is discussed at length in Complaint Counsel's Reply to Benco's Post-Trial Brief (§. I.A ("Direct and Unambiguous Evidence Establishes Respondents' Unlawful Agreement")).[1301]

Like Benco, Schein argues that witness testimony denying the existence of a conspiracy is direct evidence of a lack of agreement, and cites this Court's decision in *McWane*.[1302] As

[1298] *See* Complaint Counsel's Post-Tr. Br. at 36-37; CCFF ¶¶ 1123-1132. Steck and Misiak spoke by phone on January 6, 2014 for 14 minutes about pulling out of the annual TDA Meeting in response to its creation of a buying group, TDA Perks. CCFF ¶¶ 1123-1125. Misiak told Steck that Patterson was planning to pull out of the TDA Meeting. CCFF ¶ 1125. Following the call, Steck told Sullivan that he would follow up with Misiak as to Schein's decision regarding the TDA buying group. CCFF ¶ 1128. On January 21, 2014, Steck sent an internal email to three Schein managers, stating "Guys, I have to get back to [Patterson] on whether or not we are attending the TDA." CCFF ¶ 1129. Later that day, Steck emailed Misiak: "I'll be calling you to let you know about our decision on the matter we recently discussed in the next couple days," referring to Schein's decision on whether to pull out of the TDA annual meeting. CCFF ¶ 1130 (quoting CX0112 at 001). Schein, Benco, and Patterson all withdrew from the 2014 TDA Annual Meeting. CCFF ¶¶ 1138-1146.

[1299] *See supra*, Complaint Counsel's Reply to Patterson's Post-Tr. Br. at p. 6 (discussing the January 2014 Schein-Patterson communication in response to the Texas Dental Association's creation of a buying group). While Complaint Counsel is not alleging that Respondents' actions with respect to the TDA are a boycott of the TDA, Respondents communications and conduct in response to TDA's buying group demonstrates a conscious commitment to a common scheme.

[1300] CCFF ¶¶ 1184-1185.

[1301] Complaint Counsel's Reply to Benco's Post-Tr. Br. §. I.A ("Direct and Unambiguous Evidence Establishes Respondents' Unlawful Agreement").

discussed previously,[1303] the facts here are different from *McWane*, because there is unambiguous evidence establishing that the competitors directly communicated about the subject matter of the conspiracy.[1304] Respondents' executives admitted that they communicated directly with each other through private communications about a policy against discounting to buying groups,[1305] about deviations from a no buying group policy,[1306] and about whether an account qualified as a buying group.[1307] Further, Respondents' contemporaneous documents manifest the agreement, explicitly referencing a joint refusal to discount and acknowledging a "duty to uphold" the collective refusal.[1308] The witness denials do nothing to erase the otherwise unambiguous evidence of agreement.

1. The Evidence Contradicts Schein's Claims that Sullivan Rebuffed Cohen.

Schein asserts that it would be unreasonable to find that it conspired with its rivals "merely from evidence that an illegal course of action was suggested but immediately rejected."[1309] But the weight of the evidence shows that after Cohen contacted Sullivan about buying groups in 2013, Sullivan did not rebuff the communications. Instead, he communicated

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[1302] Schein Post-Tr. Br. at 81-83.

[1303] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.A.2 ("Witness Denials Are Not Sufficient to Overcome the Overwhelming Unambiguous Evidence of Agreement").

[1304] *In re McWane, Inc.*, Docket No. 9351, 2013 WL 8364918, at *265 (FTC May 1, 2013) (Initial Decision) ("There is no evidence showing what Mr. Tatman and Mr. Rybacki discussed . . . .").

[1305] CCFF ¶¶ 483-484, 489-490, 495-496, 500, 662-664, 1000-1001, 1004, 1011, 1036-1040. For example, a Schein executive testified: "I received a call from Pat Ryan at Benco Dental . . . he basically was making a statement . . . that they didn't like working with buying groups." CCFF ¶ 1011. Benco's Cohen testified, "Q. You did communicate Benco's no-buying group policy to Mr. Sullivan; correct? A. I believe I did. Yes." CCFF ¶ 662. Benco's Cohen testified: "Q. You've communicated Benco's no-buying group policy to Mr. Guggenheim? A. . . . [Y]es." CCFF ¶ 484. Patterson's Guggenheim testified: "It's fair to say that you viewed Benco's doing business with Atlantic Dental Care as a deviation from what Chuck Cohen had told you before about Benco's policy? A. Yes." CCFF ¶ 572; Guggenheim, Tr. 1628.

[1306] CCFF ¶¶ 568-573, 995-997, 999-1004.

[1307] CCFF ¶¶ 1036-1037.

[1308] CCFF ¶¶ 527, 549, 603, 1103, 1183, 1190-1191, 1193-1195.

[1309] Schein Post-Tr. Br. at 84 (quoting *In re Citric Acid Litig.*, 191 F.3d 1090, 1098 (9th Cir. 1999).

with Cohen (repeatedly), and acted pursuant to their shared understanding by instructing Schein executives not to engage with buying groups.[1310]

Schein's assertion that Sullivan rebuffed Cohen rests on Sullivan's trial testimony that Cohen's communications to him about ADC and buying groups raised "a red flag,"[1311] and that he told Cohen not to discuss it on the March 25, 2013 telephone call and again on an April 3, 2013 telephone call.[1312] This testimony cannot be credited.

First, Sullivan's contemporaneous communications with Cohen belie the assertion that Sullivan admonished or rebuffed Cohen. Immediately following the March 25, 2013 call, Sullivan thanked Cohen for the call and joked with Cohen.[1313] After Cohen promptly sent further information clarifying that ADC was not a buying group,[1314] Sullivan thanked him again ("Thanks for the follow up on that article. Unusual.").[1315] And after Cohen sent additional information, *Sullivan* tried to reengage by calling Cohen two times on March 27, 2013 and April 3, 2013.[1316] Sullivan's repeated (and attempted) follow-up with Cohen cannot be squared with the suggestion that Sullivan rebuffed Cohen. Moreover, despite Sullivan's purported concerns at the time, Sullivan never reported or documented his communications with Cohen about ADC or Dental Alliance in 2013 to Schein's legal department or anyone else, as he was required to do under Schein's antitrust policy.[1317]

Second, Cohen's testimony about these communications flatly contradicts Sullivan's story. Cohen testified at trial that he did not recall Sullivan ever telling Cohen to stop contacting him about buying groups, and that Sullivan never gave Cohen the impression that they should

[1310] CCFF ¶¶ 717-954, 1022-1059.
[1311] CCFF ¶ 1049.
[1312] Schein Post-Tr. Br. at 83-84.
[1313] CCFF ¶¶ 1051-1053.
[1314] CCFF ¶ 1057.
[1315] CCFF ¶ 1058.
[1316] CCFF ¶¶ 1079-1080; CCRF (Schein) ¶ 1491 (CX6027 at 028 (Row 247), 029 (Row 250), 029 (Row 255)).
[1317] CCFF ¶¶ 1049-1050. Schein's Antitrust Compliance Policy required Sullivan to report the call to Schein's "Legal Department, the Human Resources Department, or Senior Vice President of Administration." CCFF ¶ 1050.

not be talking about buying groups.[1318] (Inconveniently for Schein, Sullivan testified that he has never known Cohen to lie, so Cohen's testimony on this point must be credited).[1319] Moreover, Cohen testified that if a rival told him to stop communicating, he would do so;[1320] and Cohen did not stop communicating with Sullivan regarding buying groups: in the days following the March 25, 2013 telephone call, Cohen continued texting Sullivan about buying groups.[1321] If Sullivan had actually "admonished" Cohen on March 25, 2013, Cohen would not have followed up. In addition, Cohen clearly understood that Schein would adhere to a no-buying-group policy, despite market intelligence to the contrary.[1322] If Sullivan had "admonished" Cohen and refused to engage, Cohen would have had no basis for such an understanding.

The contemporaneous evidence (and Cohen's testimony) must be credited, particularly because Sullivan contradicted himself under oath on numerous critical points, such as:

- Sullivan testified under oath in his investigational hearing that Cohen told him on March 25, 2013 that Benco would not bid for ADC's business, and then changed his story at trial to say the opposite.[1323]

- Sullivan testified in his investigational hearing that he had no recollection of why he called Cohen on March 27, 2013, but that it was not even "possible" that the call related to ADC.[1324] Then, Sullivan later self-servingly testified that it was his intent on March 27, 2013 to "remind" Cohen that they "should not be talking about this."[1325]

- Likewise, Sullivan testified in his investigational hearing that he did not recall the April 3, 2013 telephone call but that he did not believe it was "possible" that the call

[1318] CCFF ¶¶ 1055-1056, 1090.

[1319] CCRF (Schein) ¶ 1491 (CX0311 (Sullivan, IHT at 271) (Q. Have you known Mr. Cohen to lie? A. I know him as an odd personality but to flat out lie, no. I don't communicate that much with him to tell you the truth, but it's -- I don't know him to have lied.")).

[1320] CCRF (Schein) ¶ 1491.

[1321] CCFF ¶¶ 997-1000, 1045-1051, 1069.

[1322] CCFF ¶¶ 675-684. The same is true of Patterson. Patterson executives knew that Schein would not work with buying groups, despite market intelligence to the contrary. CCRF (Schein) ¶ 133.

[1323] CCFF ¶¶ 1038-1041.

[1324] CCRF (Schein) ¶ 1491.

[1325] CCRF (Schein) ¶ 1491 (CX8025 (Sullivan Dep. 409-410); *see also* Sullivan, Tr. 3963, 3965).

related to ADC,[1326] and then changed his story at his deposition to insist that he told Cohen on April 3, 2013 that it was inappropriate to discuss ADC.[1327]

Further, Cohen has consistently testified at his investigational hearing, deposition, and at trial, that he shared Benco's no buying group policy with Sullivan,[1328] which discredits Sullivan's testimony that Cohen never did so.[1329] In addition, the contemporaneous evidence supports Cohen's testimony that he shared Benco's policy with Sullivan, rather than Sullivan's denials. For instance, Cohen's discussions with Sullivan about buying groups do not make sense unless Cohen had informed Sullivan of Benco's policies,[1330] nor do Cohen's texts,[1331] nor do Cohen's internal communications with his colleagues at Benco.[1332] In any event, the communications on their face disclose Benco's policy against buying groups.[1333]

Schein cannot erase the documentary evidence based solely on Sullivan's say-so, particularly when multiple changes in Sullivan's story support a finding of anticompetitive

[1326] CCFF ¶ 1089. Cohen and Sullivan spoke on April 3, 2013 for 5 min and 36 seconds. CCFF ¶¶ 1088.

[1327] CCFF ¶ 1089; CCRF (Schein) ¶ 1491 (Sullivan changed his testimony about the April 3, 2013 call at his deposition (CX8025, (Sullivan, Dep. 415, 416)).

[1328] CCFF ¶¶ 661-664.

[1329] Schein Post-Tr. Br. at 70-71.

[1330] On January 13, 2012, Cohen spoke with Tim Sullivan in response to market intelligence that Schein was discounting to the Unified Smiles buying group. CCFF ¶¶ 955-972. While Sullivan testified at trial that he does not recall what he discussed with Cohen on the January 13, 2012 call, (CCRF (Schein) ¶ 1422), Sullivan previously testified that he heard of Unified Smiles through a message from Cohen. CCRF (Schein) ¶ 1422 (Sullivan, Dep. at 393 ("Have you ever heard of a group called Unified Smiles? A. Only through a message I got from Chuck"); *see also* Sullivan, Tr. 4346.) And on March 25, 2013, Cohen and Sullivan had a telephone conversations in which the two discussed whether ADC was a buying group or a DSO. CCFF ¶ 1036.

[1331] On March 26, 2013, Cohen texted Sullivan informing him that Benco had turned down the Dental Alliance buying group. CCFF ¶¶ 997, 999-1001. On March 27, 2013, Cohen texted Sullivan informing him that Benco would bid on ADC because it was not a buying group. CCFF ¶ 1069.

[1332] Benco's Ryan urged Cohen to inform Tim Sullivan to "knock this shit off" when Ryan learned Schein was discounting to buying group Smile Source, and Cohen agreed to follow up with Sullivan. CCFF ¶¶ 978-993. On September 16, 2013, Benco's Ryan wrote to Cohen in response to concern that Burkhart was selling to buying groups: "CHUCK --- maybe what you should do is make sure you tell Tim [Sullivan] and Paul [Guggenheim] to hold their positions as we are[.]" CCFF ¶¶ 1103-1105.

[1333] On March 26, 2013, Cohen informed Sullivan that Benco was not bidding on the buying group, Dental Alliance. CCFF ¶ 997. On March 27, 2013, Cohen informed Sullivan that Benco would bid on ADC *because it was "not a buying group.*" CCFF ¶ 1069 ("Tim: Did some additional research on the Atlantic Care deal, seems like they have actually merged ownership of all the practices. So it's not a buying group, it's a big group. We're going to bid. Thanks.").

conduct.[1334] Schein cites *In re Citric Acid Litigation*,[1335] but that case involved *documented evidence* that the defendant had immediately rejected the suggestion of any anticompetitive conduct.[1336] Schein can point to no similar evidence in the record here. This case is the opposite of *In re Citric Acid Litigation*—apart from Sullivan's contradicted testimony, there is no evidence that Sullivan ever rebuffed Cohen. Sullivan's failure to document or keep records of his calls with a competitor involving antitrust violations belies any such claim.[1337]

While Schein compares itself to Burkhart,[1338] Sullivan's conduct was starkly different from that of Burkhart's Jeff Reece. Burkhart's Jeff Reece did not continue to reach out to or thank Benco in response to Benco's communications about buying groups.[1339] And, contrary to Sullivan, after being contacted by Benco, Burkhart continued pursuing and contracting with buying groups, and had no policy against them.[1340] Reece viewed buying groups as an opportunity,[1341] while Sullivan viewed buying groups as a threat.

Benco's (and Patterson's) internal documents further confirm that Schein was a participant in the agreement, while Burkhart was not.[1342] Benco's contemporaneous documents

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[1334] *United States v. Capitol Serv., Inc.*, 568 F. Supp. 134, 142 (E.D. Wis. 1983) (Where defendants' testimony offered at trial was inconsistent with admissions prior to trial, the court held that "[s]uch statements can lead the Court to no other conclusion but that [an agreement] was entered into by the defendants for the purpose of eliminating competition among themselves. The testimony offered at trial on behalf of the defendants regarding their reasons for entering into the [agreement] simply lacked credibility given the admissions made prior to trial."); *see also FTC v. Qualcomm, Inc.*, No. 17-CV-00220, 2019 WL 2206013, at *9 (N.D. Cal. May 21, 2019) ("It is odd that [defendant's executive] had better recall during the January 2019 trial than nearly a year earlier at his March 2018 deposition.").

[1335] *In re Citric Acid Litig.*, 191 F.3d 1090 (9th Cir. 1999).

[1336] 191 F.3d 1090, 1098 (9th Cir. 1999) (discussion surrounding anticompetitive conduct "was quickly overviewed and it was decided not to pay attention to that message for most of the information contained in it [was] against the spirit of the anti-trust law.") (quoting trade association meeting minutes) (alteration in original).

[1337] *See Phillips v. Crown Cent. Petroleum Corp.*, 602 F.2d 616, 626 (4th Cir. 1979) (rejecting claim that competitor communications concerned legitimate inquires about Robinson-Patman Act violations, where defendant "failed to keep records of the calls which would be the natural object of anyone genuinely concerned over Robinson-Patman violations").

[1338] Schein Post-Tr. Br. at 84, 89.

[1339] CCFF ¶ 1239; CCRF (Schein) ¶ 354.

[1340] CCFF ¶ 1240; CCRF (Schein) ¶ 354.

[1341] CCRF (Schein) ¶ 354.

[1342] CCFF ¶¶ 1183-1195.

show it was frustrated with Burkhart's refusal to join the agreement.[1343] In fact, when Benco was unsuccessful in getting Burkhart to join the agreement in 2013, Benco's Pat Ryan asked Cohen to contact Tim Sullivan and Paul Guggenheim to shore up the agreement: "CHUCK --- maybe what you should do is make sure you tell Tim [Sullivan] and Paul [Guggenheim] to hold their positions as we are[.]"[1344] Schein's internal documents also reference a common understanding among the Big Three about buying groups—none mentions Burkhart.[1345] Thus, Schein's conduct is not comparable to that of Burkhart, an innocent invitee.

2. Schein Entered an Unlawful Agreement Through Communications Between Sullivan and Cohen.

As discussed at length in Complaint Counsel's Reply to Benco, unambiguous evidence shows that Cohen and Sullivan exchanged assurances that neither would work with buying groups in 2011.[1346] Schein argues that Sullivan's communications with Cohen about buying groups do not evidence an agreement, because they purportedly were a "one-way" exchange of information from Cohen to Sullivan, and that Sullivan did not reciprocate with information about Schein's policies on buying groups.[1347] This cannot be squared with the contemporaneous documents, or Respondents' conduct.

The record shows that Cohen and Sullivan exchanged assurances about buying groups, and reached a common understanding that neither would deal with buying groups.[1348] First, Cohen testified that on their March 25, 2013 phone call about ADC, Cohen and Sullivan *exchanged information* "about whether Atlantic Dental Care was a group buying or group

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[1343] CCFF ¶ 1101.

[1344] CCFF ¶ 1183.

[1345] CCFF ¶ 1185.

[1346] *See supra*, *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. §§. I.A ("Direct and Unambiguous Evidence Establishes Respondents' Unlawful Agreement"); I.C ("Inter-firm Communications Establish That Benco Exchanged Assurances With Both Schein and Patterson That Respondents Would Not Discount to Buying Groups").

[1347] Schein Post-Tr. Br. at 84; Schein Post-Tr. Br. at 71.

[1348] *In re Flat Glass Antitrust Litig.*, 385 F.3d 350, 361 (3d Cir. 2004) ("[E]vidence may involve . . . 'proof that the defendants got together and exchanged assurances of common action . . . .'") (internal quotation omitted).

purchase organization or a DSO."[1349] An exchange of information is not a "one-way" communication. Second, there is no question that Cohen understood Schein would maintain a no buying group policy during the conspiracy.[1350] While Benco "had no doubt" that Schein was working with buying groups as of September 2011 based on market intelligence,[1351] after that point, Benco gained the understanding that Schein had a policy *against* doing business with buying groups.[1352] Benco communicated this understanding internally,[1353] prompting Benco's executives to ask Cohen to confront Sullivan about any perceived deviations.[1354] Indeed, Benco's internal documents referred to a common understanding among the Big Three not to deal with buying groups.[1355] Absent prior assurances from Sullivan, Cohen and his colleagues could not have gained this concrete understanding of Schein's 2011-2015 policies,[1356] and would not have had any reason to disregard the clear market intelligence that Schein worked with buying groups prior to 2011.[1357] Patterson executives had the same understanding that Schein

[1349] CCFF ¶ 1036.

[1350] CCFF ¶¶ 675-678. During the conspiracy, Benco's Cohen understood that "the policy that Henry Schein had was that they do not recognize GPOs." CCFF ¶ 676.

[1351] CCFF ¶ 673.

[1352] CCFF ¶¶ 674-684.

[1353] *See, e.g.*, CCFF ¶¶ 527-528, 1191-1193.

[1354] CCFF ¶¶ 955-972 (Cohen confronted Sullivan regarding Unified Smiles); 980-993 (After learning in July 2012 that Schein might be selling to a buying group, Ryan told Cohen: "Better tell your buddy Tim to knock this shit off." Cohen responded: "Please resend this e-mail without your comment on top so that I can print & send to Tim with a note.").

[1355] CCFF ¶ 1183.

[1356] Sullivan acted in accordance with the common understanding by implementing and communicating a policy (beginning in 2011) of categorically rejecting buying groups. CCFF ¶¶ 717-732.

[1357] CCFF ¶ 681. Benco's understanding that Schein did not work with buying groups during the conspiracy period was contrary to market intelligence Benco received. CCFF ¶ 681.

would not deal with buying groups, and internally instructed Patterson's sales force not to deal with buying groups based on this understanding, despite learning of rumors to the contrary.[1358]

Even if all of this evidence were set aside, evidence shows that, *at minimum*, Cohen communicated Benco's no buying group policy to Sullivan,[1359] that Sullivan received assurances from Cohen about buying groups,[1360] and that Sullivan acted in accordance with those assurances.[1361] This is enough to establish an unlawful agreement. As the Supreme Court held in *Interstate Circuit v. United States*, "[i]t was enough [to support a conspiracy] that, knowing that concerted action was contemplated and invited, the distributors gave their adherence to the scheme and participated in it."[1362]

This case is similar to *Esco Corp. v. United States*. There, the Ninth Circuit affirmed a price fixing conviction where the defendant followed a course of conduct suggested by a competitor, even though the defendant never expressly gave an assurance of commitment to the competitor.[1363] It held that an inference of conspiracy is supported where a course of conduct "once suggested or outlined by a competitor in the presence of other competitors, is followed by all—generally and customarily—and continuously for all practical purposes, even though there be slight variations."[1364] "An exchange of words is not required,"[1365] and "any conformance to

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[1358] In August 2013, when Patterson executive Tim Rogan received inaccurate market intelligence that Schein might be selling to a buying group, he nonetheless responded: "We don't need GPO's in the dental business. Schein, Benco, and Patterson have always said no. I believe it is our duty to uphold this and protect this great industry." CCFF ¶¶ 1273-1275 (quoting CX0106 at 001); CCRF (Schein) ¶ 133. Similarly, Patterson's Vice President Dave Misiak instructed a Patterson Regional Manager to reject a buying group in February 2013, and understood that both Schein and Benco were rejecting buying groups as well. He stated: "Confidential and not for discussion . . our 2 largest competitors stay out of these as well. If you hear differently and have specific proof please send that to me." Misiak testified that he was referring to Schein and Benco. CCFF ¶¶ 548-553 (quoting (CX0093 at 001). Misiak could not explain why he wrote that this information was "Confidential and not for discussion." CCFF ¶ 554.

[1359] CCFF ¶¶ 661-664.

[1360] For example, Sullivan previously testified that Cohen informed him that Benco was not planning to bid on ADC. CCFF ¶¶ 1038-1040.

[1361] *See supra*, Complaint Counsel's Reply to Schein Post-Tr. Br. § II.A.1 ("Schein's Contemporaneous Documents Show that During the Conspiracy Period Sullivan Began to Instruct Schein's Salesforce to Categorically Reject Buying Groups").

[1362] *Interstate Circuit v. United States*, 306 U.S. 208, 226 (1939).

[1363] *Esco Corp. v. United States*, 340 F.2d 1000, 1007-08 (9th Cir. 1965).

[1364] *Esco*, 340 F.2d at 1008 (9th Cir. 1965).

[1365] *Id.*

an agreed or contemplated pattern of conduct will warrant an inference of conspiracy."[1366] Similarly, in *United States v. Beaver*, the Seventh Circuit affirmed a price fixing conviction where a competitor discussed a pricing proposal and "no one disagreed with the proposal or stated that he would not participate in the scheme."[1367] As the *Beaver* court noted: "Nobody objected, nobody disagreed, nobody walked away."[1368]

Here, as in *Esco* and *Beaver*, Sullivan received assurances from Cohen about buying groups, and acted in accordance with those assurances. Cohen informed Sullivan of Benco's no buying group policy on at least one occasion.[1369] Schein followed suit and adopted the same policy in 2011, following inter-firm communications between Sullivan and Cohen.[1370] In fact, although Schein's President, Sullivan, was "very excited" about working with the buying group Smile Source in 2011,[1371] after talking with Benco,[1372] Schein took the exact opposite position: by early 2012, Sullivan told his team he wanted to "KILL the buying group model," referring to Smile Source's model.[1373] And even though Schein had entered into a number of successful legacy buying group arrangements before 2011, by the second half of 2011, Sullivan informed other Schein executives, "I don't think you will ever see a full service dealer get involved with GPOs."[1374] Indeed, Sullivan sent the clear message within Schein—understood by employees at all levels—that the company was to stay away from buying groups.[1375]

[1366] *Id.*

[1367] *United States v. Beaver*, 515 F.3d 730, 738 (7th Cir. 2008).

[1368] *Beaver*, 515 F.3d at 738.

[1369] CCFF ¶¶ 661-664. Schein claims that Cohen testified that he did not share Benco's no buying group policy with Sullivan. Schein Post-Tr. Br. at 70. This claim is wrong: Cohen clearly testified at trial, in deposition, and at his investigational hearing that he shared the policy with Sullivan. CCFF ¶¶ 661-664.

[1370] CCFF ¶ 686.

[1371] CCFF ¶ 696.

[1372] In 2011, Cohen and Sullivan called each other at least 23 times, texted each other at least 89 times, and attended numerous industry events and meetings together. CCFF ¶¶ 348-350, 358, 363, 366, 379, 381, 383.

[1373] CCFF ¶¶ 729-732.

[1374] CCFF ¶¶ 705-706 (quoting CX0185 at 001). Schein makes legal arguments about the meaning of Sullivan's statement here, claiming that it merely reflects Sullivan's "opinion about how full-service distributors would react when faced with a common stimuli." Sullivan never testified to this.

[1375] CCFF ¶¶ 734-737, 743-860.

Schein's cited cases are not at odds with *Esco* or *Beaver*, and none of them concern direct and unambiguous evidence of agreement, including multiple communications evidencing a common understanding. Schein cites *In re Citric Acid Litigation*,[1376] where there was no evidence of the defendant's participation in the conspiratorial communications at issue,[1377] and the evidence only showed an opportunity collude.[1378] Schein also erroneously relies on *Reserve Supply Corp. v. Owens-Corning Fiberglas Corp.*,[1379] and *City of Moundridge v. Exxon Mobil Corp.*[1380] *Reserve Supply* did not hold that a one-way exchange of information is not an agreement, as Schein suggests.[1381] It merely held that a "single, isolated, and vague" statement by a competitor that they "foresaw 'moderate growth ahead' in the market, and that 'they anticipate very little increase' in industry capacity" was insufficient to infer an agreement to fix prices.[1382] *Reserve Supply* involved no direct evidence of conspiracy or of other communications,[1383] and the allegations were centered on consciously parallel price increases and "underdeveloped" plus factor evidence.[1384] *City of Moundridge* is likewise distinguishable: it involved a theory of conscious parallelism, yet plaintiffs failed to produce evidence of parallel pricing, communications about pricing, or pricing decisions based on such communications.[1385] Here, the record includes evidence that the Big Three "discussed their refusal to deal with buying

[1376] *In re Citric Acid Litig.*, 191 F.3d 1090 (9th Cir. 1999).

[1377] *Citric Acid*, 191 F.3d at 1097 ("[T]here is no evidence that illegal activities took place during [trade association] meetings attended by [defendant's] representatives. Nor is there evidence that [defendant] participated in any of the 'unofficial' meetings.").

[1378] *Citric Acid*, 191 F.3d at 1103 (Plaintiff did not "offer any specific details with regard to illegal discussions, but instead merely asks us to infer participation in the conspiracy from the opportunity to do so.").

[1379] *Reserve Supply Corp. v. Owens-Corning Fiberglas Corp.*, 971 F.2d 37 (7th Cir. 1992).

[1380] *City of Moundridge v. Exxon Mobil Corp.*, 429 F. Supp. 2d 117 (D.D.C. 2006), *aff'd*, 409 F. App'x 362 (D.C. Cir. 2011) (unpublished).

[1381] Schein Post-Tr. Br. at 84.

[1382] *Reserve Supply*, 971 F.2d 37, 50 n.9

[1383] *Reserve Supply*, 971 F.2d 37, 50 (Plaintiff "produced no direct evidence of a price-fixing agreement," and relied instead on evidence that "an agreement plausibly could exist" in an "interdependent" industry.).

[1384] *Reserve Supply*, 971 F.2d 37, 51 (finding contentions of price discrimination and actions against self-interest "so underdeveloped

[1385] *See* 429 F. Supp. 2d at 132-33.

groups and made decisions based on these communications."[1386] Schein's reliance on *In re McWane*[1387] is also misplaced. In this case, unlike *McWane*, there is unambiguous evidence establishing that the competitors directly communicated about the subject matter of the conspiracy, a refusal to do business with buying groups, on multiple occasions.[1388] Absent an agreement, there was no reason for them to discuss buying groups.[1389]

Schein also argues that this Court should ignore other evidence of inter-firm communications about buying groups, such as Cohen's April 2014 email to both Sullivan and Guggenheim about the TDA's buying group program, TDA Perks.[1390] Schein tries to claim that the "the TDA is not a buying group."[1391] However, the TDA Perks Program *was* a buying group launched by the Texas Dental Association, and Schein, Patterson, and Benco viewed it as a buying group.[1392] Cohen's email to both Sullivan and Guggenheim is consistent with an agreement concerning buying groups, and the Big Three viewed the TDA Perks buying group as a threat.[1393] Schein also argues that the Court should ignore the 18-minute call between Schein's Foley and Benco's Ryan in October 2013 about Smile Source, because the call did not involve Cohen or Sullivan.[1394] The Foley-Ryan call, however, is evidence of Benco confronting Schein

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[1386] *See In re Benco Dental Supply Co.*, Docket No. 9379, 2018 WL 6338485, at *10 n.10 (FTC Nov. 26, 2018).

[1387] Schein Post-Tr. Br. at 84.

[1388] *In re McWane, Inc.*, Docket No. 9351, 2013 WL 8364918, at *265 (FTC May 1, 2013) (Initial

[1389] CCFF ¶¶ 1167-1172; *Gainesville Utils. Dep't v. Fla. Power & Light Co.*, 573 F.2d 292, 301 (5th Cir. 1978) ("Indeed, if solid economic reasons existed for refusing service to these cities, there was no reason for communicating with a competitor about the refusal, and certainly not for expressing such decisions in terms of hopeful, if not expected, reciprocity.").

[1390] CCFF ¶ 1133. On April 16, 2014, Cohen emailed Sullivan and Guggenheim on the same email chain about the TDA buying group; Cohen forwarded an article promoting the TDA Perks program. (Cohen, Tr. 577; CX1062 at 001). Cohen wrote, "Tim & Paul. . . Thought you'd be interested in this 'essay' from our friends at the TDA." CCFF ¶ 1133 (CX1062 at 001; Cohen, Tr. 577).

[1391] Schein Post-Tr. Br. at 66 n.51.

[1392] CCFF ¶¶ 1109-1114.

[1393] CCFF ¶ 1116. Moreover, following Cohen's email, Sullivan and Cohen spoke on the telephone the same day. CCFF ¶ 1135. Guggenheim made himself a calendar entry task to call Cohen about the TDA Perks letter, and later marked the task 100% complete. CCFF ¶ 1136.

[1394] Schein Post-Tr. Br. at 66 n.51.

when it was concerned that Schein might be working with Smile Source,[1395] and is consistent with the existence of an understanding between Benco and Schein about buying groups.

a. Benco's Internal Emails Evidencing an Agreement with Schein.

In July 2012, Benco's Ryan forwarded information to Cohen that Schein was discounting to a buying group, Smile Source, for the explicit purpose of communicating with Schein's Sullivan: "*Better tell your buddy Tim to knock this shit off.*"[1396] Cohen again responded in agreement: "Please resend this e-mail without your comment on top so that *I can print & send to Tim with a note*."[1397] Schein asks the Court to ignore this email,[1398] claiming that the evidence does not support the allegation that Cohen sent a note to Sullivan about Smile Source in July 2012 and that the record does not contain the "clean" email that Cohen requested.[1399] The evidence, however, shows that Ryan did resend the email to Cohen immediately after Cohen asked him to do so.[1400] Further, Cohen testified that he intended to send Sullivan the note at the time he wrote his email to Ryan,[1401] and Cohen had a practice of sending notes to Sullivan in the

[1395] CCFF ¶¶ 1005-1018. On the October 1, 2013 phone call, Ryan informed Foley that Benco would not bid on Smile Source, and Foley testified that Ryan wanted to know whether Schein would bid on Smile Source. CCFF ¶¶ 1011-1013.

[1396] CCFF ¶ 982 (quoting CX0018 at 001) (emphasis added).

[1397] CCFF ¶ 990 (quoting CX0018 at 001) (emphasis added). Cohen admitted he was planning to print the email with information about Schein's involvement with a buying group and send it to Sullivan with a note. CCFF ¶¶ 991-992.

[1398] Schein also asks this court to ignore the September 16, 2013 email, in which Ryan tells Cohen, after learning that Burkhart was discounting to buying groups: "CHUCK --- maybe what you should do is make sure you tell Tim [Sullivan] and Paul [Guggenheim] to hold their positions as we are[.]" CCFF ¶¶ 1101-1106. Schein claims that there is no evidence that Cohen ever delivered this message to Schein or Patterson, and that Cohen denied having a follow-up discussion with Sullivan. Schein Post-Tr. Br. at 72-73, 84-85. But Cohen only testified that he did not call Sullivan in response to this email. CCRF (Schein) ¶ 1555. Moreover, the record shows that Cohen, Sullivan, and Guggenheim were all present at the 2013 DTA Meeting one month later in October 2013 (CCFF ¶¶ 364-366), where Cohen approached Burkhart's Reece to convince him not to discount to buying groups. CCFF ¶¶ 1225-1245. Thus, Cohen had the same opportunity to discuss the buying group agreement with Sullivan and Guggenheim at that meeting.

[1399] Schein Post-Tr. Br. at 68-70, 83.

[1400] CCRF (Schein) ¶ 1451 (CX1147 (reflecting that Ryan complied with Cohen's request, and resent the email to Cohen one minute later)).

[1401] CCFF ¶ 991 (Cohen, Tr. 522 "Q. So is it fair to say that when you wrote that, you were planning to print and send it to Tim with a note. A. Yes.").

mail at this time.[1402] Sullivan similarly acknowledged that Cohen sent him notes in the mail,[1403] but testified that he did not keep the notes that Cohen sent to him.[1404] Contrary to Schein's argument, the lack of a note in the record is thus not probative of anything— if Sullivan's practice was to throw away notes, obviously Complaint Counsel's inability to find the note does not mean that it never existed. While Schein points to Cohen's testimony that he did not *recall* sending the note in the mail, Cohen did not testify that he did *not* do so.[1405] It is not surprising that Cohen would not "recall" sending a note in the mail six and a half years after the fact.[1406] Schein also claims that Ryan's statement was just a "flippant" remark.[1407] Yet, if that were true, Cohen did not take it as such. In fact, Cohen responded to Ryan's remark by agreeing to communicate with Sullivan.[1408] It also strains credulity to believe that Ryan's remark was in jest; Ryan himself communicated with Foley the following year when he learned Schein might be bidding on buying group Smile Source.[1409]

B. The Circumstantial Evidence Supports the Claim that Schein Agreed Not to Deal with Buying Groups.

The circumstantial evidence in the record, viewed in light of the totality of the evidence, tends to exclude the possibility that Respondents acted independently and proves that Respondents' conspiracy was more likely than not. Schein, like Benco and Patterson, misstates the test for evaluating circumstantial evidence by arguing that Complaint Counsel can prevail only by satisfying the *Williamson Oil* test (first prove parallel conduct, then prove plus

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[1402] CCFF ¶ 992. Indeed, Cohen acknowledged that it would not surprise him if he did send Sullivan the note in the mail. CCFF ¶ 992.

[1403] CCRF (Schein) ¶ 1452; *see also* CCFF ¶ 353 (Sullivan exchanged additional communications with Cohen that are not reflected in CX6027 (Communications Log Summary).).

[1404] CCRF (Schein) ¶ 1453.

[1405] CCRF (Schein) ¶ 1452 (Cohen, Tr. 886 ("I don't recall doing so.")).

[1406] Cohen has testified that he did not think that his communications with Sullivan regarding a buying group policy were inappropriate so there is no reason to doubt that he would have followed through on his promise to send the note in the mail. CCRF (Schein) ¶ 1452 (CX8015 (Cohen, Dep. at 243-244)).

[1407] Schein Post-Tr. Br. at 68.

[1408] CCFF ¶ 990.

[1409] CCFF ¶¶ 1009-1021.

factors).[1410] This is not the correct test: "Plaintiffs need *not* prove parallel pricing in order to prevail"[1411] and need not prove plus factors in a case that is not premised on parallel conduct.[1412] Here, given the direct and unambiguous evidence of agreement, there is no need to resort to the *Williamson Oil* test, and whether Respondents engaged in parallel conduct is not "Step One" in the Court's analysis. Rather, "Step One" entails an analysis of Respondents' inter-firm communications about a no-buying group policy and internal documents evidencing a conscious commitment to a common scheme. In any event, the evidence also supports a finding of agreement from parallel conduct and plus factors.

1. Schein's Policy of Categorically Rejecting Buying Groups Shows Parallel Conduct.

Schein claims that Schein, Benco, and Patterson did not act similarly[1413] toward buying groups, and therefore deny the existence of "parallel conduct."[1414] This argument simply ignores mountains of evidence that Sullivan, Cohen, and Guggenheim all consistently instructed their salesforces not to deal with buying groups during the conspiracy. Further, Schein's sporadic deviation from the agreement does not absolve it of liability for an unlawful agreement.[1415]

a. Sullivan and Schein Executives Instructed Schein's Sales Force against Working with Buying Groups Categorically.

The evidence demonstrates parallel conduct unequivocally. During the conspiracy, Sullivan, Cohen, and Guggenheim all instructed their salesforces not to deal with buying

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[1410] *See* Complaint Counsel's Reply to Benco Post-Tr. Br. § I.B.3.

[1411] *Fleischman v. Albany Med. Ctr.*, 728 F. Supp. 2d 130, 158 (N.D.N.Y. 2010); *see also Interstate Circuit*, 306 U.S. at 227 ("It is elementary that an unlawful conspiracy may be and often is formed without simultaneous action or agreement on the part of the conspirators.").

[1412] *In re Ins. Brokerage Antitrust Litig.*, 618 F.3d 300, 324 n.23 ("Courts devised the requirement of 'plus factors' in the context of offers of proof of an agreement that rest on parallel conduct.").

[1413] The weight of the law recognizes that the parallel conduct need only be similar. *See, e.g.*, *Petruzzi's IGA Supermkts. v. Darling-Del. Co.*, 998 F.2d 1224, 1243 (3d Cir. 1993); *SD3, LLC v. Black & Decker (U.S.) Inc.*, 801 F.3d 412, 429 (4th Cir. 2015).

[1414] Schein Post-Tr. Br. at 86-91.

[1415] *See United States v. Foley*, 598 F.2d 1323, 1333 (4th Cir. 1979). ("Since the agreement itself, not its performance, is the crime of conspiracy, the partial non-performance of [defendant] does not preclude a finding that it joined the conspiracy.") (citations omitted); *Beaver*, 515 F.3d at 739 ("[E]vidence of

groups.[1416] The Big Three rejected buying groups as a result between 2011 and 2015.[1417] While before and after the conspiracy, Respondents may have reacted to buying groups differently, during the conspiracy, they enforced a categorical rejection.[1418] Beginning in 2011, Sullivan instructed Schein's sales force not to deal with buying groups; Schein's sales force categorically rejected buying groups as a result, and terminated old buying groups.[1419] Schein's documents showing adherence to this policy are not mere outliers: at least dozens of Schein's contemporaneous documents, written by executive after executive during the conspiracy, evidence the implementation of Sullivan's policy.[1420] All of this proves that Schein acted like Benco and Patterson. Further dispelling any doubt, Schein's *own* documents reference parallel conduct by the Big Three. A Schein executive, Randy Foley, wrote "*[t]he good thing here is that PDCO [Patterson], Benco and us are on the same page regarding these buying groups / consortiums*,"[1421] and "*Schein, PDCO and Benco all refused to bid on [a buying group's] business when they entered the GPO/Buying Group world.*"[1422] Benco and Patterson had the same understanding about Schein,[1423] even though it was contrary to market intelligence they received.[1424]

[1416] *See supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.A. Schein acknowledges that Benco had a "policy" against buying groups, and that Patterson followed a "practice" of declining buying groups. Schein Post-Tr. Br. at 88. Though Schein tries to argue it had neither a "policy" nor a "practice," such semantics are irrelevant. Sullivan and other executives uniformly and consistently instructed Schein's sales force against working with buying groups throughout the conspiracy, and Schein's sales force heeded those instructions. This mirrors Cohen and Guggenheim's conduct during the conspiracy.

[1417] CCFF ¶¶ 404-425, 631-653, 925-954; *see also* CCFF ¶¶ 733-860 (Schein instructed the salesforce to refuse to sell to buying groups.).

[1418] *See supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.A.

[1419] *See supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.A.1-2, II.B.2.a.-c.

[1420] *See* Attachment C to Complaint Counsel's Post-Trial Brief for additional examples of documents evidencing Schein's no buying group policy during the conspiracy.

[1421] CCFF ¶ 1138 (quoting CX2106 at 001) (emphasis added).

[1422] CCFF ¶¶ 947, 1185, 1195 (quoting CX2094 at 001) (emphasis added). Schein argues that Foley had no personal knowledge of Benco and Patterson's conduct toward buying groups, and that these statements were based on market intelligence. But the record of evidence shows that Foley discussed Benco's anti-buying group policy in October 2013 with Benco's Patrick Ryan, and Ryan told Foley that it would not bid for Smile Source. CCRF (Schein) ¶ 1278.

[1423] CCFF ¶¶ 1186-1195.

[1424] CCFF ¶ 681; CCRF (Schein) ¶ 133 (CX0106 at 001).

Schein's arguments in response are unpersuasive. For instance, it cites testimony that its contemporaneous documents were simply "poorly worded."[1425] But after-the-fact explanations about "unfortunate language" and "ill-advised thinking" carry little weight where the record clearly discloses a "pattern as to policy."[1426] Schein's contemporaneous documents, directly at odds with Schein's arguments, are the best evidence of Schein's policies and actions during the conspiracy, and carry the most weight.[1427] Further, although Schein claims it has a "history" of dealing with buying groups,[1428] that claim is fully consistent with Complaint Counsel's allegations—Schein had no policy concerning buying groups prior to 2011, and openly worked with them.[1429]

Schein's cited cases have no application here—they concern competitors engaging in radically different conduct where parallel pricing activity was alleged. None is factually similar. In *Valspar Corporation v. E.I. Du Pont De Nemours and Company*, where the evidence of conspiracy centered on parallel price increases, the court found that there was "aggressive" and "common" price competition, and that the alleged conspirators were frequently undercutting each other's listed prices.[1430] By contrast, there is no evidence of Schein, Patterson, and Benco competing with each other for buying groups during the conspiracy, let alone evidence that they were competing frequently or aggressively. In *Michelman v. Clark-Schwebel Fiber Glass Corp.*,

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[1425] Schein Post-Tr. Br. at 29.

[1426] *See United States v. Am. Can Co.*, 87 F. Supp. 18, 26-27 (N.D. Cal. 1949) (finding that the written record disclosed a clear "pattern as to policy" and that the "general intent and purpose expressed are unmistakable," despite witness explanations that written statements were "unfortunate language," "general characterizations," and "ill-advised thinking").

[1427] *See United States v. Gen. Elec. Co.*, 82 F. Supp. 753, 844-45 (D.N.J. 1949) (Contemporaneous documents have "the highest validity as evidence of intention" and "mirror well the contemporaneous thoughts and the policy considerations of [defendants'] officials, and the testimony at the trial failed to limit them.") (internal quotation omitted), *decision supplemented*, 115 F. Supp. 835 (D.N.J. 1953); *see also FTC v. Qualcomm, Inc.*, No. 17-CV-00220, 2019 WL 2206013, at *12-13 (N.D. Cal. May 21, 2019) ("The Court finds Qualcomm's internal, contemporaneous documents more persuasive than Qualcomm's trial testimony prepared specifically for this antitrust litigation.").

[1428] Schein Post-Tr. Br. at 65.

[1429] CCFF ¶¶ 440-453, 687-696.

[1430] *Valspar Corp. v. E.I. Du Pont De Nemours & Co.*, 873 F.3d 185, 194-96 (3d Cir. 2017) ("'[A]ggressive' and 'common' price competition between firms is inconsistent with the idea that those same firms have conspired *not* to compete on price.").

the court found defendants had engaged in "radical" and "wholly different policies."[1431] Not the case here—Respondents' executives enforced the same policy. *Burtch v. Milberg Factors, Inc.*, decided on a motion to dismiss, simply held that a complaint's allegations were facially deficient and had failed to *allege* similar conduct.[1432] *Burtch* has no application to the facts at issue here. Moreover, Schein cites *In re Beef Industry Antitrust Litigation*,[1433] for the proposition that plaintiff must start by proving parallel conduct. But *Beef Industry* held that this was only true when plaintiff relies on "circumstantial evidence of conscious parallelism."[1434]

b. Schein's Asserted Buying Groups do not Negate Evidence of Conspiracy.

Preferring not to focus on its contemporaneous documents, Schein relies on a crafted list of twenty-five entities it claims are buying groups.[1435] Just four are buying groups that originated during the conspiracy, none of which were approved by Sullivan.[1436] The rest are (1) not buying groups, (2) legacy buying groups it began discounting to either before the conspiracy or (3) post-conspiracy buying groups it formed relationships with after the conspiracy began to fall apart in April 2015.[1437] Evidence that Schein worked with buying groups before and after the agreement only supports Complaint Counsel's allegations of a change in conduct.[1438]

Out of its long list, Schein can point to just four buying groups on it that it began discounting to during the conspiracy: Dental Gator, Schulman Group, Merit Dent, and Dental Alliance. Sullivan never approved these buying groups.[1439] These four buying groups do not

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[1431] *Michelman v. Clark-Schwebel Fiber Glass Corp*., 534 F.2d 1036, 1043-45 (2d Cir. 1976).

[1432] *Burtch v. Milberg Factors, Inc.*, 662 F.3d 212, 228-29 (3d Cir. 2011).

[1433] *In re Beef Indus. Antitrust Litig.*, 907 F.2d 510 (5th Cir. 1990).

[1434] *Beef Indus.*, 907 F.2d 510, 514.

[1435] Schein Post-Tr. Br. at Page 87-88. Schein asserts additional entities as "buying groups" in its Proposed Findings of Fact, but does not list them in its Post-Trial Brief. Regardless, they too are not buying groups, or are buying groups that Schein discounted to before or after the alleged conspiracy. CCRF ¶¶ 375-1335.

[1436] *See supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.B (*see* Chart of Schein's Asserted Buying Groups).

[1437] CCRF (Schein) ¶ 376.

[1438] *See supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.A.

[1439] *See supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.B.2.d.1-4.

negate agreement—it merely shows Schein's compliance was imperfect. Moreover, Schein claims that Complaint Counsel has somehow gerrymandered the definition of buying group.[1440] Not so. Complaint Counsel's definition of buying group comes from Respondents' own documents and testimony.[1441] And Schein's own documents, witness testimony, and discovery responses support Complaint Counsel's arguments that these are not buying groups.[1442]

Schein also contends that Complaint Counsel has to demonstrate that Respondents' agreement was limited to *new* buying groups, since Schein did not terminate every one of its legacy buying groups.[1443] Not so. "The government . . . is not required to prove a formal, express agreement with all the terms precisely set out and clearly understood by the conspirators. It is enough that the government shows that the defendants accepted an invitation to join in a conspiracy whose object was unlawfully restraining trade."[1444] Here, Complaint Counsel has met this standard, and has shown that Schein reached an agreement not to deal with buying groups—not just new ones. Sullivan delivered on that agreement, and instructed his salesforce accordingly throughout the conspiracy. Schein complied by terminating old ones and refusing to deal with new ones.[1445] In addition, the record shows that some of Schein's pre-conspiracy, legacy buying groups that were not terminated flew under the radar, and Schein executives were

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[1440] Schein Post-Tr. Br. at 89. Schein, not Complaint Counsel, has played definitional games. Schein has submitted ever-changing lists of "buying groups," including four different lists during discovery. In its final contention interrogatory responses, it asserted 46 groups, including entities that do not even touch the dental industry: medical group purchasing organizations, and groups comprised of hospitals, community health centers, dental schools, public facilities, and other healthcare institutions. CCFF ¶¶ 1751, 1753-54, 1757-58, 1760-62. Moreover, Schein asserts groups *for the first time* in post-trial briefing, such as Floss Dental, for which there is no evidence of any agreement in the record. Schein never identified Floss Dental in discovery, has produced no documents evidencing an agreement with Schein, and has elicited no testimony at trial or otherwise about a purported buying group relationship. CCRF (Schein) ¶ 757.

[1441] CCFF ¶¶ 67-78.

[1442] For instance, Schein takes issue with Complaint Counsel's categorizations of Comfort Dental (a DSO) and Smile Source (a buying group). This comes directly from Schein's own documents and testimony. Sullivan and Schein considered Comfort Dental to be a DSO (CCFF ¶¶ 1098-1099, 1759), and considered Smile Source a buying group. CCFF ¶ 175. Schein admitted in response to Request for Admission 32 that is considered Smile Source to be a buying group. CCFF ¶ 175.

[1443] Schein Post-Tr. Br. at 90.

[1444] *United States v. MMR Corp.*, 907 F.2d 489, 495 (5th Cir. 1990) (citations omitted).

[1445] CCFF ¶¶ 733-870, 871-897, 1750.

not aware of their existence during the conspiracy, calling them "inherited 'messes'" when they were discovered post-conspiracy.[1446] That Schein did not terminate all legacy groups does not undermine Complaint Counsel's case.

Moreover, Schein's claim seeks to make Complaint Counsel prove more than it alleges. Complaint Counsel need not prove that Schein terminated every single legacy buying group to show that Schein, Benco, and Patterson acted similarly pursuant to a common understanding.[1447] Indeed, this would require Complaint Counsel to prove a perfectly executed conspiracy, which the law does not require.[1448]

c. Schein's Imperfect Compliance does not Negate Evidence of Conspiracy.

Schein concedes that evidence of its imperfect compliance does not prevent Complaint Counsel from proving an agreement, since the Sherman Act prohibits the agreement, not its efficacy.[1449] Once parties enter a price-fixing agreement, whether they perform the agreement perfectly or successfully is immaterial to the question of liability,[1450] and it is well established that deviation from an unlawful agreement (i.e., cheating) does not prevent a plaintiff from

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[1446] CCFF ¶ 1767 (quoting CX2287 at 001); CCRF (Schein) ¶ 380 (CX2312 at 001 (February 21, 2016 email in which Hight discovers Advantage Dental's buying group component: "The [Prime Vendor Agreement] I put in place for Advantage some years ago was only for the Advantage owned offices. At that time we were specifically avoiding Buying Groups and the [Prime Vendor Agreement] language made that clear. So the metamorphosis described below and in their marketing piece has happened since my relationship.").

[1447] *See United States v. Foley*, 598 F.2d 1323, 1332-34 (4th Cir. 1979); *see also SD3, LLC v. Black & Decker (U.S.) Inc.*, 801 F.3d 412, 429 (4th Cir. 2015) ("[P]arallel conduct need not be exactly simultaneous and identical in order to give rise to an inference of agreement.") (internal quotation omitted).

[1448] *Id*.

[1449] Schein Post-Trial Brief, at 90 n.71.

[1450] *See Foley*, 598 F.2d at 1333 ("Since the agreement itself, not its performance, is the crime of conspiracy, the partial non-performance of [defendant] does not preclude a finding that it joined the conspiracy.") (citations omitted); *see also Plymouth Dealers' Ass'n of N. Cal. v. United States*, 279 F.2d 128, 132 (9th Cir. 1960) ("[O]
agreements were ever actually carried out, whether the purpose of the conspiracy was accomplished in whole or in part, or whether an effort was made to carry the object of the conspiracy into effect.'") (quoting *United States v. Trenton Potteries Co.*, 273 U.S. 392, 402 (1927)); *In re High Fructose Corn Syrup Antitrust Litigation*, 295 F.3d 651, 656 (7th Cir. 2002) ("An agreement to fix list prices is . . . a per se violation of the Sherman Act even if most or for that matter all transactions occur at lower prices.").

proving a conspiracy.[1451] Indeed, courts have recognized that members of price-fixing conspiracies tend to cheat,[1452] often have incentives to do so,[1453] and thus "cartels tend to collapse of their own weight."[1454]

Courts have upheld unlawful agreements even where the non-compliance or cheating was significant. In *United States v. Foley*, the Fourth Circuit upheld price fixing convictions where some defendants did not act to implement the commission-fixing agreement until months after it formed, and defendants only partially complied.[1455] Similarly, in *United States v. Beaver*, the Seventh Circuit rejected the defendant's claim that evidence of cheating meant there was no agreement.[1456] Since perfect compliance was not required, the *Beaver* court held that cheating did not prevent the government from proving a price-fixing conspiracy.[1457] And in *In re Brand Name Prescription Drugs Antitrust Litigation*, a case concerning buying groups of pharmacies, the court held that instances of non-compliance by working with buying groups did not "erase the factual question of whether the wholesalers joined the conspiracy" and noted the incentives for cheating in cartels. [1458]

Here, just a few buying groups fell through the cracks of Schein's no buying group policy: it worked with four buying groups during the conspiracy, despite Sullivan's instructions

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[1451] *United States v. Beaver*, 515 F.3d 730, 739 (7th Cir. 2008) (Section 1 of the Sherman Antitrust Act "does not outlaw only perfect conspiracies to restrain trade. . . . [E]vidence of cheating certainly does not, by itself, prevent the government from proving a conspiracy.").

[1452] *Id.* ("It is not uncommon for members of a price-fixing conspiracy to cheat on one another occasionally . . . .").

[1453] *In re Brand Name Prescription Drugs Antitrust Litig.*, 123 F.3d 599, 615 (7th Cir. 1997) ("There are inherent strains in a cartel. A member can do better by undercutting the cartel slightly and obtaining enormously increased volume at a slight sacrifice of unit profit than by honoring the cartel price and suffering an erosion of sales because of cheating by less scrupulous members.") (citing George J. Stigler, "A Theory of Oligopoly," in Stigler, *The Organization of Industry*

[1454] *Id.*

[1455] *Foley*, 598 F.2d 1323, 1332-34 (4th Cir. 1979); *see also SD3, LLC v. Black & Decker (U.S.) Inc.*, 801 F.3d 412, 429 (4th Cir. 2015) ("[P]arallel conduct need not be exactly simultaneous and identical in order to give rise to an inference of agreement.") (internal quotation omitted).

[1456] *Beaver*, 515 F.3d at 739.

[1457] *Id.* The court in *Beaver* analogized to contract law and noted that a breach of contract does not negate the existence of a contract in the first place.

[1458] *In re Brand Name Prescription Drugs Antitrust Litig.*, 123 F.3d at 615.

against them.[1459] This shows that Sullivan's instruction on buying groups were not effective one-hundred percent of the time but does not disprove an agreement.[1460] Indeed, the record shows that Sullivan was unaware of these deviations, in the case of Schulman Group, Merit Dent, and Dental Alliance.[1461] Schein's efforts to keep secret its deviation with Dental Gator supports that this was cheating on an agreement.[1462] After Schein decided not to terminate the relationship in order to keep the parent DSO as a customer, Schein took steps to keep its relationship with Dental Gator a secret, and told Dental Gator it could not advertise itself publicly as a buying group.[1463] Similarly, Schein's 2014 proposal to Smile Source was an unsuccessful attempt at cheating.[1464] Tellingly, Sullivan and Schein executives continued instructing Schein's sales force against buying groups before and after the Smile Source proposal and Dental Gator.[1465]

Benco and Patterson's reactions to Schein's deviations confirms that this was cheating on an illegal agreement. When Cohen learned that Schein might have been working with the Dental Alliance in 2013, he confronted Sullivan about it.[1466] Benco reached out to Schein when it suspected it of working with Unified Smiles and Smile Source on other occasions.[1467] Patterson's executives also suspected and internally discussed Schein's cheating on the

[1459] *See supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.B.2.d ("The Four Buying Groups that Appear During the Conspiracy do not Negate Evidence of Agreement"); CCFF ¶¶ 700-954; CCRF (Schein) ¶ 376.

[1460] *See Foley*, 598 F.2d at 1333 ("Since the agreement itself, not its performance, is the crime of conspiracy, the partial non-performance of [defendant] does not preclude a finding that it joined the conspiracy.") (citations omitted); *Beaver*, 515 F.3d at 739 ("[E]vidence of cheating certainly does not, by

[1461] *See supra*, Complaint Counsel's Reply to Schein Post-Tr. Br. at § II.B.2.d.2-4 (discussing Schulman Group, Merit Dent, and Universal Dental Alliance).

[1462] *See* CCFF ¶¶ 1812-1817.

[1463] CCFF ¶¶ 1812-1817.

[1464] CCRF (Schein) ¶ 1156.

[1465] CCFF ¶¶ 790-860.

[1466] CCFF ¶¶ 997, 999-1002. As Schein concedes, Sullivan thought that Cohen's text messages to him about Dental Alliance were about ADC. Schein Post-Trial Br. at n.58; SF ¶¶ 1328, 1546; CCRF (Schein) ¶¶ 1322, 1326-1327, 1331-1335.

[1467] CCFF ¶¶ 955-993, 1005-1021.

agreement.[1468] Absent a prior agreement, discussions of Schein's cheating by its competitors, and confrontations about such cheating, would not exist.

Schein argues that Complaint Counsel has improperly assumed a conspiracy by calling this cheating. This argument only holds water if one ignores the record of evidence establishing Schein's participation in and compliance with the agreement in all other instances. Schein cites *In re McWane* in support of its arguments about cheating. There, however, evidence of complaints about cheating were analyzed as a plus factor to support a finding of conspiracy.[1469] Here, by contrast, there is significant evidence of Respondents' agreement, other than confrontations about cheating, and Complaint Counsel's evidence that Schein sporadically deviated from the agreement requires no improper assumptions.

2. "Plus-Factor" Evidence Confirms the Existence of an Unlawful Agreement.

As discussed above, Complaint Counsel's evidence of agreement rests on direct and unambiguous evidence of agreement. "Plus factors" supporting an inference of concerted action are not necessary where, as here, direct competitor communications establish the existence of a conspiracy, and the case does not rest merely on parallel conduct.[1470] Nonetheless, many of the typical plus factors that courts have relied upon to find a conspiracy further confirm the existence of an unlawful agreement among the Big Three.

a. Schein's Motive to Conspire.

The Big Three had a common motive to conspire, corroborated in each of Respondents' documents. Schein denies there is evidence of any such motive, relying on inconsistent and

[1468] CCFF ¶¶ 540, 1188-1189.

[1469] *In re McWane, Inc.*, Docket No. 9351, 2013 WL 8364918, at *260-61 (FTC May 1, 2013) (Initial

[1470] *United States v. Apple Inc.*, 952 F. Supp. 2d 638, 690 (S.D.N.Y. 2013), *aff'd*, 791 F.3d 290 (2d Cir. 2015) (explaining that plus factor evidence, including that of common motive, acts against economic self-interest, inter-firm communications, and change in conduct, is necessary if alleging parallel conduct); *In re Ins. Brokerage Antitrust Litig.*, 618 F.3d 300, 323 (3d Cir. 2010) ("[P]lus factors need be pled only when a plaintiff's claims of conspiracy rest on parallel conduct.").

unpersuasive arguments. It argues that buying groups were not an imminent threat and could not shift share, so there was no need to conspire.[1471] At the same time, it makes the directly contrary assertion that a conspiracy would been have unprofitable, negating a motive, because buying groups would shift share to small, regional distributors that worked with them instead of the Big Three.[1472]

Schein's assertion that its executives did not view buying groups as a threat is contrary to its contemporaneous documents. Schein, like Benco and Patterson, feared that unfettered competition for buying groups would lead to "a huge price war," driving margins down across the board.[1473] Sullivan identified buying groups as one of the "Top 5 'Keeps Me Up at Night'" issues[1474] and [redacted].[1475] A Schein executive cautioned, "as soon as we start doing [GPOs], we will turn into medical" and "[m]argins will go down."[1476]

Moreover, the evidence shows that Schein believed that buying groups could shift share, and that each of the Big Three recognized that if one of them discounted to buying groups, the others would also need to lower prices to avoid losing business.[1477] Sullivan testified at trial that if Schein rejected a buying group, the buying group might shift Schein's customers to a competitor.[1478] He testified that this would be a risk to Schein's business and could lead to margin erosion.[1479] And contemporaneous documents show that Schein, Benco, and Patterson

[1471] Schein Post-Tr. Br. at 92.

[1472] Schein Post-Tr. Br. at 93.

[1473] CCFF ¶¶ 196-198 (quoting CX2113 at 001); *see also* CCFF ¶¶ 241-245 (Schein was concerned about how it would compete if buying groups had relationships with other distributors.).

[1474] CCFF ¶ 224 (quoting CX0183 at 001).

[1475] CCFF ¶ 225.

[1476] CCFF ¶ 262 (quoting CX0165 at 001).

[1477] CCFF ¶¶ 196-247. Sullivan further identified Patterson and Benco as key "players," and identified their partnering with buying groups as one of the most important items in relation to buying group strategy. CCFF ¶ 1166.

[1478] CCFF ¶ 240.

[1479] CCFF ¶ 240; *see also* CCFF ¶¶ 198, 200-201, 204, 217-218, 239 (relating to competitive concerns and risk to margins from working with buying groups).

were each concerned about its competitors working with buying groups.[1480] Notably, executives from each of the Big Three used the same "slippery slope" analogy in reference to buying groups.[1481] Similar motives have been instructive and compelling to courts finding an agreement, where absent one, cooperation would not occur for fear of losing business to a competitor.[1482]

Schein likewise fails in its inconsistent argument that the alleged agreement among the Big Three would have been unprofitable, because small, regional distributors can step in to supply the buying group, leading to a loss of customers for the Big Three (Respondents concede that buying groups can shift share in making this argument). As noted above, while Respondents' conspiracy would certainly be more effective if every full-service distributor in the country participated, this does not negate motive evidence.[1483] Respondents' agreement accounted for "over 80%" of the market,[1484] and involved every national, full-service distributor (the Big Three). Moreover, evidence shows that buying groups prefer to work with national, full-service distributors, not regional ones.[1485]

Finally, Schein suggests that the Big Three were merely acting as players in an oligopolistic, interdependent market, adopting a "follow-the-leader" or "wait-and-see" approach toward buying groups.[1486] Of course, this argument contradicts Schein's main defense that it is the industry "leader" in buying groups.[1487] Regardless, it has no application here: Schein worked

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[1480] CCFF ¶¶ 196-253.

[1481] CCFF ¶¶ 201-203; 709-711, 809, 950.

[1482] *See Apple*, 952 F. Supp. 2d at 691 (finding defendants' common motivation of entering price-fixing conspiracy to challenge Amazon's $9.99 price point in the "swiftly growing e-book market" and in order to "protect their then-existing business model" as compelling evidence of conspiracy); *Toys "R" Us, Inc. v. FTC*, 221 F.3d 928, 932, 935-36 (7th Cir. 2000) (affirming Commission's findings of horizontal agreement where evidence of manufacturers' common motive to join boycott of warehouse clubs was fear that "rivals who broke ranks and sold to the clubs might gain sales at their expense, given the widespread and increasing popularity of the club format").

[1483] *See supra*, Complaint Counsel's Reply to Schein Post-Tr. Br. § II.D.4.

[1484] CCFF ¶ 1458.

[1485] CCFF ¶ 1486. For instance, in 2011 [redacted]. CCFF ¶ 915.

[1486] Schein Post-Tr. Br. at 92-93.

[1487] Kass, Tr. 89 ("In fact, we are the leader in dealing with buying groups.").

with buying groups prior to 2011, while Benco did not.[1488] It was Schein's discounting to buying groups that precipitated the communications leading to an agreement. Thus, there was no "wait-and-see" for Schein. Moreover, the fact that Respondents actually communicated with each other about buying groups on multiple occasions undermines claims of mere oligopoly behavior.[1489]

b. Actions against Self-Interest.

Evidence that Respondents acted contrary to their unilateral self-interest supports a finding of conspiracy.[1490] Schein's actions check all the boxes of behavior that courts have found to be indicative of actions against self-interest.

The record shows that Schein's sales force was interested in pursuing buying groups, and that Schein executives had to continually rein in the salesforce and instruct them not to deal.[1491] This is powerful evidence that Schein's policy not to deal with buying groups was against Schein's self-interest. Moreover, Schein believed buying groups were an opportunity to win customers from its competitors and grow its profit margins, as evidenced by its buying group agreements before 2011,[1492] but nonetheless instructed its sales force to reject buying groups from late 2011 through 2015.[1493] As evidenced by Respondents' own documents, Respondents' refusal to deal led to lost customers and sales.[1494] At the same time, distributors that discounted to buying groups during the conspiracy period, such as Burkhart, profited at the expense of the

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[1488] CCFF ¶¶ 395, 432-453.

[1489] *In re Text Messaging Antitrust Litig.*, 782 F.3d 867, 875 (7th Cir. 2015) ("If any of these reflections [to follow the industry leader] persuaded the . . . firm[]—***without any communication with the leader***—to raise their prices, there would be no conspiracy, but merely tacit collusion [or 'conscious parallelism']."") (emphasis added); *Gainesville Utils. Dep't v. Fla. Power & Light Co.*, 573 F.2d 292, 300-01 (5th Cir. 1978) (refuting the notion of conscious parallelism where the record consisted of numerous exchanges of letters between high executives noting "[t]he record, however, indicates much more than just parallel activity").

[1490] *See, e.g.*, *Apple*, 952 F. Supp. 2d at 690.

[1491] *See supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.A.1, II.A.2; *see also* Attachment C to Complaint Counsel's Post-Trial Brief.

[1492] CCFF ¶¶ 1256-1266.

[1493] CCFF ¶¶ 733-870, 925-954.

[1494] CCFF ¶¶ 1267, 1269, 1310, 1655, 1657-1658, 1660.

Big Three.[1495] Schein's refusal to bid on profitable buying group opportunities was against its economic self-interest, which is the type of evidence of acts against unilateral self-interest that courts find "consistently tend to exclude the likelihood of independent conduct."[1496] Second, Schein and Benco exchanged their internal policies against discounting to buying groups.[1497] Such an exchange of strategic, non-public information is an action contrary to self-interest that would not occur absent an agreement and is "persuasive evidence" of conspiracy.[1498]

In response, Schein makes varying arguments that are easily disposed of. First, it claims it based each buying group decision on reasonable business factors. The evidence belies this claim. Schein did not engage in a business analysis concerning each group—it rejected them categorically.[1499] Executives' contemporaneous statements confirm this: "Just for clarity, we are NOT participating in any GPOs regardless of what they promise to bring us."[1500] Schein also argues that Complaint Counsel has no evidence that Schein would have acted differently absent conspiracy. Except Schein did act differently absent conspiracy: it worked with buying groups

[1495] CCFF ¶¶ 1301-1313, 1651-1654, 1664, 1666.

[1496] *See Re/Max Int'l, Inc. v. Realty One, Inc.*, 173 F.3d 995, 1009 (6th Cir. 1999); *see also In re Pool Prods. Distribution Mkt. Antitrust Litig.*, 988 F. Supp. 2d 696, 712-13 (E.D. La. 2013) (finding that evidence of acts that "risk a loss of market share to the other manufacturers" are acts against economic self-interest supporting claim of conspiracy); *Toys "R" Us*, 221 F.3d at 935 (noting that an act by a manufacturer that "deprive[s] itself of a profitable sales outlet" is evidence supporting a conspiracy).

[1497] CCFF ¶¶ 661-665, 674-680, 1036-1038, 1061-1100 .

[1498] *See Fleischman v. Albany Med. Ctr.*, 728 F. Supp. 2d 130, 162 (N.D.N.Y. 2010); *see also In re Currency Conversion Fee Antitrust Litig.*, No. 05-7116, 2012 WL 401113, at *6 (S.D.N.Y. Feb. 8, 2012) against unilateral interests); *In re Polyurethane Foam Antitrust Litig.*, 152 F. Supp. 3d 968, 991 (N.D. Ohio 2015) ("A jury could reasonably conclude that Defendants shared [sensitive business] information with each other because there existed a common understanding of how the information would be used—not to compete, but to collude."); *In re Coordinated Pretrial Proceedings in Petroleum Prods. Antitrust Litig.*, 906 F.2d 432, 450 (9th Cir. 1990) (Disclosure of "sensitive price information might be considered contrary to a firm's self-interest," and supports a finding of "common understanding" among firms sharing this information.).

[1499] *See supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.A; CCFF ¶¶ 717-870, 925-954; *see also* Attachment C to Complaint Counsel's Post-Trial Brief for additional examples of documents evidencing Schein's no buying group policy during the conspiracy.

[1500] CCFF ¶ 816.

before and after the conspiracy.[1501] Moreover, it is not Complaint Counsel's burden to reconstruct the but-for world to show that Schein would have acted differently.[1502]

As discussed above,[1503] Schein also criticizes Dr. Marshall's profitability analysis, but this critique fails because Dr. Marshall's profitability analysis only confirms the direct and unambiguous evidence. In any event, Dr. Marshall's profitability analysis was reliable and valid, and based on natural experiments in the marketplace, which offer reliable and persuasive evidence in antitrust cases.[1504] There was no need to do any "but-for" analysis.[1505] Schein's other complaints likewise fail to undermine Dr. Marshall's profitability analysis.[1506]

c. Communications Raise an Inference of Conspiracy.

While the communications at issue constitute unambiguous evidence of an agreement, Schein mistakenly suggests that they should constitute "plus factors," and asserts that an

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[1501] CCFF ¶¶ 687-696, 1316-1319.

[1502] *United States v. Microsoft Corp.*, 253 F.3d 34, 79 (D.C. Cir. 2001) ("To require that Section 2 liability turn on a plaintiff's ability or inability to reconstruct the hypothetical marketplace absent a defendant's anticompetitive conduct would only encourage monopolists to take more and earlier anticompetitive action. . . . [N]either plaintiff nor the court can confidently reconstruct a product's hypothetical technological development in a world absent the defendant's exclusionary conduct. To some degree, 'the defendant is made to suffer the uncertain consequences of its own undesirable conduct.'") (quoting Areeda & Hovenkamp ¶ 651c).

[1503] *See supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.D.4.

[1504] *In re NCAA Athletic Grant-in-Aid Cap Antitrust Litig.*, No. 14-md-02541 CW, 2019 WL 1747780, at *13 (N.D. Cal. Mar. 8, 2019) (finding expert analysis based on natural experiments "reliable and persuasive"); *FTC v. ProMedica Health Sys., Inc.*, No. 3:11 CV 47, 2011 WL 1219281, at *14 (N.D. Ohio Mar. 29, 2011) (relying on "[r]eal-world natural experiments in the marketplace" to confirm that merging parties competed for significant number of patients); *FTC v. Penn State Hershey Med. Ctr.*, 838 F.3d 327, 345-46 (3d Cir. 2016) (relying on results of natural experiment); Merger Guidelines § 2.1.2 (Antitrust enforcement agencies "look for . . . 'natural experiments,' that are informative regarding the competitive effects" of mergers); *FTC v. Foster*, No. CIV 07–352 JBACT, 2007 WL 1793441, at *38 (D.N.M. May 29, 2007) ("Where available, the antitrust agencies rely extensively on natural market experiments . . . ."); CCRF ¶¶ 1715-1717.

[1505] By contrast, such analyses are typically necessary in private antitrust actions where a plaintiff must show injury-in-fact and damages. *In re Ethylene Propylene Diene Monomer Antitrust Litig.*, 256 F.R.D. 82, 88 (D. Conn. 2009)
'but-for' price—the price a customer would have paid in the absence of the conspiracy—and the actual price paid.").

[1506] Schein claims that Kois and Smile Source were not representative buying groups (Schein Post-Tr. Br. at 94), that Marshall unjustifiably assumed that Schein terminated Smile Source (Schein Post-Tr. Br. at 94-95), that that there were "false positives" outside the conspiracy period (Schein Post-Tr. Br. at 95), and that Dr. Marshall's analysis did not distinguish between oligopoly behavior and conspiracy (Schein Post-Tr. Br. at 95). These points are addressed *supra*, Complaint Counsel's Reply to Schein's Post-Tr. Br. § II.D.4.

incorrect three-factor test should apply: evidence of a prior understanding, commitment to another to refrain from competing, and a restricted sense of action. Schein misstates *McWane* by asserting that Complaint Counsel must meet all three of these factors. Rather, as this Court recognized in *McWane*, this is a list of alternative ways to establish an agreement.[1507] Thus, any one of those three factors suffices to prove an agreement, and Complaint Counsel need not show all three.[1508] Regardless, Complaint Counsel's direct and unambiguous evidence of agreement establishes that Benco, Patterson, and Schein entered into an unlawful agreement, and establishes a prior understanding or commitment, as discussed *supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.A.1. ("There is Direct and Unambiguous Evidence of Agreement"). Complaint Counsel's evidence shows that Respondents reached a "unity of purpose or a common design and understanding, or a meeting of minds in an unlawful arrangement,"[1509] and that Respondents "had a conscious commitment to a common scheme designed to achieve an unlawful objective."[1510] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.A.1. ("There is Direct and Unambiguous Evidence of Agreement").

Schein suggests that Benco and Schein's inter-firm and intrafirm communications about buying groups suggest a mere opportunity to collude, but this cannot be taken seriously, as the communications simply make no sense absent a prior understanding.[1511] Schein compares this

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[1507] *In re McWane, Inc.*, Docket No. 9351, 2013 WL 8364918, at *245 (FTC May 1, 2013) (Initial Decision) ("[A]n 'agreement' for purposes of Section 1 . . . is revealed by evidence of a prior understanding *or* commitment . . . *or* the sort of restricted freedom of action and sense of obligation that one generally associates with agreement.") (internal citation and internal quotation omitted) (emphasis added).

[1508] *Id*. Schein also cites *Valspar*, a parallel pricing case. *Valspar*, 873 F.3d at 191-193. But *Valspar* held that a plaintiff may have to show "proof that the defendants got together and exchanged assurances of common action ***or*** otherwise adopted a common plan even though no meetings, conversations, or exchanged documents are shown." 873 F.3d at 193 (internal quotation omitted) (emphasis added).

[1509] *Copperweld Corp. v. Independence Tube Corp.*, 467 U.S. 752, 771 (1984) (quoting *Am. Tobacco Co. v. United States*, 328 U.S. 781, 810 (1946)).

[1510] *Monsanto Co. v. Spray-Rite Serv. Corp.*, 465 U.S. 752, 764 (1984) (quoting *Edward J. Sweeney & Sons, Inc. v. Texaco, Inc.*, 637 F.2d 105, 111 (3d Cir. 1980)).

[1511] *See supra*, Complaint Counsel's Reply to Benco's Post-Tr. Br. § I.A.1. ("There is Direct and Unambiguous Evidence of Agreement").

case to *In re Text Messaging Antitrust Litigation*,[1512] yet the facts there were very different. *In re Text Messaging* concerned just two *intrafirm* communications written by a non-senior executive.[1513] There was no evidence that the defendants ever actually communicated with each other.[1514] Moreover, the key internal email was not reflective of an agreement or understanding, and stated, "I know the other guys are doing it *but that doesn't mean we have to follow*."[1515] The court held that if there had been an agreement, the defendants would have had to follow.[1516] Here, by contrast, the record shows that Respondents actually communicated with each other, had an understanding of and referred to each other's policies, and referenced a common understanding pointing to a prior commitment.

d. Schein's Change in Conduct.

While evidence of changed conduct is not required where, as here, the evidence goes beyond parallel conduct,[1517] the evidence of Respondents' changes in conduct also leads to the same conclusion that there was an unlawful agreement. Schein claims that to show change in conduct, Complaint Counsel must prove a "radical" or "abrupt" shift, but again cites *Valspar*, where allegations of conspiracy were based on evidence of parallel conduct. Thus, the plaintiff in *Valspar* relied on plus factors to prove its case.[1518] Not so here.

[1512] *In re Text Messaging Antitrust Litig.*, 782 F.3d 867 (7th Cir. 2015).

[1513] *Text Messaging*, 782 F.3d at 872.

[1514] *Text Messaging*, 782 F.3d at 873.

[1515] *Text Messaging*, 782 F.3d at 872.

[1516] *Text Messaging*, 782 F.3d at 872.

[1517] *See United States v. N.D. Hosp. Ass'n*, 640 F. Supp. 1028, 1036-37 (D.N.D. 1986) (Even though the defendants did not change their preexisting policies after entering into the agreement, the court nonetheless found the existence of an agreement and a meeting of the minds.); *United States v. Champion Int'l Corp.*, 557 F.2d 1270, 1273 (9th Cir. 1977) ("[D]espite the innocent beginnings of the noncompetitive bidding, the trial court found collusion in its continuation."); *see also Bell Atl. Corp. v. Twombly*, 550 U.S. 544, 556 n.4 (2007); *In re Graphics Processing Units Antitrust Litig.*, 540 F. Supp. 2d 1085, 1092-95 (N.D. Cal. 2007) (finding that when allegations of parallel conduct are the basis of a Section 1 claim, plaintiff must allege facts to suggest preceding agreement, such as unprecedented change in behavior).

[1518] *Valspar Corp. v. E.I. Du Pont De Nemours & Co.*, 873 F.3d 185, 194-202 (3d Cir. 2017) (analyzing parallel pricing activity and plus factors in finding no evidence of a price fixing conspiracy).

Nonetheless, there is clear evidence of a change in Schein's conduct. Prior to 2011, Sullivan never instructed Schein's sales force not to work with buying groups, and Schein did not have a no buying group policy. In fact, Sullivan approved buying groups like Smile Source in 2010, even though he was concerned about it leading to a "huge price war," because of the opportunity to gain incremental profits.[1519] Schein analyzed buying groups on an individual basis, which led Schein to several buying group relationships before 2011.[1520] Beginning in 2011, Sullivan and other Schein executives began instructing Schein's sales force to reject buying groups categorically.[1521] In short, Schein's change in conduct throughout 2011 and continuing throughout the conspiracy marked a departure from its prior course of action.

Schein's claims about Schein working with buying groups in 2011 are spurious.[1522] In 2011, Foley wrote "we no longer participate in Buying Groups,"[1523] and the next day, Sullivan instructed Cavaretta not to work with a buying group: "I just met with Tim, Dave and John about the Merit Dent group. As you can imagine they feel the same as we do that we don't want to be the first company to open the floodgates to the dangerous world of GPOs."[1524] Schein erroneously claims that Foley put together a buying group agreement with Dental Partners of Georgia six months after these emails—but the evidence shows that Foley put together an agreement for a DSO that owned and managed practices, not a buying group.[1525]

Schein changed its conduct again, after the conspiracy became difficult to maintain when Benco entered a settlement agreement with the Texas Attorney General in April 2015. This change did not occur overnight, and Complaint Counsel does not contend that the agreement fell

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[1519] CCFF ¶¶ 432-439 (quoting CX2113 at 001). In September 2010, Sullivan explained to his boss, Jim Breslawski, that the benefits of working with buying groups outweighed the risks. CCFF ¶ 432.
[1520] CCFF ¶¶ 432-453.
[1521] *See supra*, Complaint Counsel's Reply to Schein Post-Tr. Br. § II.A.1 ("Schein's Contemporaneous Documents Show that During the Conspiracy Period Sullivan Began to Instruct Schein's Salesforce to Categorically Reject Buying Groups.").
[1522] Schein Post-Tr. Br. at 101-102.
[1523] CCFF ¶ 719 (quoting CX2062 at 001), 720-727, 743-746.
[1524] CCFF ¶ 713 (quoting CX2458 at 001).
[1525] CCRF (Schein) ¶ 678.

apart immediately. Nor does Complaint Counsel allege that Schein began working with all buying groups immediately. However, after the agreement collapsed, Schein no longer enforced or had a policy against buying groups, and Schein began working with buying groups again: including Teeth Tomorrow in 2017, Mastermind Group in 2017, and Klear Impakt in 2015.[1526] It also won back the valuable Smile Source account in 2017.[1527]

C. Independent Business Justifications do not Negate Evidence of Conspiracy.[1528]

Schein argues summarily that the existence of any independent business justification rebuts an inference of conspiracy and that these judgments should never be second-guessed.[1529] That is not the law. Such justifications are no defense to an unlawful conspiracy, and cannot disprove substantial evidence of a conspiracy.[1530] Courts have upheld findings of unlawful agreements, despite independent justifications for the underlying conduct, where the totality of the evidence established an agreement.[1531] In *United States v. General Motors Corp.*, the Supreme Court held that a trial court erred in finding no conspiracy based on evidence that the conspirators were acting to promote their own self-interest, given other evidence of coordinated conduct.[1532] The Court held that, for purposes of determining the existence of an unlawful

[1526] CCFF ¶¶ 1317-1318, 1710-1712.

[1527] CCFF ¶¶ 1319-1320, 1681, 1722-1725.

[1528] Section II.C of Complaint Counsel's Reply Brief responds to arguments in Section III.C of Schein's Post-Trial Brief ("Schein's Evidence Rebuts Any Inference of Conspiracy"); *See* Schein Post-Tr. Br. at 103.

[1529] Schein Post-Tr. Br. at 103.

[1530] *See Standard Oil*, 251 F.2d at 211 (finding conduct that may be explainable as a reasonable business decision is "not excusatory of liability" where there is sufficient evidence to support a finding of a conspiracy); *Domestic Drywall*, 163 F. Supp. 3d at 251.

[1531] *Gen. Motors*, 384 U.S. at 142 ("It is of no consequence, for purposes of determining whether there has been a combination or conspiracy under [Section] 1 of the Sherman Act, that each party acted in its own *Apple*, 791 F.3d at 317-18 ("[T]he fact that Apple's conduct was in its own economic ;
Gainesville, 573 F.2d at 301; *Bond Crown & Cork Co. v. FTC*, 176 F.2d 974, 979 (4th Cir. 1949). (Innocent explanations must not be considered alone, and must be taken together with the entire record.).

[1532] 384 U.S. at 141-43.

agreement, "[i]t is of no consequence . . . that each party acted in its own lawful interest."[1533] Nor does it matter whether the conduct is economically desirable.[1534]

Likewise, in *United States v. Apple, Inc.*, the Second Circuit rejected Apple's claim that there was insufficient evidence of conspiracy because its conduct was consistent with its own independent business interests.[1535] The court endorsed the district court's conclusion that the "context of the entire record" supported a finding that Apple participated in a conspiracy to fix prices, including evidence of its communications with co-conspirators about the agreement.[1536] It held that "the fact that Apple's conduct was in its own economic interest in no way undermines the inference that it entered an agreement to raise e-book prices."[1537] Similarly, in *Gainesville*, the Fifth Circuit upheld a finding that defendants acted pursuant to a conspiracy, despite defendants' claims that they based their conduct on valid economic considerations.[1538] The court held that the communications among competitors were inexplicable if defendants were acting independently.[1539] Moreover, courts have found unlawful agreements where the conduct in question began independently based on unilateral business interests, but later morphed into collusion, confirming that independent justification does not preclude a finding of collusion.[1540]

Thus, here, the assertion of independent business reasons for not discounting to buying groups is no obstacle to proving the existence of an agreement. Additionally, the fact that Respondents' executives communicated with each other about buying groups is fatal to their

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[1533] *Id.* at 142.

[1534] *Id.*

[1535] *United States v. Apple, Inc.*, 791 F.3d 290, 316 (2d Cir. 2015).

[1536] *Id.* at 318-19 ("[T]he emails and phone records demonstrate that Apple *agreed* with the Publisher Defendants, within the meaning of the Sherman Act, to raise consumer-facing ebook prices by

[1537] *Id.* at 317-18.

[1538] 573 F.2d at 300-301.

[1539] *Id.* at 301 ("[I]f solid economic reasons existed for refusing service to these cities, there was no reason for communicating with a competitor about the refusal . . . .").

[1540] *Champion*, 557 F.2d at 1273 ("[D]espite the innocent beginnings of the noncompetitive bidding, the trial court found collusion in its continuation."); *N.D. Hosp.*, 640 F. Supp. at 1036-37, 1039 (finding an agreement among hospitals "to adhere to their independently developed, preexisting policies against granting discounts" to Indian Health Services was nonetheless an unreasonable restraint where "[t]he effect of defendants' agreement was to foreclose any potential competition").

claim of independent action. Competitor communications about not discounting to buying groups, followed by a refusal to discount, is the antithesis of independent action. Executives from each Respondent admitted that they had no business reason for these communications.[1541] If Respondents' executives had been acting according to their own independent interests, there would have been no need to discuss with a competitor whether to discount to buying groups.[1542]

IV. REMEDY.

Schein, like Patterson, argues that even if Complaint Counsel establishes that Respondents entered into an unlawful agreement, injunctive relief is improper because there is no cognizable danger of reoccurrence. Schein cites no case law in support of its position. Regardless, this argument is inconsistent with clear legal authority holding that termination of alleged infringing conduct does not warrant dismissal for mootness.[1543] It is not a defense to liability.[1544] Further, the Orders that led to the collapse of Respondents' agreement are either no longer in effect or are reaching the end of its term. Respondents' conspiracy began to fall apart after Benco's settlement with the Texas Attorney General, which required it to log communications with competitors about buying groups.[1545] Patterson and Schein entered similar stipulated agreements in 2018 and 2017, respectively.[1546] The orders have now expired for Benco and Patterson.[1547] Moreover, Schein's obligations under the order terminates in August 2019.[1548] Absent an injunction in this case, nothing would prevent Respondents from reverting

[1541] CCFF ¶¶ 1078, 1167-1172.

[1542] *See Gainesville*, 573 F.2d at 301 ("[I]f solid economic reasons existed for refusing service to these

[1543] *See FTC v. Goodyear Tire & Rubber Co.*, 304 U.S. 257, 260 (1938) ("Discontinuance of the practice which the Commission found to constitute a violation of the Act did not render the controversy moot.").

[1544] *See In re Sears, Roebuck & Co.*, Docket No. 9104, 1980 WL 338970, at *86 (FTC Apr. 28, 1980) (Comm'n Op.) ("Courts have recognized that discontinuance of an offending practice is neither a defense to liability, nor grounds for omission of an order.").

[1545] CCFF ¶¶ 1160-1161; *see also* CCFF ¶ 1162 (The 2015 Benco Final Judgment also permanently enjoined Benco from communicating with, or agreeing with, competitors about refusing to sell dental supplies to any third party.).

[1546] CCFF ¶¶ 1163-1164.

[1547] CCFF ¶¶ 1160-1161, 1164.

[1548] CCFF ¶ 1163.

to the very conduct that led to the unlawful agreement. Thus, Complaint Counsel seeks a pragmatic but effective order necessitated by Respondents' illegal conduct.[1549]

Schein also claims that Complaint Counsel's proposed relief is overly broad,[1550] but as discussed in Complaint Counsel's Post-Trial Brief, this Court is empowered to develop a remedy to prohibit Respondents from engaging in unlawful conduct upon a finding that Respondents violated Section 5 of the FTC Act. The Remedy Complaint Counsel seeks is proper and warranted under the law.[1551]

Respectfully submitted,

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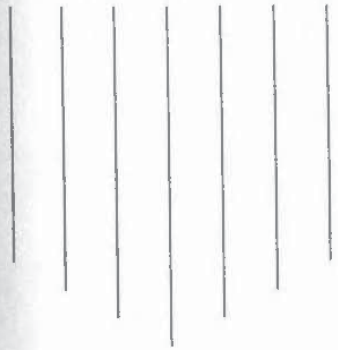
[1549] *See* Complaint Counsel's Post-Tr. Br. at 106-111.
[1550] Schein Post-Tr. Br. at 104.
[1551] *See* Complaint Counsel's Post-Tr. Br. § VI.

ATTACHMENT A

The Seven Pillars of Statistical Wisdom

STEPHEN M. STIGLER

THE SEVEN PILLARS OF STATISTICAL WISDOM



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To my grandchildren,
Ava and Ethan

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CONTENTS

INTRODUCTION

WHAT IS STATISTICS? THIS QUESTION WAS ASKED AS EARLY AS 1838—in reference to the Royal Statistical Society—and it has been asked many times since. The persistence of the question and the variety of answers that have been given over the years are themselves remarkable phenomena. Viewed together, they suggest that the persistent puzzle is due to Statistics not being only a single subject. Statistics has changed dramatically from its earliest days to the present, shifting from a profession that claimed such extreme objectivity that statisticians would only gather data—not analyze them—to a profession that seeks partnership with scientists in all stages of investigation, from planning to analysis. Also, Statistics presents different faces to different sciences: In some

applications, we accept the scientific model as derived from mathematical theory; in some, we construct a model that can then take on a status as firm as any Newtonian construction. In some, we are active planners and passive analysts; in others, just the reverse. With so many faces, and the consequent challenges of balance to avoid missteps, it is no wonder that the question, "What is Statistics?" has arisen again and again, whenever a new challenge arrives, be it the economic statistics of the 1830s, the biological questions of the 1930s, or the vaguely defined "big data" questions of the present age.

With all the variety of statistical questions, approaches, and interpretations, is there then no core science of Statistics? If we are fundamentally dedicated to working in so many different sciences, from public policy to validating the discovery of the Higgs boson, and we are sometimes seen as mere service personnel, can we really be seen in any reasonable sense as a unified discipline, even as a science of our own? This is the question I wish to address in this book. I will not try to tell you what Statistics is or is not; I will attempt to formulate seven principles, seven pillars that have supported our field in different ways in the past and promise to do so into the indefinite future. I will try to convince you that each of these was revolutionary when introduced, and each remains a deep and important conceptual advance.

My title is an echo of a 1926 memoir, *Seven Pillars of Wisdom*, by T. E. Lawrence, Lawrence of Arabia.[1] Its relevance comes from Lawrence's own source, the Old Testament's Book of Proverbs 9:1, which reads, "Wisdom hath built her house, she hath hewn out her seven pillars." According to Proverbs, Wisdom's house was constructed to welcome those seeking understanding; my version will have an additional goal: to articulate the central intellectual core of statistical reasoning.

In calling these seven principles the Seven Pillars of Statistical Wisdom, I hasten to emphasize that these are seven *support* pillars—the disciplinary foundation, not the whole edifice, of Statistics. All seven have ancient origins, and the modern discipline has constructed its many-faceted science upon this structure with great ingenuity and with a constant supply of exciting new ideas of splendid promise. But without taking away from that modern work, I hope to articulate a unity at the core of Statistics both across time and between areas of application.

The first pillar I will call Aggregation, although it could just as well be given the nineteenth-century name, "The Combination of Observations," or even reduced to the simplest example, taking a mean. Those simple names are misleading, in that I refer to an idea that is now old but was truly revolutionary in an earlier day—and it still is so today, whenever it reaches into a new area of application. How is it

revolutionary? By stipulating that, given a number of observations, you can actually gain information by throwing information away! In taking a simple arithmetic mean, we discard the individuality of the measures, subsuming them to one summary. It may come naturally now in repeated measurements of, say, a star position in astronomy, but in the seventeenth century it might have required ignoring the knowledge that the French observation was made by an observer prone to drink and the Russian observation was made by use of an old instrument, but the English observation was by a good friend who had never let you down. The details of the individual observations had to be, in effect, erased to reveal a better indication than any single observation could on its own.

The earliest clearly documented use of an arithmetic mean was in 1635; other forms of statistical summary have a much longer history, back to Mesopotamia and nearly to the dawn of writing. Of course, the recent important instances of this first pillar are more complicated. The method of least squares and its cousins and descendants are all averages; they are weighted aggregates of data that submerge the identity of individuals, except for designated covariates. And devices like kernel estimates of densities and various modern smoothers are averages, too.

The second pillar is Information, more specifically Information Measurement, and it also has a long and interesting intellectual history. The question of when we have enough

evidence to be convinced a medical treatment works goes back to the Greeks. The mathematical study of the rate of information accumulation is much more recent. In the early eighteenth century it was discovered that in many situations the amount of information in a set of data was only proportional to the square root of the number n of observations, not the number n itself. This, too, was revolutionary: imagine trying to convince an astronomer that if he wished to double the accuracy of an investigation, he needed to quadruple the number of observations, or that the second 20 observations were not nearly so informative as the first 20, despite the fact that all were equally accurate? This has come to be called the root-n rule; it required some strong assumptions, and it required modification in many complicated situations. In any event, the idea that information in data could be measured, that accuracy was related to the amount of data in a way that could be precisely articulated in some situations, was clearly established by 1900.

By the name I give to the third pillar, Likelihood, I mean the calibration of inferences with the use of probability. The simplest form for this is in significance testing and the common P-value, but as the name "Likelihood" hints, there is a wealth of associated methods, many related to parametric families or to Fisherian or Bayesian inference. Testing in one form or another goes back a thousand years or more, but some of the earliest tests to use probability were in the early

eighteenth century. There were many examples in the 1700s and 1800s, but systematic treatment only came with the twentieth-century work of Ronald A. Fisher and of Jerzy Neyman and Egon S. Pearson, when a full theory of likelihood began serious development. The use of probability to calibrate inference may be most familiar in testing, but it occurs everywhere a number is attached to an inference, be it a confidence interval or a Bayesian posterior probability. Indeed, Thomas Bayes's theorem was published 250 years ago for exactly that purpose.

The name I give the fourth pillar, Intercomparison, is borrowed from an old paper by Francis Galton. It represents what was also once a radical idea and is now commonplace: that statistical comparisons do not need to be made with respect to an exterior standard but can often be made in terms interior to the data themselves. The most commonly encountered examples of intercomparisons are Student's *t*-tests and the tests of the analysis of variance. In complex designs, the partitioning of variation can be an intricate operation and allow blocking, split plots, and hierarchical designs to be evaluated based entirely upon the data at hand. The idea is quite radical, and the ability to ignore exterior scientific standards in doing a "valid" test can lead to abuse in the wrong hands, as with most powerful tools. The bootstrap can be thought of as a modern version of intercomparison, but with weaker assumptions.

I call the fifth pillar Regression, after Galton's revelation of 1885, explained in terms of the bivariate normal distribution. Galton arrived at this by attempting to devise a mathematical framework for Charles Darwin's theory of natural selection, overcoming what appeared to Galton to be an intrinsic contradiction in the theory: selection required increasing diversity, in contradiction to the appearance of the population stability needed for the definition of species.

The phenomenon of regression can be explained briefly: if you have two measures that are not perfectly correlated and you select on one as extreme from its mean, the other is expected to (in standard deviation units) be less extreme. Tall parents on average produce somewhat shorter children than themselves; tall children on average have somewhat shorter parents than themselves. But much more than a simple paradox is involved: the really novel idea was that the question gave radically different answers depending upon the way it was posed. The work in fact introduced modern multivariate analysis and the tools needed for any theory of inference. Before this apparatus of conditional distributions was introduced, a truly general Bayes's theorem was not feasible. And so this pillar is central to Bayesian, as well as causal, inference.

The sixth pillar is Design, as in "Design of Experiments," but conceived of more broadly, as an ideal that can discipline our thinking in even observational settings. Some elements of design are extremely old. The Old Testament and early

Arabic medicine provide examples. Starting in the late nineteenth century, a new understanding of the topic appeared, as Charles S. Peirce and then Fisher discovered the extraordinary role randomization could play in inference. Recognizing the gains to be had from a combinatorial approach with rigorous randomization, Fisher took the subject to new levels by introducing radical changes in experimentation that contradicted centuries of experimental philosophy and practice. In multifactor field trials, Fisher's designs not only allowed the separation of effects and the estimation of interactions; the very act of randomization made possible valid inferences that did not lean on an assumption of normality or an assumption of homogeneity of material.

I call the seventh and final pillar Residual. You might suspect this is an evasion, "residual" meaning "everything else." But I have a more specific idea in mind. The notion of residual phenomena was common in books on logic from the 1830s on. As one author put it, "Complicated phenomena . . . may be simplified by subducting the effect of known causes, . . . leaving . . . a *residual phenomenon* to be explained. It is by this process . . . that science . . . is chiefly promoted."[2] The idea, then, is classical in outline, but the use in Statistics took on a new form that radically enhances and disciplines the method by incorporating structured families of models and employing the probability calculus and statistical logic to

decide among them. The most common appearances in Statistics are our model diagnostics (plotting residuals), but more important is the way we explore high-dimensional spaces by fitting and comparing nested models. Every test for significance of a regression coefficient is an example, as is every exploration of a time series.

At serious risk of oversimplification, I could summarize and rephrase these seven pillars as representing the usefulness of seven basic statistical ideas:

1. The value of targeted reduction or compression of data
2. The diminishing value of an increased amount of data
3. How to put a probability measuring stick to what we do
4. How to use internal variation in the data to help in that
5. How asking questions from different perspectives can lead to revealingly different answers
6. The essential role of the planning of observations
7. How all these ideas can be used in exploring and comparing competing explanations in science

But these plain-vanilla restatements do not convey how revolutionary the ideas have been when first encountered,

both in the past and in the present. In all cases they have pushed aside or overturned firmly held mathematical or scientific beliefs, from discarding the individuality of data values, to downweighting new and equally valuable data, to overcoming objections to any use of probability to measure uncertainty outside of games of chance. And how can the variability interior to our data measure the uncertainty about the world that produced it? Galton's multivariate analysis revealed to scientists that their reliance upon rules of proportionality dating from Euclid did not apply to a scientific world in which there was variation in the data—overthrowing three thousand years of mathematical tradition. Fisher's designs were in direct contradiction to what experimental scientists and logicians had believed for centuries; his methods for comparing models were absolutely new to experimental science and required a change of generations for their acceptance.

As evidence of how revolutionary and influential these ideas all were, just consider the strong push-back they continue to attract, which often attacks the very aspects I have been listing as valued features. I refer to:

Complaints about the neglect of individuals, treating people as mere statistics

Implied claims that big data can answer questions on the basis of size alone

Denunciations of significance tests as neglectful of the science in question

Criticisms of regression analyses as neglecting important aspects of the problem

These questions are problematic in that the accusations may even be correct and on target in the motivating case, but they are frequently aimed at the method, not the way it is used in the case in point. Edwin B. Wilson made a nice comment on this in 1927. He wrote, "It is largely because of lack of knowledge of what statistics is that the person untrained in it trusts himself with a tool quite as dangerous as any he may pick out from the whole armamentarium of scientific methodology."[3]

The seven pillars I will describe and whose history I will sketch are fine tools that require wise and well-trained hands for effective use. These ideas are not part of Mathematics, nor are they part of Computer Science. They are centrally of Statistics, and I must now confess that while I began by explicitly denying that my goal was to explain what Statistics is, I may by the end of the book have accomplished that goal nonetheless.

I return briefly to one loose end: What exactly does the passage in Proverbs 9:1 mean? It is an odd statement: "Wisdom hath built her house, she hath hewn out her seven pillars." Why would a house require seven pillars, a seemingly

unknown structure in both ancient and modern times? Recent research has shown, I think convincingly, that scholars, including those responsible for the Geneva and King James translations of the Bible, were uninformed on early Sumerian mythology and mistranslated the passage in question in the 1500s. The reference was not to a building structure at all; instead it was to the seven great kingdoms of Mesopotamia before the flood, seven kingdoms in seven cities founded on principles formulated by seven wise men who advised the kings. Wisdom's house was based upon the principles of these seven sages. A more recent scholar has offered this alternative translation: "Wisdom has built her house, The seven have set its foundations."[4]

Just so, the seven pillars I offer are the fruit of efforts by many more than seven sages, including some whose names are lost to history, and we will meet a good selection of them in these pages.

CHAPTER 1

AGGREGATION

From Tables and Means to Least Squares

THE FIRST PILLAR, AGGREGATION, IS NOT ONLY THE OLDEST; it is also the most radical. In the nineteenth century it was referred to as the "combination of observations." That phrase was meant to convey the idea that there was a gain in information to be had, beyond what the individual values in a data set tell us, by combining them into a statistical summary. In Statistics, a summary can be more than a collection of parts. The sample mean is the example that received the earliest technical focus, but the concept includes other summary presentations, such as weighted means and even the method of least squares, which is at bottom a weighted or adjusted average, adjusting for some of the other characteristics of individual data values.

The taking of a mean of any sort is a rather radical step in an analysis. In doing this, the statistician is discarding information in the data; the individuality of each observation is lost: the order in which the measurements were taken and the differing circumstances in which they were made, including the identity of the observer. In 1874 there was a much-anticipated transit of Venus across the face of the sun, the first since 1769, and many nations sent expeditions to places thought to be favorable for the viewing. Knowing the exact time from the beginning to the end of the transit across the sun could help to accurately determine the dimensions of the solar system. Were numbers reported from different cities really so alike that they conld be meaningfully averaged? They were made with different equipment by observers of different skills at the slightly different times the transit occurred at different locations. For that matter, are successive observations of a star position made by a single observer, acutely aware of every tremble and hiccup and distraction, sufficiently alike to be averaged? In ancient and even modern times, too much familiarity with the circumstances of each observation could undermine intentions to combine them. The strong temptation is, and has always been, to select one observation thought to be the best, rather than to corrupt it by averaging with others of suspected lesser value.

Even after taking means had become commonplace, the thought that discarding information can increase information has not always been an easy sell. When in the 1860s William Stanley Jevons proposed measuring changes in price level by an index number that was essentially an average of the percent changes in different commodities, critics considered it absurd to average data on pig iron and pepper. And once the discourse shifted to individual commodities, those investigators with detailed historical knowledge were tempted to think they could "explain" every movement, every fluctuation, with some story of why that particular event had gone the way it did. Jevons's condemnation of this reasoning in 1869 was forceful: "Were a complete explanation of each fluctuation thus necessary, not only would all inquiry into this subject be hopeless, but the whole of the statistical and social sciences, so far as they depend upon numerical facts, would have to be abandoned."[1] It was not that the stories told about the data were false; it was that they (and the individual peculiarities in the separate observations) had to be pushed into the background. If general tendencies were to be revealed, the observations must be taken as a set; they must be combined.

Jorge Luis Borges understood this. In a fantasy short story published in 1942, "Funes the Memorious," he described a man, Ireneo Funes, who found after an accident that he could

remember absolutely everything. He could reconstruct every day in the smallest detail, and he could even later reconstruct the reconstruction, but he was incapable of understanding. Borges wrote, "To think is to forget details, generalize, make abstractions. In the teeming world of Funes there were only details."[2] Aggregation can yield great gains above the individual components. Funes was big data without Statistics.

When was the arithmetic mean first used to summarize a data set, and when was this practice widely adopted? These are two very different questions. The first may be impossible to answer, for reasons I will discuss later; the answer to the second seems to be sometime in the seventeenth century, but being more precise about the date also seems intrinsically difficult. To better understand the measurement and reporting issues involved, let us look at an interesting example, one that includes what may be the earliest published use of the phrase "arithmetical mean" in this context.

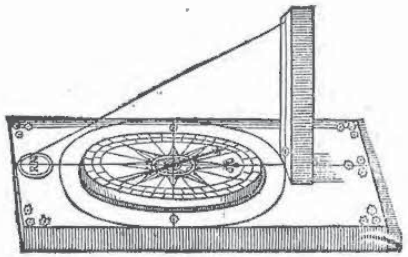
Variations of the Needle

By the year 1500, the magnetic compass or "needle" was firmly established as a basic tool of increasingly adventurous mariners. The needle could give a reading on magnetic north in any place, in any weather. It was already well known a century earlier that magnetic north and true north differed, and by 1500 it was also well known that the difference between true and magnetic north varied from place to place, often by considerable amounts—10° or more to the east or to the west. It was at that time believed this was due to the lack of magnetic attraction by the sea and the consequent bias in the needle toward landmasses and away from seas. The correction needed to find true north from a compass was called the variation of the needle. Some navigational maps of that period would mark the known size of this correction at key locations, such as in straits of passage and near landmarks visible from sea, and mariners had confidence in these recorded deviations. William Gilbert, in his classic book on terrestrial magnetism published in 1600, *De Magnete*, reported that the constancy of the variation at each location could be counted on as long as the earth was stable: "As the needle ever inclined toward east or toward west, so even now does the arc of variation continue to be the same in whatever place or region, be it sea or continent; so too, will it be forevermore unchanging, save there should be a great break-up of a continent and annihilation of countries, as the region Atlantis, whereof Plato and ancient writers tell."[3]

Alas, the mariners and Gilbert's confidence was misplaced. In 1635, Henry Gellibrand compared a series of determinations of the variation of the needle at the same London location at times separated by more than fifty years, and he found that the variation had changed by a considerable amount.[4] The correction needed to get true north had been

11° east in 1580, but by 1634 this had diminished to about 4° east. These early measurements were each based upon several observations, and a closer look at them shows how the observers were separately and together groping toward a use of the arithmetic mean, but never clearly getting there.

The best recorded instance of these early determinations of the variation of the needle was published by William Borough in 1581 in a tract entitled *A Discours of the Variation of the Cumpas, or Magneticall Needle.*[5] In chapter 3 he described a method to determine a value for the variation without detailed preliminary knowledge of the direction of true north at one's location, and he illustrated its use at Limehouse, in the Docklands at the East End of London, not far from the Greenwich Meridian. He suggested making careful observations of the sun's elevation with an astrolabe (essentially a brass circle marked with a scale in degrees, to be suspended vertically while the sun was observed with a finder scope and its elevation noted). Every time the sun reached a new degree of elevation in ascent before noon and in descent after noon, Borough would take a reading of the deviation of the sun from magnetic north by noting and recording the direction of a shadow of a wire on his magnetic compass's face. The sun's maximum elevation should be achieved when the sun is at the meridian, when it was at true north (see Figure 1.1).



1.1 The compass used by Borough. The vertical column is at the north end of the compass, which is marked by a fleur-de-lis. The initials R. N. are those of Robert Norman, to whose book Borough's tract was appended. The "points" of the compass he refers to in the text are not the eight points as shown but the division lines dividing each of their gaps into four parts and thus dividing the circle into 32 parts, each 11° 15′ in size. *(Norman 1581)*

Borough would consider each pair of recorded compass observations made at the same elevation of the sun, one in the morning (Fornoone in Figure 1.2, also designated AM below) and one in the afternoon (Afternoone, designated PM below). On the one hand, if true and magnetic north agree at Limehouse, that common value should be (nearly) the midpoint between the two measurements, since the sun travels a symmetrical arc with the maximum at the meridian ("high noon"). On the other hand, if magnetic north is 10° east of true north, then the morning shadow should be 10° farther west and the afternoon shadow likewise. In either case the average of the two should then give the

¶ *In Limehouſe the ſixteenth of October. Anno,1580.*

Fornoone.			Afternoone.			
Elevation of the Sunne.	*Variation of the ſhadow from the North of the Needle to the weſtwards.*		*Elevation of the Sunne.*	*Variation of the ſhadow from the North of the Needle to the Eaſtwards.*		*Variation of the Needle from the Pole or Axis.*
Deg.	Degr.	Min.	Deg.	D.	M.	D. M.
17	52	35	17	30	0	11 17 ½
18	50	8	18	27	45	11 11 ¼
19	47	30	19	24	30	11 30
20	45	0	20	22	15	11 22 ½
21	42	15	21	19	30	11 22 ½
22	38	0	22	15	30	11 15
23	34	40	23	12	0	11 20
24	29	35	24	7	0	11 17
25	22	20	25	Fró N.to w. 0.8'		11 14

1.2 Borough's 1580 data for the variation of the needle at Limehouse, near London. *(Norman 1581)*

variation of the needle. Borough's table of data for October 16, 1580, is presented in Figure 1.2.

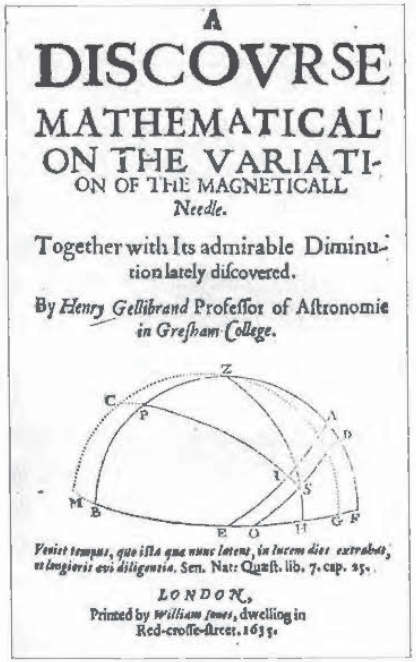
He had data for nine pairs, taken at elevations from 17° to 25° with the morning variations (given in westward degrees) and afternoon variations (given in eastward degrees, so opposite in sign to the morning, except for the 25° afternoon measure, which was slightly westward). Because of the different signs in the morning and afternoon, the variations in the right-hand column are found as the difference of the variations divided by 2. For the pair taken at sun's elevation 23° we have

$$\begin{aligned}(\mathrm{AM}+\mathrm{PM})/2 &= (34°\,40' + (-12°\,0'))/2\\ &= (34°\,40' - 12°\,0')/2\\ &= (22°\,40')/2 = 11°\,20'.\end{aligned}$$

The nine determinations are in quite good agreement, but they are not identical. How could Borough go about determining a single number to report? In a pre-statistical era, the need to report data was clear, but as there was no agreed upon set of summary methods, there was no need to describe summary methods—indeed, there was no precedent to follow. Borough's answer is simple: referring to the right hand column, he writes, "conferring them all together, I do finde the true variation of the Needle or Cumpas at Lymehouse to be about 11 d. ¼, or 11 d. ⅓, whiche is a poinct of the Cumpas just or a little more." His value of 11 d. 15 m. (11° 15') does not correspond to any modern summary measure—it is smaller than the mean, median, midrange, and mode. It agrees with the value for 22° elevation, and could have been so chosen—but then why also give 11 d. 20 m., the figure for 23° elevation? Or perhaps he rounded to agreement with "one point of the compass," that is, the 11 d. 15 m. distance between each of the 32 points of the compass? Regardless, it is clear Borough did not feel the necessity for a formal compromise. He could take a mean of two values from morning and afternoon at the same

elevation, but that was a clever way of using contrasting observations to arrive at a result, not a combination of essentially equivalent observations. That average was a "before minus after" contrast.

In 1634, more than half a century later, the Gresham College professor of astronomy Gellibrand revisited the problem (see Figure 1.3). Twelve years earlier, Gellibrand's predecessor at Gresham, Edmund Gunter, had repeated Borough's experiment at Limehouse and made eight determinations of the variation in the needle, with results ranging around 6°, quite different from Borough's 11¼. Gunter was an excellent observer, but he lacked the imagination to see this as a discovery, attributing the discrepancy between his results and Borough's to errors by Borough. Gellibrand had too high an opinion of Borough to endorse that view, writing with regret that "this great discrepance [has] moved some of us to be overhasty in casting an aspersion of error on Mr Burrows observations (though since upon noe just grounds)."[6] Gellibrand did try adjusting Borough's figures for the parallax of the sun using a method he attributed to Tycho Brahe that had not been available to Borough, but the effect was negligible (for example, Borough's value for 20 d. elevation, namely 11 d. 22½ m., became about 11 d. 32½ m.). Gellibrand then set about making his own observations with fancy new equipment (including a six-foot quadrant instead of


A
DISCOVRSE
MATHEMATICAL
ON THE VARIATI-
ON OF THE MAGNETICALL
Needle.
Together with Its admirable Diminu-
tion lately discovered.
By Henry Gellibrand Profeſſor of Aſtronomie
in Greſham College.
Venit tempus, quo iſta quæ nunc latent, in lucem dies extrahat,
& longioris ævi diligentia. Sen. Nat: Quæſt. lib. 7. cap. 25.
LONDON,
Printed by William Jones, dwelling in
Red-croſſe-ſtreet. 1635.

1.3 The title page of Gellibrand's tract. *(Gellibrand 1635)*

an astrolabe) at Deptford, just south of the Thames from (and at the same longitude as) Limehouse.

On June 12, 1634, using methods based upon Brahe's tables, Gellibrand made eleven separate determinations of the variation of the needle: five before noon and six after noon (see Figure 1.4). The largest was 4° 12'; the smallest was 3° 55'. He summarized as follows:

Obſervations made at Diepford An. 1634 Junij 12 before Noone

Alt: ⊙ vera		*Azim: Mag*		*Azim. ⊙*		*variatio*	
Gr.	Min.	Gr.	M.	Gr.	M,	Gr.	M.
44,	45.	106,	0	110	6	4.	6
46,	30,	109,	0	113	10	4,	10
48,	31,	113,	0	117	1	4.	1
50,	54,	118	0	122,	3	4.	3
54,	24,	127	0	130	55	3	55

After Noone the ſame day.

Alt. ⊙ vera		*Azi. Mag*		*Azim. ⊙*		*Variation*	
Gr.	Min.	Gr:	M.	G,	Mn.	Gr,	Min
44	37	114:	0	109.	53.	4:	7
40	48	108:	0	103,	50	4:	10
38	46	105.	0	100,	48	4.	12
36	43	102,	0	97.	56	4.	4
34	32	99,	0	95,	0	4:	0
32	10	96:	0	91.	55	4:	5

These Concordant Obſervations can not produce a variation greater then 4 gr. 12 min. nor leſſe then 3 gr. 55 min. the Arithmeticall meane limiting it to 4 gr. and about 4 minutes.

1.4 *(above and below)* Gellibrand's data and the appearance of "Arithmeticall meane." *(Gellibrand 1635)*

These Concordant Observations can not produce a variation greater than 4 gr. 12 min. nor lesse than 3 gr. 55 min. the Arithmeticall meane limiting it to 4 gr. and about 4 minutes.[7] ["gr." here simply refers to "degree", the unit of the "graduated" scale at that time. In the 1790s a French revolutionary scale would use "gr." for "grad" to mean $\frac{1}{100}$ of a right angle.]

The "meane" Gellibrand reports, then, is not the arithmetic mean of all eleven; that would be 4° 5′. Instead he gives the mean of the largest and smallest, what later statisticians would call a midrange. As such it is not remarkable. While it is an arithmetic mean of two observations, there is scarcely any other way of effecting a compromise between two values. There were in fact several earlier astronomers who had done this or something similar when confronted with two values and in need of a single value—certainly Brahe and Johannes Kepler in the early 1600s, and possibly al-Biruni ca. 1000 CE. What was new with Gellibrand's work was the terminology—he gives a name to the method used. The name had been known to the ancients, but, as far as is now known, none of them had felt it useful or necessary to actually use the name in their written work.

A later sign that the statistical analysis of observations had really entered into a new phase was a short note in the *Transactions of the Royal Society* in 1668, also on the variation of the needle. There, the editor, Henry Oldenburg, printed an extract from a letter from a "D. B." that gave five values for the variation at a location near Bristol (see Figure 1.5).

An Extract
Of a Letter, written by D. B. *to the Publisher, concerning the present* Declination *of the* Magnetick Needle, *and the* Tydes, *May* 23. 1668.

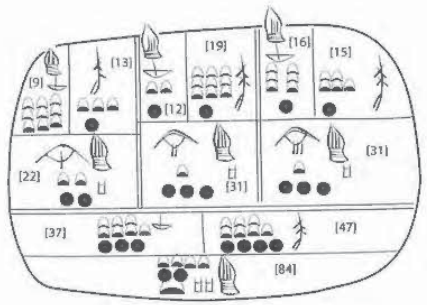
SIr, I here present you with a Scheme of the *Magnetical Variations*, as it was sent me by Capt. *Samuel Sturmy*, an experienced Seaman, and a Commander of a Merchant Ship for many years; who (as he assures me) took the Observations himself in the presence of Mr. *Staynred*, an antient Mathematician, & others, in *Rownham*-Meadowes by the water-side, in some such approach, I think, to *Bristol*, as *Lime-house* or the Fields adjoyning are to *London*. This (as the *Table* shews) was taken *June* 13. 1666. They observed again in the same day of the next year, *viz.*, *June* 13. 1667; and then they found the Variation increas'd about 6. minutes *Westerly*.

Observed June 13. 1668.

Sun's Observ'd Altitude.		Magnetical Azimuth.		Suns true Azimuth.		Variat. Westerly.	
Gr.	M.	Gr.	M.	Gr.	M.	G.	M.
44	20	72	00	70	38	1	22
39	30	80	00	78	24	1	36
31	50	90	00	88	26	1	34
27	42	95	00	93	36	1	24
23	20	103	00	101	23	1	23

1.5 The opening passage of D. B.'s letter. *(D. B. 1668)*

D. B. reports Captain Sturmy's summary: "In taking this *Table* he notes the greatest distance or difference to be 14 minutes; and so taking the *mean* for the true *Variation*, he concludes it *then* and *there* to be just 1 deg. 27 min. *viz. June* 13 1666."[8] While the true mean is 1°27.8' and Captain Sturmy (or the mathematician Staynred) rounded down, it is in any event clear that the arithmetic mean had arrived by the last third of that century and been officially recognized as a method for combining observations. The date of birth may never be known, but the fact of birth seems undeniable.



1.6 A reconstruction of a ca. 3000 BCE Sumerian tablet, with modern numbers added. *(Reconstruction by Robert K. Englund; from Englund 1998, 63)*

Aggregation in Antiquity

Statistical summaries have a history as long as that of writing. Figure 1.6 is a reconstruction of a Sumerian clay tablet dating from about 3000 BCE—nearly the dawn of writing—shown to me by a colleague, Chris Woods, at the Oriental Institute at the University of Chicago.

The tablet presents what amounts to a 2×3 contingency table, showing counts of two types of a commodity, possibly the yields of two crops over three years (with modern numbers added).[9] The top row shows the six cells, with commodity symbols above the respective counts. In the second row are the year or column totals, in the third row are the two crop row totals, and the grand total is at the

	Year 1	Year 2	Year 3	Total
Crop A	9	12	16	37
Crop B	13	19	15	47
Total	22	31	31	84

bottom. We would today arrange the numbers differently, as the table shows.

The statistical analysis has not survived, but we can be certain it did not include a chi-square test. What we can say is that the tablet shows a high level of statistical intelligence for its time, but it does not move far away from the individual data values: not only does the body of the table show all the crop-per-year counts, the back side of the tablet gives the raw data upon which these counts were based—the individual producer numbers. Even five thousand years ago some people felt it useful to publish the raw data!

But when did the scientific analysis of statistical data begin? When did the use of the arithmetic mean become a formal part of a statistical analysis? Was it really not much before the seventeenth century? Why was the mean not used to combine observations in some earlier era—in astronomy, surveying, or economics? The mathematics of a mean was certainly known in antiquity. The Pythagoreans knew already in 280 BCE of three kinds of means: the arithmetic, the

geometric, and the harmonic. And by 1000 CE the philosopher Boethius had raised that number to at least ten, including the Pythagorean three. To be sure, these means were deployed in philosophical senses, in discussing proportions between line segments, and in music, not as data summaries.

Surely we might expect the Greeks or the Romans or the Egyptians to have taken means of data in day-to-day life more than two millennia ago. Or, if they did not, surely the mean may be found in the superb astronomical studies of Arabic science a thousand years ago. But diligent and far-ranging searches for even one well-documented example from those sources have come up empty.

The most determined seeker of an early use of the mean was the indefatigable researcher Churchill Eisenhart, who spent most of his professional career at the National Bureau of Standards. Over several decades he pursued historical uses of the mean, and he summarized his researches in his presidential address to the American Statistical Association in 1971.[10] His enthusiasm carried the address to nearly two hours, but for all that effort, the earliest documented uses of the mean he found were those I have already mentioned by D. B. and Gellibrand. Eisenhart found that Hipparchus (ca. 150 BCE) and Ptolemy (ca. 150 CE) were silent on their statistical methods; al-Biruni (ca. 1000 CE) gave nothing

closer to a mean than using the number produced by splitting the difference between a minimum and a maximum. The mean occurred in practical geometry in India quite early; Brahmagupta, in a tract on mensuration written in 628 CE, suggested approximating the volume of irregular excavations using that of the rectangular solid with the excavation's mean dimensions.[11]

Over all these years, the historical record shows that data of many types were collected. In some cases, inevitably, summaries would be needed; if the mean was not used, what did people do in order to summarize, to settle on a single figure to report? Perhaps we can get a better idea of how this question was seen in pre-statistical times by looking at a few examples where something similar to a mean was employed.

One story told by Thucydides involved siege ladders and dates to 428 BCE:

> Ladders were made to match the height of the enemy's wall, which they measured by the layers of bricks, the side turned towards them not being thoroughly whitewashed. These were counted by many persons at once; and though some might miss the right calculation, most would hit upon it, particularly as they counted over and over again, and were no great way from the wall, but could see it easily enough for their purpose. The length required for the ladders was thus obtained, being calculated from the breadth of the brick.[12]

Thucydides described the use of what we can recognize as the mode—the most frequently reported value. With the expected lack of independence among counts, the mode is not particularly accurate, but if the reports were tightly clustered it was likely as good as any other summary. Thucydides did not give the data.

Another, much later example dates from the early 1500s and is reported by Jacob Köbel in a finely illustrated book on surveying. As Köbel tells us, the basic unit of land measure in those times was the rod, defined as sixteen feet long. And in those days a foot meant a real foot, but whose foot? Surely not the king's foot, or each change of monarch would require a renegotiation of land contracts. The solution Köbel reports was simple and elegant: sixteen representative citizens (all male in those days) would be recruited after a church service and asked to stand in a line, toe to heel, and the sixteen-foot rod would be the length of that line. Köbel's picture, etched by himself, is a masterpiece of explanatory art (see Figure 1.7).[13]

It was truly a community rod! And, after the rod was determined, it was subdivided into sixteen equal sections, each representing the measure of a single foot, taken from the

1.7 Köbel's depiction of the determination of the lawful rod. *(Köbel 1522)*

communal rod. Functionally, this was the arithmetic mean of the sixteen individual feet, but nowhere was the mean mentioned.

These two examples, separated by nearly two millennia, involve a common problem: how to summarize a set of similar, but not identical, measurements. The way the problem was dealt with in each situation reflects the intellectual difficulty involved in combination, one that persists today. In antiquity, and in the Middle Ages, when reaching for a summary of diverse data, people chose an individual example. In Thucydides's story, the individual case chosen was the most popular case, the mode. So it was in other instances: the case selected might be a prominent one—for numeric data it could even be a maximum, a record value. Every society has wished to trumpet their best as representing the whole. Or the selected case could be simply an individual or value picked as "best" for reasons not well articulated. In astronomy, the selection of a "best" value could reflect personal knowledge of the observer or the atmospheric conditions for observation. But whatever was done, it amounted to maintaining the individuality of at least one data value. In Köbel's account the emphasis was on the sixteen individual feet; the people in the picture may have even been recognizable at the time. In any event, the idea that the individuals were collectively determining the rod was the forceful point—their identity was not discarded; it was the key to the legitimacy of the rod, even as the separate foot marks were a real average.

The Average Man

By the 1800s, the mean was widely in use in astronomy and geodesy, and it was in the 1830s that it made its way into society more broadly. The Belgian statistician Adolphe Quetelet was at that time crafting the beginnings of what

he would call Social Physics, and, to permit comparisons among population groups, he introduced the Average Man. Originally he considered this as a device for comparing human populations, or a single population over time. The average height of an English population could be compared to that of a French population; the average height at a given age could be followed over time to derive a population growth curve. There was no single Average Man; each group would have its own. And yes, he did focus on men; women were spared this reduction to a single number.[14]

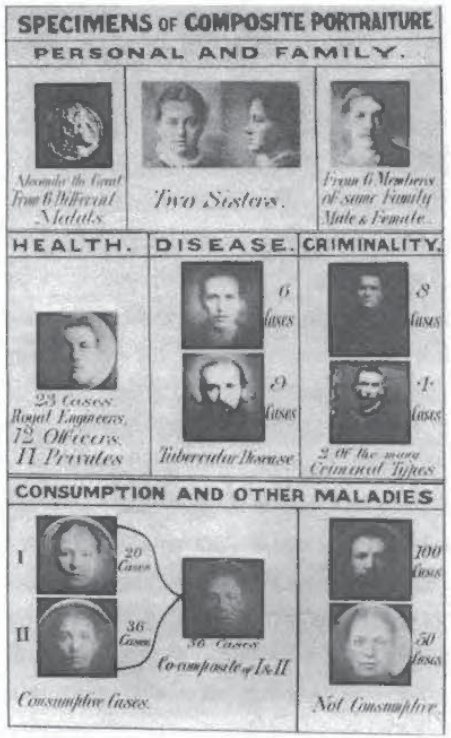
Already in the 1840s a critic was attacking the idea. Antoine Augustin Cournot thought the Average Man would be a physical monstrosity: the likelihood that there would be any real person with the average height, weight, and age of a population was extremely low. Cournot noted that if one averaged the respective sides of a collection of right triangles, the resulting figure would not be a right triangle (unless the triangles were all proportionate to one another).

Another critic was the physician Claude Bernard, who wrote in 1865:

> Another frequent application of mathematics to biology is the use of averages which, in medicine and physiology, leads, so to speak, necessarily to error. . . . If we collect a man's urine during 24 hours and mix all his urine to analyze the average, we get an analysis of a urine that simply does not exist; for urine, when fasting, is different from urine during digestion. A startling instance of this kind was invented by a physiologist who took urine from a railroad station urinal where people of all nations passed, and who believed he could thus present an analysis of average European urine![15]

Quetelet was undeterred by such criticism, and he insisted that the Average Man could serve as a "typical" specimen of a group, capturing the "type," a group representative for comparative analysis. As such, it has been highly successful and often abused. The Average Man and his descendants amount to a theoretical construction that allows some of the methods of physical science to be employed in social science.

In the 1870s, Francis Galton took the idea of a mean a step further, to nonquantitative data. He put considerable time and energy into the construction of what he called "generic images" based upon composite portraiture, where, by superimposing pictures of several members of a group, he essentially produced a picture of the average man or woman in that group (see Figure 1.8).[16] He found that close facial agreement among sisters and other family members permitted a family type to emerge, and he experimented with other groups, producing composites of medals of Alexander the Great (in hopes of revealing a more realistic picture), and of groups of criminals or of people suffering from the same disease.



1.8 Some of Galton's composite portraits. *(Galton 1883)*

Galton practiced restraint in constructing these pictures, and he was well aware of some of the limitations of these generic portraits. As he explained, "No statistician dreams of combining objects of the same generic group that do not cluster towards a common centre; no more should we attempt to compose generic portraits out of heterogeneous elements, for if we do so the result is monstrous and meaningless."[17] Some who followed him were not so cautious. An American scientist, Raphael Pumpelly, took photographs of those attending a meeting of the National Academy of Sciences in April 1884; the following year he published the results. As one example, in Figure 1.9, the images of 12 mathematicians (at the time, the term included astronomers and physicists) are superimposed as a composite picture of an average mathematician.[18] Leaving aside the fact that the composite picture might appear as sinister as those of Galton's criminals, we could note that the combination of images of clean-shaven individuals with a few of those with full beards and several more of those with mustaches produces a type

1.9 Pumpelly's composite portrait of 12 mathematicians. *(Pumpelly 1885)*

that looks more like someone who has been lost in the brush for a week.

Aggregation and the Shape of the Earth

In the mid-1700s, the use of statistical aggregation was expanded to situations where the measurements were made under very different circumstances; indeed, it was forced upon scientists by those circumstances. A prime example of the simplest type is the eighteenth-century study of the shape of the earth. To a good first approximation, the earth is a sphere, but with increases in the precision of navigation and astronomy, questions were bound to appear. Isaac Newton, from dynamical considerations, had suggested the earth was a slightly oblate spheroid (compressed at the poles, expanded at the equator). The French astronomer Domenico Cassini thought it was a prolate spheroid, elongated at the poles. The matter could be settled by comparing measures taken on the ground at different latitudes. At several locations from the equator to the North Pole, a relatively short arc length, A, would be measured, the arc being in a direction perpendicular to the equator, a segment of what was called a meridian quadrant, which would run from the North Pole to the equator. The arc length along the ground would be measured and divided by the difference between latitudes at both ends, so it

was given as arc length per degree latitude. Latitude was found by sight, the angle between the polar North Star and the horizontal. By seeing how this 1° arc varied depending on how far from the equator you were, the question could be settled.[19]

The relation between arc length and latitude for spheroids is given by an elliptic integral, but for short distances (and only relatively short distances were practical to measure), a simple equation sufficed. Let A=the length as measured along the ground of a 1° arc. Let L=the latitude of the midpoint of the arc, again as determined by observation of the polestar, $L=0°$ for the equator, $L=90°$ for the North Pole. Then, to a good approximation you should have $A=z+y\cdot\sin^2 L$ for each short arc measured:

> If the earth were a perfect sphere, $y=0$ and all 1° arcs are the same length z.
>
> If the earth were oblate (Newton) then $y>0$ and the arcs vary from length z at the equator ($\sin^2 0°=0$) to $z+y$ at the North Pole ($\sin^2 90°=1$).
>
> If the earth is prolate (Cassini), $y<0$.

The value y could be thought of as the polar excess (or, if negative, deficiency). The "ellipticity" (a measure of departure from a spherical shape) could be calculated approximately as $e=y/3z$ (a slightly improved approximation $e=y/(3z+2y)$ was sometimes used).

Data were required. The problem sounds easy: measure any two degrees, perhaps one at the equator, and another near Rome. At that time, lengths were measured in Toise, a pre-metric unit where a Toise is about 6.39 feet. A degree of latitude was about 70 miles in length, too large to be practical, so a shorter distance would be measured and extrapolated. A French expedition in 1736 by Pierre Bouguer took measurements near Quito in what is now Ecuador, where it was feasible to measure relatively long distances near the equator in a north–south direction, and he reported a length $A=56751$ Toise with $\sin^2(L)=0$. A measurement near Rome by the Jesuit scholar Roger Joseph Boscovich in 1750 found $A=56979$ Toise with $\sin^2(L)=.4648$. These gave the two equations

$$56751 = z + y \cdot 0$$

$$56979 = z + y \cdot .4648$$

These equations are easily solved to give $z=56751$ and $y=228/.4648=490.5$, and $e=490.5/(3\cdot 56751)=1/347$, as they tended to write it at the time.

However, by the time Boscovich wrote reports about the question in the late 1750s, there were not two but five reputably recorded arc lengths: Quito ("In America"), Rome ("In Italia"), Paris ("In Gallia"), Lapland ("In Lapponia"), and all the way south to the Cape of Good Hope at the tip of Africa ("Ad Prom. B. S.").[20] Any two of these would give a solution, and so Boscovich was faced with an embarrassment of data: ten solutions, all different (see Figures 1.10 and 1.11).

Locus observationis	*Latitudo* °	′	*½ sin. vers. rad. 10000*	*Hexapedæ*	*Differ. a primo*	*Differ. computata*	*Error*
In America	0	0	0	56751	0	0	0
Ad Prom. B. S.	33	18	2987	57037	286	240	−46
In Italia	42	59	4648	56979	228	372	144
In Gallia	49	23	5762	57074	323	461	138
In Lapponia	66	19	8386	57422	671	671	0

1.10 Boscovich's data for five arc lengths. The columns give (in our notation) for each of the arcs $i=1$ to 5, the latitude L_i (in degrees), $\sin^2(L_i)$ [$=\frac{1}{2}(1-\cos(L_i))=\frac{1}{2}$ versed sine], A_i ("hexapedae," the length in Toise), the difference A_i-A_1, the same difference using the solution from arcs 1 and 5, and the difference between these differences. The value for $\sin^2(L)$ for the Cape of Good Hope should be 3014, not 2987. *(Boscovich 1757)*

Boscovich was faced with a dilemma. The five measured arcs were inconsistent. Should he simply pick one pair and settle for what it told him? Instead, he invented a genuinely novel method of aggregation that led him to a principled solution based upon all five. For him the most suspect element in the data was the arc measurement. These arcs required

Binarium	*Differ. in pol., & æqu.*	*Ellipticitas*	*Binarium*	*Differ. in pol., & æqu.*	*Ellipticitas*
1, & 5	800	1/213	2, & 4	133	1/128
2, 5	713	1/239	3, 4	853	1/200
3, 5	1185	1/144	1, 3	491	1/347
4, 5	1327	1/128	2, 3	−350	−1/486
1, 4	549	1/314	1, 2	957	1/78

1.11 Boscovich's calculations for the 10 pairs of arcs, giving for each the polar excess y and the ellipticity $e=3y/z$. The ellipticities for (2,4) and (1,2) are misprinted and should be 1/1,282 and 1/178. The figures for (1,4) are in error and should be 560 and 1/304. *(Boscovich 1757)*

careful measures taken under extremely difficult conditions—from the forests around Paris and Rome, to the tip of Africa, to the frozen tundra of Lapland, to the plains of Ecuador halfway around the world—and it was not possible to repeat the measures as a check. Thinking in terms of the equation $A=z+y\ \sin^2(L)$, Boscovich reasoned as follows: Each choice of z and y implies a corresponding value for A, and the difference between that value and the observed value could be thought of as an adjustment that needed to be made to the observed A if that measure were to fit the equation. Among all possible z and y, which values implied the smallest total of the absolute values of the adjustments, supposing also that

the chosen z and y were consistent with mean of the As and the mean of the Ls? Boscovich gave a clever algorithm to solve for the best values, an early instance of what is now called a linear programming problem. For the five arcs, his method gave the answers $z=56{,}751$, $y=692$, $e=1/246$.

Over the next half century, a variety of ways were suggested for reconciling inconsistent measures taken under different conditions through some form of aggregation. The most successful was the method of least squares, which is formally a weighted average of observations and had the advantage over other methods of being easily extendable to more complicated situations in order to determine more than two unknowns. It was first published by Adrien-Marie Legendre in 1805, and even though it first appeared in a book explaining how to determine the orbits of comets, the illustrative worked example he gave was for the determination of the earth's ellipticity, using the same measures that were taken to define the length of the meter after the French Revolution.[21] Those data gave the ellipticity as 1/148, a much larger value, but because of the shorter range of the arcs (only 10° latitude, all within France) and the discrepancy from other values, this was judged less suitable than the earlier measures made over the range from the equator to Lapland, so the final meter was determined using a hybrid derived from the different expeditions.

Aggregation has taken many forms, from simple addition to modern algorithms that are opaque to casual inspection. However, the principle of using summaries in place of full enumeration of individual observations, of trying to gain information by selectively discarding information, has remained the same.

CHAPTER 2

INFORMATION

Its Measurement and Rate of Change

THE SECOND PILLAR, INFORMATION MEASUREMENT, IS LOGICALLY related to the first: If we gain information by combining observations, how is the gain related to the number of observations? How can we measure the value and acquisition of information? This also has a long and interesting intellectual history, going back to the ancient Greeks.

The paradox of the heap was well known to the Greeks: One grain of sand does not make a heap. Consider adding one grain of sand to a pile that is not a heap—surely adding only one grain will not make it into a heap. Yet everyone agrees that somehow sand does accumulate in heaps. The paradox is generally attributed to the fourth-century BCE philosopher Eubulides of Miletus; five centuries later the physician and

What gives statistics its unity as a science? Stephen Stigler sets forth the seven foundational ideas of statistics—a scientific discipline related to but distinct from mathematics and computer science.

Even the most basic idea—*aggregation*, exemplified by averaging—is counterintuitive. It allows one to gain information by discarding information, namely, the individuality of the observations. Stigler's second pillar, *information measurement*, challenges the importance of "big data" by noting that observations are not all equally important: the amount of information in a data set is often proportional to only the square root of the number of observations, not the absolute number. The third idea is *likelihood*, the calibration of inferences with the use of probability. *Intercomparison* is the principle that statistical comparisons do not need to be made with respect to an external standard. The fifth pillar is *regression*, both a paradox (tall parents on average produce shorter children; tall children on average have shorter parents) and the basis of inference, including Bayesian inference and causal reasoning. The sixth concept captures the importance of *experimental design*—for example, by recognizing the gains to be had from a combinatorial approach with rigorous randomization. The seventh idea is the *residual*: the notion that a complicated phenomenon can be simplified by subtracting the effect of known causes, leaving a residual phenomenon that can be explained more easily.

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ATTACHMENT B

Natural and Quasi-Experiments in Economics

Bruce D. Meyer

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Natural and Quasi-Experiments in Economics

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Using research designs patterned after randomized experiments, many recent economic studies examine outcome measures for treatment groups and comparison groups that are not randomly assigned. By using variation in explanatory variables generated by changes in state laws, government draft mechanisms, or other means, these studies obtain variation that is readily examined and is plausibly exogenous. This article describes the advantages of these studies and suggests how they can be improved. It also provides aids in judging the validity of inferences that they draw. Design complications such as multiple treatment and comparison groups and multiple preintervention or postintervention observations are advocated.

KEY WORDS: Comparison groups; Control groups; Difference in differences; Exogeneity; Experimental design; Observational studies.

1. INTRODUCTION

There has been an outburst of work in economics that adopts the language and conceptual framework of randomized experiments. These studies, which are often called "natural experiments," examine outcome measures for observations in treatment groups and comparison groups that are not randomly assigned. Much attention is often paid to finding suitable comparison groups. This article analyzes the strengths and weaknesses of these new studies and describes how future work can be improved.

I argue that these natural experiments can be improved through the use of more complicated research designs. In particular, multiple treatment and comparison groups allow further checks of hypotheses and may allow hypotheses to be refined and alternative explanations to be ruled out. Similarly, multiple preintervention or postintervention observations can be used to examine the comparability of comparison groups and the influences of omitted factors. These and other design features can increase the validity of inferences that can be drawn from natural experiments.

Good natural experiments are studies in which there is a transparent exogenous source of variation in the explanatory variables that determine the treatment assignment. A natural experiment induced by policy changes, government randomization, or other events may allow a researcher to obtain exogenous variation in the main explanatory variables. This occurrence is especially useful in situations in which estimates are ordinarily biased because of endogenous variation due to omitted variables or selection. Such approaches have recently been used to analyze a wide range of issues. The natural-experiment approach emphasizes the general issue of understanding the sources of variation used to estimate the key parameters. In my view, this is the main lesson of these studies. If one cannot experimentally control the variation one is using, one should understand its source. This idea is evident in past research, but natural experiments certainly give it more emphasis.

A couple of examples illustrate how a natural experiment may allow the study of the effects of exogenous variation in an explanatory variable that is in other situations endogenously related to the outcome of interest. First, in studies of the effects of social insurance programs on labor supply it is often difficult to distinguish the effects of an individual's benefit entitlement from the effects of past labor supply and earnings that typically determine that benefit entitlement. Specifically, programs such as unemployment insurance, workers' compensation, and Social Security condition eligibility and the level of benefits on previous earnings. Previous earnings are highly correlated with future earnings and the payoff to work. Thus, in studies of the effects of these programs on employment and earnings, it may be difficult to separate the independent influences of earnings history from benefit generosity. This problem is typically exacerbated by the use of proxies for the relevant earnings and benefit variables so that idiosyncratic and potentially exogenous variation in the benefit variables is often lost. Because of this concern, many recent studies have examined changes in social insurance benefits that applied to certain groups but not others. For example, Classen (1979), Solon (1985), Meyer (1989, 1992), and Green and Riddell (1993a,b) examined unemployment insurance, and Meyer, Viscusi, and Durbin (1990, in press), Krueger (1990), Gardner (1991), and Curington (1994) examined workers' compensation.

A second example is provided by studies of the effects of military service on earnings. Work that compares civilian earnings by veteran status may be biased if a nonrandom group of individuals serves in the military. In particular, those who enlist may face worse labor-market opportunities than those who do not enlist. Alternatively, military induction may screen out those individuals in worse health. Recent

work has overcome this problem by using the variation in veterans' status caused by the Vietnam-era draft lottery or the World War II draft mechanism, which depended on date of birth (Angrist 1990; Angrist and Krueger 1994). Other research uses variation across cohorts in conscription rates in the Netherlands (Imbens and van der Klaauw 1994).

Other topics that have been examined using natural experiment approaches include, though are by no means limited to, the effects of minimum wage laws through studies of changes in state laws (Card 1992a; Card and Krueger 1994) and federal law (Card 1992b; Katz and Krueger 1992); the effects of immigrants on the employment and wages of natives through studies of the impacts of large influxes of immigrants (Card 1990; Hunt 1992); the effects of family size on family choices using the delivery of twins as exogenous variation (Bronars and Grogger 1993; Rozensweig and Wolpin 1980); the effects of taxes on labor supply and investment by examining tax reforms (Cummins, Hassett, and Hubbard 1994; Eissa 1993); the effects of Medicaid on health, labor supply, and Aid to Families with Dependent Children participation through studies of program expansions that have expanded eligibility to certain groups (Currie and Gruber 1993; Yelowitz 1994) and related work on Canada (Hanratty 1992); and the effects of liquidity constraints on investment using changes in oil prices as shocks to the cash flow of nonoil subsidiaries (Lamont 1993).

There are certainly many antecedents to this literature. Examples in economics include Rose (1952), who analyzed strike rates before and after compulsory mediation laws, and Simon (1966) who examined liquor sales before and after state price increases. Both authors used comparison states that did not have law or price changes. Many of the research designs discussed here have been extensively analyzed in psychology, where they are called quasi-experiments. Because there is a rich tradition of use of these methods in psychology, I will often refer to the parallel terms and literature from that discipline. The term quasi-experiments emphasizes that such studies are not quite experiments. The term natural experiments, which is more commonly used in economics, somewhat inappropriately suggests that these studies are experiments and moreover that they are spontaneous. In economics we have not settled on a name for the approach of conventional studies, where the process that determines the variation in the key explanatory variables is not known or modeled. In psychology such studies are called correlational designs, or static-group comparisons. Such studies are based on variation that commonly occurs, usually in a cross-section.

The article proceeds as follows. Section 2 outlines some general problems, drawing inferences in empirical work. Section 3 describes the main research designs used in natural experiments. Section 4 describes extensions to these methods, and Section 5 indicates ways of probing the comparability of comparison groups. Section 6 outlines ways that the hypotheses under test can be further examined, and Section 7 describes the sources of exogenous variation in natural experiments and other studies. Section 8 describes instrumental variables methods that have been used when treatment assignment is imprecise. Section 9 discusses how to interpret the results from natural experiments, and Section 10 concludes.

2. THREATS TO VALIDITY

It is useful to begin by outlining some of the general problems with drawing economic conclusions from empirical studies. Because these problems apply to some extent to all of the research designs discussed here, it is useful first to describe them in general. A good starting point is Donald Campbell's (Campbell 1957, 1969; Campbell and Stanley 1966; Cook and Campbell 1979) list of "threats to validity." These threats are problems that may undermine the causal interpretations in studies. The examination of threats is a study-by-study problem. A detailed knowledge of the theory, institutions, data collection, and other background relevant to a topic is necessary to judge the importance of these problems for a given study.

2.1 Threats to Internal Validity

Internal validity refers to whether one can validly draw the inference that within the context of the study the differences in the dependent variables were caused by the differences in the relevant explanatory variables. Although I have altered the list of threats and their descriptions to make them more relevant to economics, the debt to Campbell is clear:

1. Omitted variables: Events, other than the experimental treatment, occurring between preintervention and postintervention observations that provide alternative explanations for the results.
2. Trends in outcomes: Processes within the units of observations producing changes as a function of the passage of time per se, such as inflation, aging, and wage growth.
3. Misspecified variances: The overstatement of the significance of statistical tests due to effects such as the omission of group error terms that indicate that outcomes for individual units are correlated.
4. Mismeasurement: Changes in definitions or survey methods that may produce changes in the measured variables. This would include changes in survey wording or question order. For example, there have been important recent changes of this kind in the Current Population Survey (CPS) unemployment and education questions. One might also include in this category seam-bias problems in which higher levels of changes (e.g., becoming unemployed or going on welfare) are reported for periods that straddle successive interviews than are reported for analogous time periods that are surveyed in the same interview (Citro and Kalton 1993) and time-in-survey effects such as rotation-group bias in the CPS unemployment rate (Bailar 1975).
5. Political economy: Endogeneity of policy changes due to governmental responses to variables associated with past or expected future outcomes.
6. Simultaneity: Endogeneity of explanatory variables due to their joint determination with outcomes.

7. Selection: Assignment of observations to treatment groups in a manner that leads to correlation between assignment and outcomes in the absence of treatment. Selection can take many forms. For example, observations may be assigned to a treatment group based on previous extreme values of the dependent variable or variables associated with the dependent variable. In the training literature, it has been emphasized that a decline in earnings frequently precedes program entry because program operators tend to enroll those individuals with recent labor-market problems (Ashenfelter 1978; Ashenfelter and Card 1985; Heckman and Smith 1994). This rule for selecting participants makes comparisons of changes in earnings for participants and nonparticipants difficult. Different types of selection will have different remedies. For example, selection based on time-invariant individual characteristics possibly may be differenced away, but selection bias based on the lagged dependent variable could be exaggerated by this approach. The general selection problem is the subject of an extensive literature, as discussed by Heckman and Robb (1985) and Manski (1989).

8. Attrition: The differential loss of respondents from treatment and comparison groups. For example, Hausman and Wise (1979) examined attrition of individuals from a randomized experiment, and Pakes and Ericson (1990) examined attrition from a firm panel due to liquidations and changes in ownership.

9. Omitted interactions: Differential trends in treatment and control groups or omitted variables that change in different ways for treatment and control groups. An example is a time trend in a treatment group that is not present in a comparison group. The exclusion of such interactions is a common identifying assumption in the designs of natural experiments.

I should emphasize that this list is a practical list of concerns rather than an exhaustive list of possible problems. Campbell's list was modified several times in later work by Campbell and others (Cook and Campbell 1979; Cook and Shadish 1994). This later work emphasized such threats as "diffusion and imitation of treatments" and the "compensatory equalization of treatments." These ideas are similar to the observation in recent studies of training that the controls often receive some training through other programs even when they are denied entry to the program being studied.

2.2 Threats to External Validity

Cook and Campbell (1979) enumerated three threats to external validity. External validity deals with whether effects found in an experiment can be generalized to different individuals, contexts, and outcomes. In essence, these threats to external validity are just the possibility that there are important interactions between the treatment and individual characteristics, location, or time:

1. Interaction of selection and treatment: Unrepresentative responsiveness of the treated population. The treatment group may not be representative of certain population, or the treatment may be different from that which one would like to examine.

2. Interaction of setting and treatment: The effect of the treatment may differ across geographic or institutional settings.

3. Interaction of history and treatment: The effect of the treatment may differ across time periods.

Examples of such interactions come from studies in which the treatment involves changing a key explanatory variable (the workers' compensation benefit or the minimum wage) from one value to another. The effect of a given change in this explanatory variable may depend on the range of the variable over which this change is made and the composition of the treatment group. This issue is of particular concern if one seeks to extrapolate the results. This problem is not unique to natural experiments, however.

Cook and Campbell also enumerated 10 threats to what they call "construct validity." This concept refers to confusion over what is actually the cause and effect, such as confusion over the relevant part of a treatment that has many dimensions. Although these types of issues may not seem important in economics, they do arise. For example, Angrist (1990) asked to what extent the effect on earnings of being draft eligible is purely due to service in the military per se rather than the effects of draft avoidance behavior and special educational programs for veterans. A second example is the debate over signaling versus productive schooling in which it is asked whether the higher earnings of the more educated are due to the credentials that signal ability or the lessons that impart skills (Ehrenberg and Smith [1994, pp. 308–312] provided a nice summary and references).

There are other threats to the generalizability of study results that are again not unique to natural experiments. First, one might expect difficulty in extrapolating results from a temporary change to a permanent one in which individuals as well as institutions fully adapt to the new situation. Second, one might expect general equilibrium response to changes such as labor-market displacement effects. These issues and others receive much attention in the literature on social experiments (Hausman and Wise 1985, and more recently Meyer in press; Spiegelman and Woodbury 1990). See also Manski (1994) for several results on extrapolating experimental evidence from one group to another.

3. THE RESEARCH DESIGNS

Three of the main goals of a research design should be (1) finding variation in the key explanatory variables that is exogenous, (2) finding comparison groups that are comparable, and (3) probing the implications of the hypotheses under test. Without the ability to experimentally vary the relevant variables, researchers should seek to find variation that is driven by factors that are clearly identified and understood. One can then make an informed decision about the exogeneity of that variation and rule out other explanations. Being able to rule out obvious sources of endogeneity is not enough, however. The possibility of omitted variables, trends in outcomes, omitted interactions, and so forth places a burden on the researcher to examine the comparability of groups that

are being compared. Often other information from additional comparison groups or time periods can be used to examine comparability. It is also often possible to further probe hypotheses by refining them and subjecting them to additional tests. These ideas need to be kept in mind when analyzing the design of any study. Recent work that emphasizes some of these themes includes that of Rosenbaum (1987), Cook (1991), and Cook and Shadish (1994).

There are a few study designs that have been commonly used in natural experiments. Many other works use slight variants on these designs. I begin with the simplest design.

3.1 The One Group Before and After Design

I begin with this design because it is often used as a method of preliminary analysis and because many other methods are logical extensions of this approach. In psychology, this approach has been called the one group pretest-posttest design. In economics, this approach is often called differences, based on the most common statistic calculated with such data. This approach is not very likely to lead to valid inferences, but it may be appropriate in some situations. Most of the more complicated designs are used to overcome some difficulty or deficiency with this simple design or to determine if the inferences from it are valid.

The one group before and after design is motivated by the equation

$$y_{it} = \alpha + \beta d_t + \epsilon_{it}, \tag{1}$$

where y_{it} is the outcome of interest for unit i in period t, $t = 0, 1$, and $i = 1, \ldots, N_t$. d_t is a dummy variable for being in the treatment group—that is, $d_t = 1$ if $t = 1$ and 0 otherwise—and β is the true causal effect of the treatment on the outcome for this group. The treatment group is usually defined (at least in part) by the variation in another variable such as the level of the minimum wage or the workers' compensation benefit. Examples of outcomes include employment in the minimum-wage studies or time out of work in the workers' compensation studies.

The key identifying assumption of this model is that, in the absence of the treatment, β would be 0; that is, there would be no difference in the mean of those in group 0 and group 1. This condition is typically written as $E[\epsilon_{it} \mid d_t] = 0$; that is, the conditional mean of the error term does not depend on the value of the treatment dummy. Using a term common in statistics, one might say that this condition is implied by ignorable treatment assignment (Rubin 1978). If this condition holds, an unbiased estimate of β can be obtained as

$$\begin{aligned} \widehat{\beta}_d &= \Delta\bar{y} \\ &= \bar{y}_1 - \bar{y}_0, \end{aligned} \tag{2}$$

where the bar indicates an average over the individual units and the subscript on y denotes the time period. Under typical assumptions, $\widehat{\beta}_d$ would also be consistent as the number of units in each group goes to infinity. β can also be obtained by directly estimating the parameters of Equation (1) using pooled data from the two time periods. This regression approach will reproduce β_d and, if one allows the variance of ϵ_{it} to vary with t, give the same standard error.

Although I focus on analyzing the mean difference between the treatment group and the comparison group, other summary measures of the differences in the distributions may be of interest. These measures include quantiles such as the median or 75th percentile and the cumulative distribution function at certain points. For example, Meyer et al. (in press) examined both the cumulative distribution function and quantiles of the outcome variable, injury duration. When examining the effect of an explanatory variable on years of education received, we may be interested in the fraction of a group graduating from high school (a point on the cumulative distribution function).

Because nothing so far requires data on individual units rather than grouped means, one could use aggregate data for this pretest-posttest approach. One would need an estimate of the variances of any statistics examined, however, to conduct statistical tests. Some other advantages of individual-level data are discussed later. If individual data are used, the samples could be different in the two periods; that is, one might use repeated cross-section data rather than panel data.

The use of the one group before and after design requires very special circumstances. One needs strong evidence that the two groups would have been comparable over time in the absence of the treatment. An example that illustrates this issue is the work of Meyer et al. (1990, in press). These authors examined the effect of the level of workers' compensation benefits on the length of time out of work by comparing individuals injured during the year before and after two large increases in state maximum weekly benefit amounts. These increases raised the benefit amount for an easily identified class of high-income workers who were injured after the changes in the state laws. In this example, there might be other influences on injury duration that one would want to rule out as explanations for any outcomes. One influence would be other changes in the law regarding injury compensation over the study period (omitted variables). Similarly, one might be concerned about overall trends in injury severity or changes in the reporting practices of the insurance companies that submit the records (trends in outcomes or mismeasurement). If the data were from a panel, one might be worried about nonrandom exit from the sample (attrition). One way to assess the importance of these threats to internal validity is to examine the outcomes for similar groups that did not receive the treatment but would presumably be subject to these influences as well. Such an idea leads to the next design.

3.2 The Before and After Design With an Untreated Comparison Group

Often data will be available for the time period before and after the treatment for a group that does not receive the treatment but experiences some or all of the other influences that affect the treatment group. When such a group is present, the design in psychology has been called the untreated control group design with pretest and posttest. In economics the approach is identified with the most common statistical technique used in this situation, difference in differences.

When one has a comparison group over the same time period as the before and after groups, often the underlying model of the outcome variable is of the form.

$$y_{it}^{j} = \alpha + \alpha_1 d_t + \alpha^1 d^j + \beta d_t^j + \epsilon_{it}^{j}, \tag{3}$$

where the outcome y is now also indexed by j for the group, $j = 0, 1$, and $d_t = 1$ if $t = 1$ and 0 otherwise, $d^j = 1$ if $j = 1$ and 0 otherwise, and $d_t^j = 1$ if $t = 1$ and $j = 1$ and 0 otherwise. d_t^j is a dummy variable for being in the experimental group after it receives the treatment, and β is the true causal effect of the treatment on the outcome for this group. Again, the key identifying assumption is that β would be 0 in the absence of the treatment, or $E[\epsilon_{it}^{j} \mid d_t^j] = 0$. In this case, and unbiased estimate of β can be obtained by difference in differences as

$$\begin{aligned}\widehat{\beta}_{dd} &= \Delta\bar{y}_0^1 - \Delta\bar{y}_0^0 \\ &= \bar{y}_1^1 - \bar{y}_0^1 - (\bar{y}_1^0 - \bar{y}_0^0),\end{aligned} \tag{4}$$

where again a bar indicates an average over i, the subscript denotes the time period, and the superscript denotes the group. The key idea behind this approach is that α_1 summarizes the way that both group $j = 0$ and group $j = 1$ are influenced by time. There may be a time-invariant difference in overall means between the groups $j = 0$ and $j = 1$, but this aspect is captured by α^1.

This research design is the essence of two recent studies. Card and Krueger (1994) examined the effects of an increase in the New Jersey state minimum wage on employment. Their sample consists of fast-food restaurants from four chains in New Jersey before ($t = 0$) and after ($t = 1$) the increase in the minimum wage. In addition, they examined employment at a sample of similar restaurants in eastern Pennsylvania over the same time period. This sample from Pennsylvania provides a group ($j = 0$) that is plausibly subject to the same changes over time as the group in New Jersey, except that Pennsylvania did not change the minimum wage. These common changes are captured by α_1 in Equation (3). This term represents such things as macroeconomic conditions and regional growth trends in fast-food employment over the period.

Meyer et al. (1990, in press) examined the effects of two large workers' compensation benefit increases on the length of claims. They also relied on an untreated comparison group, as well as before and after groups. The untreated comparison group is those individuals within a state who were not subject to the increases in workers' compensation benefits because they had average or low earnings. These comparison workers were likely to be subject to any other changes in program administration or insurers' claim-monitoring procedures.

Again, β can be estimated directly by applying ordinary least squares to Equation (3). This method reproduces $\widehat{\beta}_{dd}$ but gives a different standard error for the estimate unless one allows the error variance to differ across the four groups defined by t and j. An advantage of the regression formulation is that it makes clear that the key identifying assumption is that there is no interaction between $t = 1$ and $j = 1$ (except for the influence under study).

Several of the internal validity threats are reduced by this approach, but important concerns may remain. In the workers' compensation and minimum wage studies such influences as changes in other state laws and labor-market conditions (omitted variables) and any changes in surveyors' methods (mismeasurement) are likely reduced by the use of the untreated comparison group. The importance of trends in employment and the duration of workers' compensation receipt (trends in outcomes) is also reduced or eliminated. The comparability of the before and after groups is higher if sample attrition is negligible. Card and Krueger (1994) went to great lengths to determine the status and employment of nonresponding establishments in their panel study. In repeated cross-section studies one usually does not have an attrition problem, but one needs to examine if the samples are selected over time in the same way from comparable populations.

One of the main threats to the validity of inferences from this design is the possibility of an interaction (besides the treatment) between $j = 1$ and $t = 1$ (omitted interactions). Changes in other state laws or macroeconomic conditions are not likely to always influence all groups in the same way. A recession may have a disproportionate effect on one income group compared to another or in one state than another. This design is most plausible when the untreated comparison group is very similar to the treatment group so that interactions are less likely.

A situation favorable to this design is one in which the comparison group both before and after has a distribution of outcomes close to that for the treatment group during the before period. If there are large differences, then transformations of the dependent variable in (3) may affect the results. For example, if the mean of the outcome variable is very different in the treatment and comparison groups, then (3) could not be an appropriate model both in levels and logarithms (unless $\alpha_1 = 0$). This problem occurs because nonlinear transformations of the dependent variable imply different marginal effects on the dependent variable at different levels of the dependent variable. Thus time could not have an effect of the exact same magnitude in both treatment and control groups in both a linear and logarithmic specification. In this example, one may be able to determine whether a linear or logarithmic transformation is more appropriate by testing whether other variables change the dependent variable in a linear or a logarithmic fashion. The same issue arises when the right side of (3) is nonlinear or when maximum likelihood techniques are used (e.g., see Madrian 1994). In any case, it is useful to examine the size and significance of $\widehat{\alpha}_1$ and $\widehat{\alpha}^1$ for an indication of the comparability of the groups. If they are both near 0, then possible transformations of the dependent variable or different functional forms in likelihoods should be of little importance.

In addition, examining the size and significance of $\widehat{\alpha}_1$ and $\widehat{\alpha}^1$ may reveal other problems of interpretation. If $\widehat{\alpha}_1$ is large in absolute value, it suggests that period-to-period changes in the dependent variable are not unusual and further evidence on its variance over time might be warranted. If the effects of omitted variables, trends in outcomes, mismeasurement,

and so forth that are captured by this term are large, it is more likely that the effect varies substantially across groups. A large $\widehat{\alpha}_1$ may also be an indication that standard errors are understated due to the presence of a group effect in the error term for the interaction of treatment and time.

Although these last remarks are given as a rule of thumb rather than an absolute principle, the idea can be formalized in the following way. Suppose that we are willing to assume that α_1 represents the average effect of a change in an unobserved explanatory variable that has a heterogeneous but positive effect on the outcome for all observations. Then a bound on the true interaction between time and being after the treatment is α_1/p, where p is the fraction of the after population that is in the treatment group. Because this bound is decreasing in the size of α_1, we are able to rule out interactions of a smaller magnitude the smaller α_1 is. A similar argument can be made about α^1.

I should note that the appropriate error structure in (3) may differ in repeated cross-section and panel data. In repeated cross-section data it is likely that ϵ_{i0} is uncorrelated with ϵ_{i1} so that the averages in (4) are independent. In panel data, correlation is likely, but an easy solution is to estimate (3) in differences and in (4) calculate the variance of $\widehat{\beta}_{dd}$ using the sample variance of the quantity $(y_{i0} - y_{i1})$. In the case of positively correlated ϵ's the variance of the difference is smaller than the sum of the individual variances.

4. EXTENSIONS OF DIFFERENCE–IN–DIFFERENCES METHODS

To narrow the focus of this article, I omit some research designs that have found use in other fields, such as the regression discontinuity design (Cook and Campbell 1979). The main ideas of Section 3, however, are imbedded in other commonly used research designs. This section describes several extensions to the difference-in-differences approach.

4.1 Studies Without a Time Dimension

There are many ways that the variables in Equation (3) can be relabeled without changing the underlying approach. The index t does not need to indicate time. Rather, it only needs to indicate one group that was subject to a treatment and another group that was not. For example, Madrian (1994) examined the effects of insurance coverage on the probability of moving between jobs. The hypothesis is that those with *both* current coverage and a greater demand for insurance (due to lack of coverage through a spouse or greater demand for health care due to pregnancy or large family size) should be less likely to move. Let $t = 0$ for someone with a low demand for insurance, and $t = 1$ for someone with a high demand. Similarly, let $j = 0$ for an uncovered worker, and $j = 1$ for a person currently covered. The treatment effect is the interaction of being currently covered and having a greater demand for future insurance ($t = 1, j = 1$).

A word of caution is appropriate here. When t does not indicate being before or after an event (often a sudden change in an explanatory variable), it may be more difficult to assess whether there would be an interaction between $t = 1$ and $j = 1$ even without the treatment. One would like to be able to examine if the outcome measure for the treatment and control groups would change by the same amount in response to differences analogous to those that define the treatment but in the case in which the treatment is not present. In the preceding example, one needs to consider if greater insurance demand as reflected in no spousal coverage, pregnancy, or large family size would have the same quantitative effect on the mobility of those with and without their own coverage even if health insurance were not an influence. In this situation it may also be more difficult or impossible to find additional observations on analogous units (time periods, states) to examine if in other contexts the mobility of those with and without coverage moves in parallel. When the units are time or states, one may be able to select similar states or additional time periods to examine this hypothesis.

4.2 Controls for Individual Characteristics

The incorporation of the influences of other variables is straightforward in the regression approach of Equation (3). If we have a vector of characteristics of the units under study, z_{it}^j, we can include it as an additional vector of explanatory variables. Thus the regression equation

$$y_{it}^j = \alpha + \alpha_1 d_t + \alpha^1 d^j + \beta d_t^j + z_{it}^j \delta + \epsilon_{it}^j \qquad (5)$$

provides a simple way to adjust for observable differences between the observations in the different groups. Using this equation may also improve the efficiency of the estimate of β by reducing the residual variance. I should note that, as usual, enforcing homoscedasticity of the error term across groups (even if it truly holds) does not improve asymptotic efficiency.

I should also note that one needs to enforce equality of δ across groups; otherwise Equation (5) will not adjust for differences in these variables across groups. One can test whether this restriction holds using conventional methods. If the variables have different effects within the different groups, it is unlikely that the regression adjustment will eliminate these differences. A test of equality of δ across groups might also detect omitted variables or functional-form misspecifications that would make the regression adjustments inadequate.

4.3 Treatments That Are Higher-Order Interactions

In the examples so far, the treatment group has been defined by the interaction of two dummy variables, usually a dummy variable for being in the treatment group and one for being after the time of the treatment. Situations often arise in which the treatment is defined by the interaction of more than two variables. In this case, a design relying on this higher level of interaction may allow the researcher to remove main effects and lower-level interactions effects. More concretely, the researcher may believe that there are extra terms in (3) besides time and state in the United States, for example. It may be that the treatment group affects a certain demographic group in the state and time period. Thus a version of (3) may be appropriate with a higher-order interaction being the key explanatory variable with the coefficient β. This approach is suitable if the treatment group differs from the comparison group along

several dimensions, and it may have the advantage of removing any trends along these other dimensions of the data.

The regression equation for this model is

$$y_{it}^{jk} = \alpha + \alpha_1 d_t + \alpha^1 d^j + \gamma^1 e^k + \alpha_1^1 d_t^j + \gamma_1^1 e_t^k + \alpha^{11} d^{jk} + \beta d_t^{jk} + \epsilon_{it}^{jk}, \quad (6)$$

where the outcome y is now also indexed by k, $k = 0$, 1, and $d_t = 1$ if $t = 1$ and 0 otherwise; $d^j = 1$ if $j = 1$ and 0 otherwise; $e^k = 1$ if $k = 1$ and 0 otherwise; d_t^j, e_t^k, and d^{jk} are the three possible interactions of two factors (the first-order interactions); and $d_t^{jk} = 1$ if $t = 1, j = 1$, and $k = 1$ and 0 otherwise is the interaction of all three factors (the second-order interaction). d_t^{jk} is a dummy variable for being in the subset of the experimental group that receives the treatment after it receives the treatment, and β is the effect of the treatment on the outcome.

Examples of such designs include that of Gruber (1994), who examined the incidence of mandated maternity benefits, and Yelowitz (1994) who examined the effects of Medicaid expansions on welfare participation and labor supply. In the work of Gruber (1994), the treated are those women of certain ages ($k = 1$) in a certain group of states ($j = 1$) after the mandate ($t = 1$). The coefficient on this second-order interaction is the key parameter of interest. Variables to capture the main effects and first-order interactions are also included in the estimation equations. Similarly, in the work of Yelowitz (1994) the treated are mothers with children of certain ages ($k = 1$) in certain states ($j = 1$) after extensions of Medicaid coverage ($t = 1$). Again, the coefficient on a second-order interaction variable is the key parameter of interest. This idea can be extended to even higher-level interactions. It is important to include the first-order interactions in Equation (6) when testing for the presence of the second-order interaction; otherwise the second-order interaction effect would be confounded with the omitted first-order interactions, likely leading to biased estimates.

5. FURTHER EVIDENCE ON COMPARABILITY

The use of the before and after design with an untreated comparison group rests on comparability of the before and after groups, at least after netting out a time mean common to both the treatment and comparison groups. To examine comparability, often supplementary information is available. Examples of supplementary information include a clearly specified hypothesis about the likely differences between the before and after groups or additional control groups.

5.1 Multiple Comparison Groups

The before and after design with an untreated comparison group can be strengthened by the use of additional comparison groups. This design feature allows further examination of the $\beta = 0$ hypothesis in the absence of a treatment. Additional comparison groups reduce the importance of biases or random variation in a single comparison group. There are some simple principles to follow in choosing comparison groups. The more similar the comparison group is to the treatment group the better. For a given degree of similarity with the treatment group, however, greater differences across comparison groups are desirable if they are likely to lead to different biases.

Last, the more comparison groups the better. Examples of studies that feature multiple comparison groups include that of Meyer (1989), who examined the effect of 17 increases in unemployment insurance benefits on unemployment durations and 16 analogous cases in which benefits were unchanged. Similarly, Krueger (1990) examined the effect of an increase in workers' compensation benefits on claim durations and used two groups of comparison workers who were not subject to the benefit increase.

Another approach may be available if the researcher has knowledge about how the treatment and comparison groups differ, say that one group has a higher mean value of a given, possibly unmeasured, variable that affects the outcome. One can examine if groups that differ in the mean value of this variable respond to other factors (time, for example, in the before and after designs) similarly. This idea has been called "control by systematic variation" (see Rosenbaum 1987 for a nice discussion). If the groups do respond similarly, it would support the assumption of no omitted interactions and the converse if they do not.

When a comparison group that would be expected to be similarly affected by other factors cannot be identified, one possible approach is to search for comparison groups whose outcomes could be expected to bracket the outcome for the treatment group. For example, using groups that might be expected to have both larger and smaller responses to other changes during the relevant time period could provide bounds for the possible effects. If these bounds are narrow, the method provides useful information about the parameter of interest.

In related work, Rosenbaum (1987) emphasized that one can formally test whether comparison groups are similar to each other. This approach is likely to be most useful when the assumptions that make one group a valid comparison group imply that the other is valid also. Then a comparison of the two groups provides a test of these assumptions. This comparison of control groups can be reinterpreted as the economist's test of overidentifying restrictions. A comparison of two estimates of β, based on a summary statistic from the same treatment group but different comparison groups, would just be a test of equality of the summary statistic from the two comparison groups.

Additional comparison groups are sometimes called null treatment groups. A null treatment group is a group like the treatment group in time or geography that does not receive a treatment. The use of such groups to check assumptions regarding the unbiasedness or variance of outcome measures has been called "uniformity trials" (see Margolin 1987).

5.2 Multiple Preintervention or Postintervention Time Periods

A design feature that allows the examination of various validity threats is the use of data from several preintervention or postintervention time periods. For example, Meyer

(1992) studied the effect of a 27% increase in the New York unemployment insurance benefit that only applied to above-average-income workers. An analysis of two years of quarterly data makes it clear that there is strong seasonality (omitted variables in terms of the validity threats) in the outcome measures, which are the number and length of claims. This result suggests that comparing outcomes for the months immediately before and after the benefit increase would be inappropriate. Additional time series observations may also indicate the importance of group effects in the error of equations such as (5) (misspecified variances).

A second and underemphasized advantage of a long time series for outcome measures is that they may allow the researcher to examine if the treatment and control groups tend to move in parallel—that is, go up or down together. In the absence of interactions between treatment and other influences (omitted interactions), parallel movement would be expected. In the case of the minimum wage study described previously, one could ask if the New Jersey and Pennsylvania fast-food employment levels tend to move together. One could also examine if movements of a given magnitude are more or less common than the standard errors suggest.

5.3 Other Ways to Examine Comparability

In the before and after comparison designs, with or without an untreated group, it is useful to compare the characteristics of the units in the groups for indications of comparability. If substantial differences in mean characteristics are present, they should cause concern. Such differences would not necessarily invalidate the results because one may be able to control for these characteristics. In addition, group differences in characteristics may accord with or reject hypotheses about likely differences between treatment and comparison groups. Similarly, in repeated cross-section analyses the population (or sample) sizes should be examined because large changes in the size of the population may indicate changes in the composition of the groups in ways not completely captured by observed characteristics. The direction of change, especially if competing hypotheses imply directions, may be informative.

Last if assignment to the treatment and comparison groups is defined by a measured variable, it may be possible to examine comparability in an additional way. In the preceding unemployment insurance and workers' compensation examples, the groups were defined by past earnings. One could look for an effect of earnings on the outcome of interest *within* the high and low earnings groups. If there is no relationship, that suggests that the groups are more likely to be comparable, and the opposite is true if there is a strong relationship.

6. FURTHER TESTS OF THE HYPOTHESES

6.1 Multiple Treatment Groups

The before and after design with an untreated comparison group is also strengthened by the presence of several distinct groups that are subject to the treatment. Especially useful are treatment groups in different settings such as different time periods or states or treatment groups receiving treatments of different intensities. This design feature was used by Meyer et al. (1990, in press), who examined the same sets of statistics for workers' compensation benefit increases in two different states. Differences in the intensity of the treatment across different groups allow one to examine if the changes in outcomes differ across treatment levels in the expected direction. Multiple treatment groups may also allow testing of more refined hypotheses if the treatment is expected to have a differential impact on the outcomes for different groups. For example, Card and Krueger (1994) in their minimum wage study defined additional treatment groups within New Jersey defined by high, medium, and low wages prior to the increase in the minimum. The expectation is that the minimum wage would have a larger effect in restaurants with lower wages.

6.2 Other Tests

Another design feature that strengthens evidence of causal effects is the later reversal of the initial treatment. For example, a state law may be passed and then later repealed. Curington (1994) examined several changes in workers' compensation benefits that increased the worker's reward for lengthening the period of receipt of temporary benefits relative to permanent benefits. He was also able to examine one change that reversed the incentives, increasing permanent benefits relative to temporary ones, and saw if the effect on the dependent variable reversed. In a slightly different vein, Gruber (1994) examined a later federal mandate of maternity benefits that changed some of his earlier treatment states (which had state mandates) into controls, and vice versa.

A final way of examining the appropriateness of an approach (especially when no effects are found) is to examine if the approach has sufficient power to detect and properly measure the effect of a known causal variable on the outcome. Margolin (1987) called this the use of a positive treatment group.

7. SOURCES OF EXOGENOUS VARIATION

One of the themes from the examples that I have described is that government policies often create natural treatment and comparison groups. Frequently, this event occurs because our federal system of government allows one state to change a policy while others do not. The many cross-state differences in policies and changes in these policies allow the examination of a wide range of questions.

An illustrative example comes from studies of the effects of unemployment insurance and workers' compensation benefits on the length of absence from work. These studies have typically used several sources of variation in benefits generally in unspecified proportions. These sources include (a) the variation due to differences in individuals' earnings histories that is often the sole determinant of benefits within a state at a point in time, (b) differences across states in these schedules that relate current benefits to past earnings, and (c) changes in these benefit schedules over time.

Given that labor supply is correlated over time for an individual, (a) is unlikely to be exogenous. In terms of the validity threats, there is selection on a variable highly correlated with

the lagged dependent variable. Because it is difficult to measure characteristics of state programs and state labor markets that are important for the outcomes of interest, mean differences across states incorporated in (b) are unlikely to be useful. Again, in terms of the validity threats, there are likely important omitted variables. This leaves interactions between (a) and (b)—that is, how different states treat differences in earnings history differently—and (c) as possible sources of variation. Interactions between (a) and (b) in addition to (c) are the sources of variation used by Meyer (1990) and Anderson and Meyer (1994). Source (c) is likely to be especially useful if one can examine sharp changes in policies that were unlikely to have been determined by past values of the outcomes of interest (so that political economy issues are not important). It is also important that past values of outcomes could not have been affected by knowledge of future policy changes. Conventional studies typically include all three sources of variation in unknown proportions and do not adequately control for the sources of endogeneity (i.e., the selection mechanism or omitted variables) of the different components. Recent natural experiment studies have taken the more convincing approach of examining changes in benefits, typically ones that affect some groups but not others.

Nevertheless, not every law change is a good natural experiment. The danger in using such variation is that the changes may be driven by political factors associated with outcomes. Campbell (1969) and Cook and Tauchen (1982) provided a good summary of the argument in the case of natural experiment approaches, and Besley and Case (1994) provided a recent discussion. For example, a few high years of crime due to unusual circumstances may stimulate a crackdown. A subsequent reduction in crime after the unusual years should not be taken to indicate an effective crackdown if a drop would have been expected anyway.

The way to avoid that pitfall is to know the circumstances surrounding reforms or to more generally model the determinants of policy changes. For example, Cook and Tauchen (1982) examined whether liquor taxes affect the incidence of heavy drinking. Because of a concern that changes in drinking habits might cause changes in taxes, they performed a series of Granger and Sims exogeneity tests to see if there is evidence of a causal link running in this other direction.

Other situations favorable to the use of natural experiment approaches include changes in government policies that are applicable to some groups but not others. Then, unless past changes specific to that group motivated the policy change, the groups not subject to the policy change provide comparison groups. Additionally, data from before and after large, sharp policy changes can often avoid the influence of slowly moving factors that determine political decisions.

8. IMPRECISE ASSIGNMENT TO TREATMENT AND INSTRUMENTAL VARIABLES

Government policy or other forces do not always create simple treatment and comparison groups but may instead influence the likelihood that an individual receives a treatment. In such a situation, a variable that is correlated with the assignment to treatment but that does not solely determine the assignment may be available. If this variable is also uncorrelated with the error in the outcome equation, then in linear and certain nonlinear models the effects of the treatment may be estimated using instrumental variables (IV).

An example of the imprecise assignment to treatment and the use of IV comes from the Vietnam-era draft lottery. The lottery randomly established priority for induction into the military. Draft lottery numbers can be used as instruments for veteran status when one is interested in determining the effect of military service on earnings later in life (Angrist 1990). A second example is the work of Angrist and Krueger (1991), who used quarter of birth as an instrument for educational attainment in earnings equations. Quarter of birth is correlated with educational attainment because it affects whether compulsory school attendance laws were binding. The authors also provided substantial evidence that quarter of birth does not have an effect on earnings except through compulsory schooling laws.

IV estimation also may often be applied to a modified version of the earlier equations. Changes in state laws can be thought of as generating instruments that can be used to identify causal effects. For example, in the workers' compensation study described at length previously, one could include as an explanatory variable the benefit amount, b_{it}^j, and then use the appropriate dummy variable as an instrument. The equation would become

$$y_{it}^j = \alpha + \alpha_1 d_t + \alpha^1 d^j + \pi b_{it}^j + z_{it}^j \delta + \epsilon_{it}^j, \qquad (7)$$

and d_t^j would be the appropriate instrument for the benefit amount. The first-stage regression in two-stage least squares (2SLS) consists of regressing the benefit amount on the dummy variable d_t^j and other control variables. The predicted values from this regression are then substituted for the benefit amount in the second stage of 2SLS. An advantage of the IV approach in this example is that one directly estimates the derivative of y with respect to the benefit amount.

9. WHAT PARAMETER DO NATURAL EXPERIMENTS ESTIMATE?

A weakness of natural experiments is that their results may not be generalizable beyond the group of individuals or firms or the setting used in the study. The workers' compensation example described earlier estimated the effect of increasing workers' compensation benefits over a particular range for a group of high-wage workers. One might wonder if these results generalize to all workers. Similarly, the minimum wage study described earlier estimated the effect of minimum wage laws on employment for a group of four national chains of fast-food restaurants. One might wonder if these results generalize to all low-wage employment.

This issue of external validity arises when the treatment has different effects on different observations. In terms of the equations, β in (5) may vary over i and may interact with z_i. Interactions between the treatment and individual characteristics have been examined in some natural experiments. For example, Angrist (1990) and Angrist and Krueger

(1991) performed most of their analyses separately for blacks and whites. In most cases, however, researchers permit little or no variation in treatment effects.

Although this problem certainly limits the generalizability of natural experiment results, many (or most) conventional studies assume constant impacts across groups or constant elasticities. Furthermore, in conventional studies one rarely determines what parts of the variation in a key explanatory variable are particularly influential—that is, play the largest roles in determining coefficient values. This variation is rarely the unweighted variation in a sample because a multiple regression coefficient is determined by the residual variation after other explanatory variables are conditioned out. In conventional studies, typically all sources of variation are combined and treated equally, even though some of the sources may be endogenous or have different effects on the outcomes. In natural experiments one usually can point to the source of the variation that generated the results.

10. CONCLUSIONS

Policy change, government randomization, or other events may allow a researcher to obtain exogenous variation in key explanatory variables. This is especially useful when there is concern about omitted variables, purposeful selection into treatment, or other threats to validity. Research designs based on exogenous variation have recently been used to analyze a wide range of issues. Even when not conclusive, the simplicity of such designs often narrows the range of plausible alternative explanations.

Of course, calling a source of variation a natural experiment does not make that variation exogenous. But the natural experiment approach emphasizes the importance of understanding the source of variation used to estimate key parameters. In my view, this is the primary lesson of recent work in the natural experiment mold. If one cannot experimentally control the variation one is using, one should understand its source.

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ATTACHMENT C

Proving Antitrust Damages

Legal and Economic Issues

Third Edition

ANTITRUST LAW
Promoting Competition

AMERICAN BAR ASSOCIATION
Defending Liberty
Pursuing Justice

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FOREWORD

The American Bar Association Section of Antitrust Law is pleased to publish the third edition of *Proving Antitrust Damages: Legal and Economic Issues*, a comprehensive analysis of the issues involved in the proof of damages under Section 4 of the Clayton Act.

Like the previous editions, published in 1996 and 2010, this third edition serves both as an introduction to the various conceptual and practical issues associated with proving damages in an antitrust case and as the definitive reference to relevant case law and secondary sources.

This edition was sponsored by the Economics Committee. The Section is grateful to the many attorneys and economists who contributed to this publication. I want to extend special thanks to co-editors Tasneem Chipty and Cathy Beagan Flood, who coordinated the efforts of the edition's authors.

William C. MacLeod
Chair, Section of Antitrust Law
American Bar Association
2016-2017

Southern Photo Materials Co.,[3] *Story Parchment Co. v. Paterson Parchment Paper Co.*,[4] and *Bigelow v. RKO Radio Pictures*.[5] They remain the leading cases on this point.[6] In *Eastman Kodak*, the Court was unmoved by defense contentions that "plaintiff's damages were purely speculative" and "not of an amount susceptible of expression in figures[.]"[7] The Court reasoned that "a defendant whose wrongful conduct has rendered difficult the ascertainment of the precise damages suffered by the plaintiff, is not entitled to complain that they cannot be measured with the same exactness and precision as would otherwise be possible."[8] The Court held that "[d]amages are not rendered uncertain because they cannot be calculated with absolute exactness. It is sufficient if a reasonable basis of computation is afforded, although the result be only approximate."[9]

The Court echoed its *Eastman Kodak* holding in *Story Parchment*, observing that "it would be a perversion of fundamental principles of justice to deny all relief to the injured person, and thereby relieve the wrongdoer from making any amend for his acts."[10] Thus, while "damages may not be determined by mere speculation or guess, it will be enough if the evidence shows the extent of the damages as a matter of just and reasonable inference, although the result be only approximate."[11]

In *Bigelow*, the Court added: "[a]ny other rule would enable the wrongdoer to profit by his wrongdoing at the expense of his victim."[12] To avoid the injustice of allowing the defendant to improperly retain its illicit profits, a jury is allowed to make a "just and reasonable" estimate of damages based on either direct or inferential proof.[13]

Given these circumstances, damages may be awarded despite imperfect proof. Judges must "observe the practical limits of the burden of

3. 273 U.S. 359 (1927).
4. 282 U.S. 555 (1931).
5. 327 U.S. 251 (1946).
6. The Supreme Court has recently reaffirmed this line of precedent, observing in the antitrust context that damages "calculations need not be exact." Comcast Corp. v. Behrend, 133 S. Ct. 1426, 1433 (2013) (citing *Story Parchment*, 282 U.S. at 563).
7. *Eastman Kodak*, 273 U.S. at 378.
8. *Id.* at 379.
9. *Id.* (internal quotes omitted).
10. *Story Parchment*, 282 U.S. at 563.
11. *Id.*
12. *Bigelow*, 327 U.S. 251, 264 (1946).
13. *Id.*

proof which may be demanded of a treble-damage plaintiff who seeks recovery for injuries[.]"[14] A damages analysis based on assuming away the defendant's violation is inherently uncertain because "the vagaries of the marketplace usually deny us sure knowledge of what plaintiff's situation would have been in the absence of the defendant's antitrust violation."[15] Nevertheless, courts will continue to apply a low threshold because "[t]he most elementary conceptions of justice and public policy require that the wrongdoer shall bear the risk of the uncertainty which his own wrong has created."[16]

B. The "But-For" Premise

A fundamental step in computing antitrust damages is to envision the manner in which a particular market would have developed, assuming that the antitrust violation did not occur and holding every other feature of the actual world constant. The purpose of this analysis is to isolate the effects of the challenged conduct so as to ascertain what would have happened "but for" the defendant's unlawful activities.[17] Then, antitrust damages can be quantified by comparing the plaintiff's actual profits (in a lost profits case), purchase prices (in an overcharge case), or the like, against what the plaintiff would have enjoyed absent the illegal conduct.[18]

14. Zenith Radio Corp. v. Hazeltine Research, 395 U.S. 100, 123 (1969).
15. J. Truett Payne Co. v. Chrysler Motors Corp., 451 U.S. 557, 566 (1981).
16. *Bigelow*, 327 U.S. at 265. *See also Story Parchment*, 282 U.S. at 563-65 (holding that where violation "preclude[s] the ascertainment of the amount of damages with certainty, it would be a perversion of fundamental principles of justice to deny all relief to the injured person, and thereby relieve the wrongdoer from making any amend for his acts"); Eastman Kodak Co. v. Southern Photo Materials Co., 273 U.S. 359, 379 (1927) ("a defendant whose wrongful conduct has rendered difficult the ascertainment of the precise damages suffered by the plaintiff, is not entitled to complain that they cannot be measured with the same exactness and precision as would otherwise be possible").
17. *See, e.g.*, *Bigelow*, 327 U.S. at 259, 263 (referring to proof of competitor plaintiff's profits "in the absence of" the restraints, or "if the restraints had not been imposed"); LePage's Inc. v. 3M, 324 F.3d 141, 165 (3d Cir. 2003) (damage model should "measur[e] what, hypothetically, would have happened 'but for' the defendant's unlawful activities").
18. *See, e.g.*, *LePage's*, 324 F.3d at 165; Cordes & Co. Fin. Servs., Inc. v. A.G. Edwards & Sons, Inc., 502 F.3d 91, 107 (2d Cir. 2007) (damages could be measured as "the difference between the but-for fee and the actual fee paid"); New York v. Julius Nasso Concrete Corp., 202 F.3d 82, 88 (2d Cir.

Applying the "but-for" analysis can take a variety of forms, depending on the plaintiff bringing the claim and type of relief sought. For instance, a plaintiff who is a direct purchaser of products whose prices are artificially inflated due to anticompetitive conduct would typically seek overcharge damages, which are measured as the difference between the price the plaintiff actually paid and the price that would have prevailed in the absence of the antitrust violation (the "but-for" price), multiplied by the quantity of the product that was actually purchased.[19] This difference between the price that actually prevailed and the price that would have

2000) (holding, in a price-fixing case, the measure of damages is "the difference between the price actually paid by the [plaintiff] on the contracts and the price it would have paid absent the conspiracy").

19. *See* Howard Hess Dental Labs v. Dentsply Int'l, 424 F.3d 363, 374 (3d Cir. 2005) ("the standard method of measuring damages in price enhancement cases is overcharge, . . . [that is] 'the difference between the actual price and the presumed competitive price multiplied by the quantity purchased'"); PHILLIP E. AREEDA, ET AL., ANTITRUST LAW ¶ 392a (2013) (an overcharge "is the difference between the illegal price that was actually charged and the price that would have been charged 'but for' the violation multiplied by the number of units purchased"). The plaintiffs' overcharge injury is deemed complete at the time it paid the overcharge on its actual purchases. Illinois Brick Co. v. Illinois, 431 U.S. 720, 724 (1977) ("a direct purchaser suing for treble damages under § 4 of the Clayton Act is injured within the meaning of § 4 by the full amount of the overcharge paid by it"); Meijer, Inc. v. Warner Chilcott Holdings Co. III, 246 F.R.D. 293, 303 (D.D.C. 2007) ("[a]ntitrust injury is considered complete when the direct purchaser pays an illegal overcharge"). Thus, overcharges are computed on products a direct purchaser actually bought at the allegedly artificially inflated price, even if the plaintiff might have made fewer purchases in the but-for world. *See In re* Niaspan Antitrust Litig., No. 13-MD-2460, 2015 WL 4197590, at *1 (E.D. Pa. July 9, 2015) (rejecting argument that damages must be offset "by the amount of any purchases . . . that would not have been made in a 'but for' world"); *In re* Prograf Antitrust Litig., No. 11-2242, 2014 WL 7641156, at *4 (D. Mass. Dec. 23, 2014); *In re* Skelaxin (Metaxalone) Antitrust Litig., No. 12-MD-2343, 2014 WL 2002887, at *5 (E.D. Tenn. May 15, 2014); Teva Pharm. USA, Inc. v. Abbott Labs., 252 F.R.D. 213, 230-31 (D. Del. 2008) ("[d]efendants . . . enmesh the idea of a 'but for' world with a 'but for' price . . . plaintiffs only are required to show that they, in fact, did purchase TRICOR® at a higher price once an antitrust violation and causal relationship are established"); *In re* Relafen Antitrust Litig., 346 F. Supp. 2d 349, 368-69 (D. Mass. 2004).

prevailed in the but-for world is called the "overcharge."[20] In contrast, for competitors prevented from fully competing in the marketplace by anticompetitive conduct, applying the but-for premise may require comparing the competitor-plaintiff's actual profits versus the profits the plaintiff would have earned in a world free of the market restraint—as was the case in *Eastman Kodak*, *Story Parchment*, and *Bigelow*. In addition, to the extent that an impaired competitor seeking lost profits enjoyed profits or benefits in the actual world that it would not have received but for the violation, some courts have required an offset.[21] A potentially different analysis may be required to establish the amount of overcharge paid by a plaintiff suing under state law as an *indirect purchaser* of the good in question (that is, who is suing as a purchaser of a product from an entity or person other than the claimed antitrust violator or entity in league with the antitrust violator). In such a case, the damages computation, depending upon the data available and the market or markets at issue, may involve, in part, an assessment of how much of the overcharge was "passed on" to the indirect purchaser.

The but-for premise requires some conceptualization of the actions in which the defendant might have engaged in the but-for world, instead of committing the violation. For certain types of violations, such as unlawful terminations by suppliers, the usual assumption is that the termination did not occur, leaving the supply relationship intact.[22] For other types of violations, such as overcharges caused by exclusionary conduct or cartel behavior, it is necessary to construct a but-for price that the evidence shows likely would have prevailed absent the violation.[23] Importantly, it is not relevant that the defendant or defendants could theoretically have

20. *Illinois Brick*, 431 U.S. at 724-725; Hanover Shoe, Inc. v. United Shoe Mach. Corp., 392 U.S. 481, 489 (1968).

21. *See, e.g.*, *Los Angeles Mem'l Coliseum Comm'n*, 791 F.2d at 1367.

22. *See, e.g.*, DeLong Equip. Co. v. Wash. Mills Elec. Minerals Corp., 990 F.2d 1186, 1203 (11th Cir. 1993), *amended per curiam*, 997 F.2d 1340 (11th Cir. 1993). The amount of damages suffered will depend on how long the wrongfully terminated relationship would otherwise have continued. *See, e.g.*, Coastal Fuels of P.R. v. Caribbean Petrol. Corp., 175 F.3d 18 (1st Cir. 1999).

23. *See, e.g.*, *Cordes*, 502 F.3d at 107 (where conspiracy allegedly led to enhanced prices, overcharge damages could be measured as "difference between the but-for fee and the actual fee paid"); Berkey Photo v. Eastman Kodak Co., 603 F.2d 263, 297-98 (2d Cir. 1979) (monopolization overcharge damages are "the price increment caused by the anticompetitive conduct that originated or augmented the monopolist's control over the market").

caused the same harms through lawful means; what matters is what they did and likely would have done.[24] For instance, if the violation is cartel behavior and the claimed harm artificially inflated prices, it is not relevant that a member of the cartel could theoretically have raised prices acting alone absent the cartel, unless it could be shown that such a cartelist would have done so regardless.

C. Methods for Quantifying Damages

Plaintiffs may rely on one or more of a number of methodologies to quantify the damages arising from anticompetitive conduct. In every case, however, courts require that the economic model used must isolate the effect of the anticompetitive conduct.[25] The process of separating out effects of the challenged conduct from other unrelated factors is typically accomplished by comparing the experience in the actual world and the experience the plaintiff likely would have had in a but-for world free of the challenged anticompetitive conduct, holding all other factors the same.

A variety of models can be used to re-construct the but-for world, including "Before-During-After" models, "Yardstick" models, Projection-based models, and Cournot or Bertrand simulation models. These are described in more detail in later chapters, but an overview is provided here.

Before-During-After Models. These models seek to isolate harm flowing from the challenged anticompetitive conduct by comparing the plaintiff's experience in the same market before, or after, the misconduct

24. *See, e.g.*, Story Parchment Co. v. Paterson Parchment Paper Co., 282 U.S. 555 (1931). In *Story Parchment*, the plaintiff was permitted to seek damages based on the entire difference between prevailing prices before and after the alleged predation, despite defendants' claim that they could have lowered prices anyway by independent (and hence lawful) means. *See id.* at 561-62. So long as "the old prices were reasonable, and that they would not have changed by reason of any economic condition, but would have been maintained except for the unlawful acts" of the defendants, the jury might base damages on the difference between the old price and the new one. *Id. See also* H.J., Inc. v. ITT Corp., 867 F.2d 1531, 1550 (8th Cir. 1989) (defendant may not challenge damage model's assumption of prices at levels before defendant's predatory price cutting by asserting that defendant could have competed with lower but non-predatory prices).

25. *See, e.g.*, Comcast Corp. v. Behrend, 133 S. Ct. 1426, 1433 (2013); *see also infra* n.45 ("a defendant whose wrongful conduct has rendered difficult the ascertainment of the precise damages suffered by the plaintiff, is not entitled to complain that they cannot be measured with the same exactness and precision as would otherwise be possible").

with its experience during the time the conduct was ongoing, which is sometimes referred to as the "damages period." The "Before-During" model acknowledges the likelihood that for a plaintiff who participated in the *same* market before or after the damages period, its actual experience in the time period before the violation may serve as a proxy for the plaintiff's but-for experience during the damages period.[26] A similar logic applies to the "During-After" model, where, the plaintiff's actual experience after the damages period may serve as a proxy.[27]

Yardstick Models. These models seek to isolate harm flowing from the challenged anticompetitive conduct by comparing the experience of the plaintiff in a market subject to anticompetitive conduct to the experience of the plaintiff, or another firm, in a comparable market unaffected by the defendant's violation.[28] The yardstick employed must be comparable to the industry and firm in question.[29] The yardstick method is particularly useful where the before-during-after approach is inappropriate, for example where the plaintiff is a start-up that never began operations in the

26. *See, e.g.*, Bigelow v. RKO Radio Pictures, 327 U.S. 251, 259-64 (1946) (comparison of plaintiff's profits before the conspiracy to its profits during the conspiracy); *Story Parchment*, 282 U.S. at 561-62 (comparison of plaintiff's prices before a predatory pricing conspiracy to prices during the conspiracy); Eastman Kodak Co. v. Southern Photo Materials Co., 273 U.S. 359, 376-79 (1927) (comparison of plaintiff's profits before its unlawful termination to profits after the termination); *In re* Mushroom Direct Purchaser Antitrust Litig., No. 06-0620, 2015 WL 5767415, at *7 (E.D. Pa. July 29, 2015) ("The purpose of separating conduct free periods and conduct periods is to create a benchmark conduct free period as an evidentiary foundation for inferring what the prices would have been in the [conduct] period[s] but for the [alleged] illegal activity.") (internal quotes omitted).

27. *See, e.g.*, Independence Tube Corp. v. Copperweld Corp., 691 F.2d 310, 330-31 (7th Cir. 1982), *rev'd on other grounds*, 467 U.S. 752 (1984).

28. *See, e.g.*, *Bigelow*, 327 U.S. at 251-52 (comparison of plaintiff's profits during the conspiracy to those of a comparable competitor not affected by the conspiracy). *See also LePage's*, 324 F.3d at 165 ("an expert may construct a reasonable offense-free world as a yardstick for measuring what, hypothetically, would have happened 'but for' the defendant's unlawful activities."); Conwood Co. v. U.S. Tobacco Co., 290 F.3d 768, 793 (6th Cir. 2002) (yardstick is among "generally accepted methods for proving antitrust damages").

29. Eleven Line v. N. Tex. State Soccer Ass'n., 213 F.3d 198, 208 (5th Cir. 2000) ("An antitrust plaintiff who uses a yardstick method of determining lost profit bears the burden to demonstrate the reasonable similarity of the business whose earning experience he would borrow.").

affected market,[30] or where data for the market free of the antitrust violation are not available. The yardstick approach often requires data about the proxy market participant's sales and profits, or prices paid. These data serve as a proxy to reflect what the plaintiff's experience would have been but for the illegal conduct and, as such, when compared to the plaintiff's actual experience can provide a means to measure the damages suffered.

In either the before-during-after approach or the yardstick approach issues of comparability may arise. In the former, changes in market conditions during the damages period may raise doubts about the direct comparability of the damages period prices or profits to prices and profits before or after. With respect to a yardstick approach, differences in the yardstick and the market subject to anticompetitive conduct may raise questions about their comparability. However, a perfect comparator is not required, and adjustments may be used to account for differences.[31] Thus, while in some cases the proxy may be so lacking in comparability that the court will reject it,[32] whether the proxy is reasonably comparable is usually a question for the trier of fact.[33] This is because only a reasonable

30. *See, e.g.*, Lehrman v. Gulf Oil Corp., 500 F.2d 659, 667 (5th Cir. 1974) (yardstick method available to plaintiff "who is driven out of business before he is able to compile an earnings record").

31. *See, e.g.*, Blue Cross & Blue Shield United v. Marshfield Clinic, 152 F.3d 588, 592-94 (7th Cir. 1998). A lack of comparability may cut either way: the proxy may understate the success the plaintiff would have achieved but for the violation, making the damages estimate conservative, or may overstate the plaintiff's but-for success, inflating the damages. Defendants will naturally focus on the latter possibility to the exclusion of the former. Because a proxy methodology is a necessarily imprecise way to isolate the effects of an antitrust violation, its sufficiency, at least as an initial matter, should rest on a standard of overall reasonableness, subject to more detailed rebuttal. *See, e.g.*, National Farmers' Org. v. Assoc. Milk Producers, 850 F.2d 1286, 1294-97 (8th Cir. 1988), *amended*, 878 F.2d 1118 (8th Cir. 1989).

32. *See, e.g.*, Eleven Line v. N. Tex. State Soccer Ass'n, 213 F.3d 198, 206-09 (5th Cir. 2000) (average of plaintiff's experience in other markets not shown to be comparable is insufficient).

33. *See, e.g.*, Image Tech. Servs. v. Eastman Kodak Co., 125 F.3d 1195, 1221 (9th Cir. 1997); *In re* Prograf Antitrust Litig., No. 11-2242, 2014 WL 7641156, at *3 (D. Mass. Dec. 23, 2014) ("[i]t was for the jury to consider [plaintiff's] arguments about the [differences between the yardstick and the but-for world] on the validity of comparison and to adjust its damage award accordingly") (internal quotes and citation omitted; alterations in original).

approximation is necessary for damages, so a proxy can be applied even if it does not fully correspond to the plaintiffs' situation.[34]

Because the before-during-after approach looks outside the damages period in the same market, and the yardstick approach looks to a different market, one may need to examine changes in economic conditions over time or across markets, the plaintiff's circumstances, or other variables which could affect prices, sales, and profits. One tool widely used by economists to account for such changes in economic conditions is a statistical technique known as multiple regression analysis.[35] In the context of antitrust damages, multiple regression analysis is useful because it allows an expert to control for variables *other* than the anticompetitive conduct that may change between the damages period, or the market in question, and the benchmark or yardstick used to model the but-for world. Regression analyses are discussed in greater detail in Chapter 6.

Projection-Based Models. Courts have also accepted internal business projections by market actors of expected prices, sales, or profits for the damages period, formulated before the violation was known or anticipated, as the basis for but-for predictions.[36] As one court has noted:

> [I]nternal projections for future growth often serve as legitimate bases for expert opinions. Businesses are generally well-informed about the industries in which they operate, and have incentives to develop accurate projections. As such, experts frequently use a plaintiff's business plan to estimate the plaintiff's expected profits in the absence of the defendant's misconduct.[37]

34. *See, e.g., National Farmers' Org.*, 850 F.2d at 1295 (affirming use of yardsticks despite "many defects" and although they may not be "perfect").

35. *See, e.g.*, Conwood Co. v. U.S. Tobacco Co., 290 F.3d at 768, 793-95 (6th Cir. 2002); City of Tuscaloosa v. Harcros Chems., Inc., 158 F.3d 548, 566 (11th Cir. 1998) (regression analysis is among "well-established and reliable methodologies" for proving antitrust damages); *In re* High Pressure Laminates Antitrust Litig., No. 00 MDL 1368 (CLB), 2006 WL 931692, at *1 (S.D.N.Y. Apr. 7, 2006) (refusing to exclude regression damages model).

36. *See, e.g.*, H.J., Inc. v. ITT Corp., 867 F.2d 1531, 1549-50 (8th Cir. 1989); MCI Commc'ns Corp. v. AT&T, 708 F.2d 1081, 1099, 1160-66 (7th Cir. 1983); Autowest, Inc. v. Peugeot, Inc., 434 F.2d 556, 563-67 (2d Cir. 1970).

37. ZF Meritor, LLC v. Eaton Corp., 696 F.3d 254, 292 (3d Cir. 2012) (internal quotes and citations omitted). *See also* LePage's Inc. v. 3M, 324 F.3d 141, 165 (3d Cir. 2003) (affirming damage award that used, inter alia, projections as basis for computing extent of injuries); *Autowest*, 434 F.2d

However, if a defendant shows that actual events and conditions during the damages period (unrelated to the violation) departed substantially from the assumptions underlying the projections, an inference that the plaintiff failed to achieve its projected performance solely because of the violation may be undermined or weakened.[38]

Cournot and Bertrand Models. Cournot and Bertrand models provide another means to predict the prices that would have prevailed in the but-for market, and hence damages in private antitrust actions. They can be particularly useful in cases where before-during-after models and yardsticks may be unavailable or difficult to derive. The Cournot and Bertrand models are structure-based models with assumptions made regarding non-cooperative strategic interaction among the firms absent conspiratorial behavior. The Cournot model assumes that interaction among firms sets quantities and their customers pay the prices determined by the total output.[39] The Bertrand model assumes that interaction among firms sets prices and their customers choose quantities at the prices set.[40] In the Bertrand and Cournot approaches to quantifying damages, but-for prices are simulated based on the theoretical relationship between price and factors such as market-concentration, demand elasticity, and marginal cost.[41]

The Department of Justice and the Federal Trade Commission use Cournot and Bertrand models routinely in evaluating prospective mergers

566 (holding that damages testimony was admissible because the financial projections on which the testimony was based "were the product of deliberation by experienced businessmen charting their future course"). *Cf. In re* Nifedipine Antitrust Litig., 246 F.R.D. 365, 371 (D.D.C. 2007) (defendants' projections that prices would have been lower for purchasers in but for world were among "powerful and compelling" proof of plaintiffs' injuries).

38. *See, e.g.*, ILC Peripherals Leasing Corp. v. IBM, 458 F. Supp. 423, 434-36 (N.D. Cal. 1978) (failure to "adjust these forecasts to reflect the results of actual experience" rendered damages evidence speculative), *aff'd per curiam sub nom.* Memorex Corp. v. IBM, 636 F.2d 1188 (9th Cir. 1980). *See also ZF Meritor*, 696 F.3d at 292 (affirming exclusion of damage model based on projection due to lack of information of circumstances under which projection was created and the assumptions it relied upon).
39. *See* Dennis W. Carlton and Jeffrey M. Perloff, Modern Industrial Organization 161-70 (4th ed. 2005).
40. *Id.* at 171-76.
41. *See* James A. Brander and Thomas W. Ross, *Estimating Damages from Price-Fixing*, in LITIGATING CONSPIRACY 349-351 (Stephen Pitel, ed. 2006).

to predict what prices would exist if two firms merged.[42] These agencies rely on these techniques because, as the agencies are attempting to forecast the implications of merger that has not been consummated and whose price effects are as yet unknown, data are not available to construct a before-during-after model. Bertrand and Cournot models can similarly be used to predict but-for prices in private antitrust actions where before-during-after methods are not available.[43] As with other types of predictive constructs, Bertrand and Cournot models must be rooted in the facts of the case.[44] Indeed, because Bertrand and Cournot models are frequently based on data which is specific to the market which is subject to the misconduct, they may have an advantage over yardstick models that rely on entirely different markets.[45]

* * *

The use of any of the above models is not required, and the plaintiff may instead build its but-for world based on other relevant data and

42. See Andrew R. Dick, Merger Policy Twenty-Five Years Later: Unilateral Effects Move to the Forefront, ANTITRUST 25 (Fall 2012), at 26-27.
43. *See, e.g.*, Castro v. Sanofi Pasteur Inc., No. 11-7178, 2015 WL 5770381, at *11 (D.N.J. Sept. 30, 2015) (allowing use of Bertrand model in computing damages); Ticketmaster Corp. v. Tickets.com, Inc., No. 99-7654, 2003 WL 25781900, *3 (C.D. Cal. Jan. 27, 2003) (refusing to exclude Cournot model of private antitrust damages).
44. *See, e.g.*, Concord Boat Corp. v. Brunswick Corp., 207 F.3d 1039 (8th Cir. 2000). In *Concord Boat*, the district court had upheld "the soundness of the Cournot model as a fundamental, time-tested economic tool that has been widely accepted for years by reputable economists," and noted that "the Cournot model provides the theoretical underpinnings for the Department of Justice's Horizontal Merger Guidelines and the widely used Herfindahl-Hirschman Index (the 'HHI')." Concord Boat Corp. v. Brunswick Corp. 21 F. Supp.2d 923, 934 (E.D. Ark. 1998). The Court of Appeals did not take issue with the acceptability of Cournot models generally, but found that the specific model offered by the plaintiffs was "not grounded in the economic reality" of the market because it assumed competitors were identical and would have each have 50 percent share in hypothetical market, but ignored that competitors were not symmetric and that defendant's share exceeded 50 percent even before it began engaging in the alleged anticompetitive conduct. *Concord Boat*, 207 F.3d at 1056-57.
45. *See, e.g.*, *Castro*, 2015 WL 5770381, at *12 (discussing ways in which Bertrand model may be superior to other damage models).

economic theory.[46] In that case, however, it may he challenging for the plaintiff to establish that the difference between the custom-built but-for plaintiff and the plaintiff's actual experience is attributable to the violation.[47] A simpler approach might be to estimate the profits the plaintiff would have made on sales to specific customers lost because of the violation.

Several courts have further held that a plaintiff must disaggregate the effects of the violation from other, lawful causes of plaintiffs' harm. If the model on its face indistinguishably includes effects of lawful and unlawful conduct, and it is impossible to distinguish the effect of each on prices and profits, then it may be vulnerable to attack.[48] Also, a defendant may

46. As the Fifth Circuit held in *Lehrman v. Gulf Oil Corp.*, 500 F.2d 659, 668 (5th Cir. 1974), the plaintiff's method of proving damages may be "specially tailored" to fit its case. For examples of such damages models, see DeLong Equip. Co. v. Wash. Mills Elec. Minerals Corp., 990 F.2d 1186, 1203-06 (11th Cir.), *amended per curiam*, 997 F.2d 1340 (11th Cir. 1993); Dolphin Tours v. Pacifico Creative Serv., 773 F.2d 1506 (9th Cir. 1985) (estimated but-for market share based on survey of customers); Park v. El Paso Bd. of Realtors, 764 F.2d 1053, 1066-68 (5th Cir. 1985); Southern Pac. Commc'ns Co. v. AT&T, 556 F. Supp. 825, 1073-90 (D.D.C. 1983), *aff'd*, 740 F.2d 980 (D.C. Cir. 1984).

47. *See, e.g.*, *Southern Pac. Commc'ns*, 556 F. Supp. at 1092-93 (stating that difference between financial performance of but-for and actual plaintiff "due at least in substantial part to a number of factors wholly unrelated to any conduct (lawful or unlawful) of defendants"); *In re* IBM Peripheral EDP Devices Antitrust Litig., 481 F. Supp. 965, 1019-21 (N.D. Cal. 1979) (holding that "arbitrary" adjustments to account for "other causative factors" were insufficient), *aff'd sub nom.* Transamerica Computer Co. v. IBM, 698 F.2d 1377 (9th Cir. 1983). A custom-built model survived similar attacks in *Litton Systems v. AT&T*, 700 F.2d 785, 822-25 (2d Cir. 1983).

48. *See, e.g.*, Comcast Corp. v. Behrend, 133 S. Ct. 1426, 1433 (2013) (holding plaintiffs failed to present viable classwide damages approach where the damage model was tied to multiple theories of liability, but only one theory was triable); MCI Commc'ns Corp. v. AT&T, 708 F.2d 1081, 1161-64 (7th Cir. 1983). *But see* LePage's Inc. v. 3M, 324 F.3d 141, 165-66 (3d Cir. 2003) (stating that given that 3M's conduct taken as a whole violated Section 2, disaggregation was "unnecessary, if not impossible."); National Farmers' Org. v. Assoc. Milk Producers, 850 F.2d 1286, 1307 (8th Cir. 1988) (the fact that defendants' actions were "composed of lawful and unlawful conduct so tightly intertwined as to make it difficult to determine which portion of the damages claimed were caused by the unlawful conduct should not diminish the recovery" and that "the harmful

attempt to show that independent causal factors other than the violation explain at least some substantial part of the difference between the but-for plaintiff's experience and that of the actual plaintiff.[49] However, the antitrust plaintiff need not prove the violation was the only cause of its damages; proof that the violation was a material cause of its damages is sufficient, as discussed in prior chapters.[50] Thus, a plaintiff is entitled to recover damages caused jointly by lawful and unlawful means. In addition, where two or more wrongdoers cause a harm to the plaintiff that is incapable of division, then damages should not be apportioned, and each wrongdoer is liable for the entirety of the harm done.[51]

While the focus is often on whether the plaintiff's damages model has adequately isolated the effects of the violation, occasionally the plaintiff's but-for world is rejected on its face as not credible. For example, the posited but-for competitor plaintiff may be unrealistically successful, indicating that the calculated damages are inflated. Astronomical rates of return claimed by a plaintiff seeking lost profits, for example, will likely cast doubt on the reasonableness of the plaintiff's quantification, regardless of how it was derived.[52] Another potential failing of a plaintiff's damages theory may arise if, when applied in a context in which there is no misconduct, it nonetheless yields positive damages.[53]

consequences of certain unlawful conduct may have been exacerbated by otherwise lawful conduct," and that in that case "the fact that lawful conduct contributed to additional injury should not prohibit recovery for that injury"); Spray-Rite Serv. Corp. v. Monsanto, 684 F.2d 1226, 1242-43 (7th Cir. 1982) (defendant had not demonstrated that disaggregation was possible or necessary, and that "[w]e will not deprive Spray-Rite of this recovery merely because the jury may have found that Monsanto combined lawful conduct with unlawful conduct making it impossible to determine which portion of the total damages was caused by the unlawful conduct."), *aff'd*, 465 U.S. 752 (1983).

49. *See, e.g.*, *Southern Pac. Commc'ns*, 556 F. Supp. at 1090-91.

50. *See* Zenith Radio Corp. v. Hazeltine Research, 395 U.S. 100, 114 n.9 (1969). *See also* Chapter 1, Section B for a discussion of the material cause standard.

51. Discover Fin. Servs. v. Visa USA, Inc., 598 F. Supp. 2d 394, 410-12 (S.D.N.Y. 2008).

52. *See* Olympia Equip. Leasing Co. v. W. Union Tel. Co., 797 F.2d 370, 381-83 (7th Cir. 1986).

53. *See, e.g.*, *In re* Rail Freight Fuel Surcharge Antitrust Litig., 725 F.3d 244 (D.C. Cir. 2013). In *Rail Freight*, the court held that the presence of such "false positives" left the damages methodology subject to criticism. *See id.* at 253-55.

Similarly, the quantification will be weakened if the defendant can show that it conflicts with basic economic forces. For example, an impaired competitor plaintiff may claim that absent the illegal conduct, it could have charged higher prices—prices higher than any of its competitors. Absent an explanation of how it could have maintained such high prices for a sustained period without inviting price competition, expansion, or new entry, such a damages model may defy economic theory. Moreover, an assumption that the but-for plaintiff would charge higher prices than those the plaintiff actually charged, while maintaining or increasing sales volume, would require further examination as to whether and how such a claim can conform to basic economic theory.[54]

D. Mitigation

After an antitrust plaintiff has demonstrated the impact of the violation, some courts have held that it must take reasonable measures to minimize its damages.[55] Failure to take reasonable steps to mitigate damages may be a reason to reduce, or even eliminate altogether, damages claimed by the plaintiff.

The defendant has the burden to prove that the plaintiff did not mitigate its antitrust damages, and that the plaintiff's conduct in failing to take steps to mitigate was unreasonable and aggravated the harm.[56] The plaintiff does not have an absolute obligation to pursue an alternative course of conduct.[57] Hindsight should not be used to gauge whether the plaintiff should have adopted an alternative that, as it turns out, would have been beneficial.[58] The test is whether it was unreasonable under the circumstances for the plaintiff to forgo the mitigation opportunity, not simply whether the opportunity was the next best alternative available.[59]

54. *See, e.g.*, Gray v. Shell Oil Co., 469 F.2d 742, 749-50 (9th Cir. 1972).
55. *See, e.g.*, Malcolm v. Marathon Oil Co., 642 F.2d 845, 863 (5th Cir. 1981) (observing that under contract law, injured party need only pursue "reasonable" efforts to mitigate damages).
56. *See, e.g.*, *Malcolm*, 642 F.2d at 863. *See also* Litton Sys., Inc. v. AT&T Co., 700 F.2d 785, 820 n.47 (2d Cir. 1983) (mitigation is an affirmative defense which defendant must plead and prove).
57. *Cf.* RESTATEMENT (SECOND) OF CONTRACTS § 350 (1981).
58. *See, e.g.*, Veranda Beach Club v. W. Surety Co., 936 F.2d 1364, 1386 (1st Cir. 1991).
59. *See* Fishman v. Estate of Wirtz, 807 F.2d 520, 556-60 & n.34 (7th Cir. 1986) (holding that mitigation doctrine does not necessarily require plaintiff to undertake the risks of the next best alternative to an unlawfully foreclosed investment).

The plaintiff must be shown to have failed to take reasonable steps to avoid its damages.[60] For instance, in the case of a terminated distributor pursuing a refusal to deal theory, the plaintiff may not recover for the loss of its business if it "bypasse[d] an obviously adequate alternative supplier[.]"[61] However, in cases where the affected product was not available from another source (as is often the case for a purchaser of a product subject to a price-fixing conspiracy), the purchaser plaintiff may be relieved of a duty to mitigate.[62] Moreover, where the violators concealed their wrongdoing, the plaintiff cannot be expected to mitigate or otherwise offset damages that the plaintiff does not know it is incurring.[63]

Actual mitigation efforts by the plaintiff may affect its recoverable damages in a number of ways. Whether or not the efforts are successful, reasonable expenditures pursuing them are recoverable.[64] Even if the mitigation proves successful, the disruption suffered while the plaintiff

60. *Malcolm*, 642 F.2d at 863.
61. *Id.*
62. *See In re* TFT-LCD (Flat Panel) Antitrust Litig., No. M 07-1827 SI, 2012 WL 6000154, at *3 (N.D. Cal. Nov. 30, 2012) ("the Court declines to hold that defendants may assert mitigation as a defense to Dell's horizontal price-fixing claim"); *In re* Airline Ticket Comm'n Antitrust Litig., 918 F. Supp. 283, 286 (D. Minn. 1996) ("[i]n a horizontal price-fixing case, . . . mitigation and offset generally do not affect the ultimate measure of damages."); Westman Comm'n Co. v. Hobart Corp., 541 F. Supp. 307, 314-15 (D. Colo. 1982) (refusal-to-deal case; the "argument that [plaintiff] failed to mitigate its damages . . . is ridiculous. This argument implicitly assumes that [defendant] was guilty of a continuing violation of the antitrust laws, yet attempts to place the onus of stopping that violation on [plaintiff] . . . . [A] defendant [cannot] claim immunity from damages caused by its illegal actions because a plaintiff could have stopped them . . . .").
63. *See, e.g.*, Home Indem. Co. v. Lane Powell Moss & Miller, 43 F.3d 1322, 1329 (9th Cir. 1995) ("[T]he duty to mitigate damages does not arise until the party upon whom the duty is impressed is aware of facts making the duty to mitigate necessary." (citation omitted)); Ford Motor Credit Co. v. Hairston, No. 4:06CV00004, 2006 WL 2850615, at *4 (W.D. Va. 2006) ("[I]t would be an absurd misapplication of the rule for mitigation of damages to expect the Plaintiff to minimize injury before the discovery of the breach.").
64. *See* Cont'l Airlines, Inc. v. United Airlines, Inc., 277 F.3d 499, 508 (4th Cir. 2002) (costs of finding alternatives to mitigate damages qualify as antitrust injury); Lee-Moore Oil Co. v. Union Oil Co., 599 F.2d 1299, 1306 (9th Cir. 1979).

Hence, an essential question that must be addressed in order to determine if a forecasting model can be used to forecast but-for prices is whether the economic model is stable between the estimation period and the anticompetitive period. The difficulty, of course, is that this is a question that involves comparing the model in the competitive period to what the model would have been in the anticompetitive period, absent the anticompetitive behavior. Thus, the forecasting approach does not avoid the fundamental problem of estimating "causal effects"—in fact, it makes the problem in some ways more complex because it requires that the stability of an entire equation be assessed.

One way to test a forecasting model is to see how well it predicts for some time period before the alleged anticompetitive act, assuming adequate data are available, or more generally to see if the forecasting model yields accurate predictions for periods assumed to be free of the allegedly anticompetitive act.[176] To implement such a test, one would divide the data from before the alleged anticompetitive act into two parts: one part is used to estimate the forecasting model, and the other part is used to assess the accuracy of the forecasts of the model. It is particularly useful to exclude from the part of the data used to estimate the model observations that contain a turning point (e.g., a substantial change in prices). If the forecasting model is reliable, then it should produce a reasonably accurate forecast for the part of the data not used in estimation. In particular, it should be able to predict any turning points. If the model does a poor job forecasting in this context, then it is unlikely to produce a reliable estimate of but-for prices during the period of the anticompetitive act.

Another way to test a forecasting model for stability is to perform Chow tests of stability during the competitive period. The logic is that if the econometric model is not stable during the competitive period, then there is a reasonable presumption that the model is unlikely to be stable when applied to the anticompetitive period. Furthermore, if there are two or more possible regimes during the competitive period, then it will require additional, careful economic analysis to determine whether any of these models are appropriate for the forecasting in the period during which the alleged anticompetitive conduct occurred. Of course, evidence of stability during the competitive period does not imply that the model estimated on the competitive period is appropriate for forecasting during the anticompetitive period, but evidence of instability during the competitive

176. KENNEDY, *supra* note 27, at 102.

period may create a presumption that forecasting models are unlikely to satisfy the required stability.

F. Before-During and Related Approaches to Damages

The before-during approach identifies the effect of the alleged anticompetitive conduct by using data from a period before the alleged conduct in combination with data from the period when the alleged conduct occurred.[177] Comparing the values of the dependent variable in the "before" period to its values in the "during" period may serve to identify the effect of the alleged conduct.[178]

To establish the extent, if any, of damages, it is generally useful to begin with a simple data analysis as a prelude to performing a more sophisticated analysis. For example, it may be useful to compare average prices before and after an alleged price-fixing agreement was implemented to explore the potential magnitude of a conspiracy-related overcharge. In industries in which prices tend to be relatively stable (e.g., vitamins, hydrogen peroxide), such price comparisons can often be done via a simple comparison of price levels during and outside the alleged cartel period. However, in industries in which prices are trending up or down (e.g., the high technology industries that have been the subject of several recent cartel investigations and in which prices are often falling rapidly), the more relevant question is generally whether, at the start or end of the alleged cartel, there is a break from the prevalent trend in prices.

In making this comparison, however, it is generally important to account for any significant differences in other economic factors between the before and during periods.[179] A basic comparison of average prices in different periods, however, does not hold constant other factors that may impact price. Thus, the initial analysis of averages is usefully supplemented with regression analysis.

177. *See* van Dijk & Verboven, *supra* note 19, at 2335-36.
178. *Id.* The before period may be considered the control period and the during period the treatment period. See the discussion in part I of this chapter.
179. *See* van Dijk & Verboven, *supra* note 19, at 2335-36.

G. Benchmark and Difference-in-Differences Approaches to Damages

Two additional methods are sometimes used to estimate the impact of alleged conduct on the outcome of interest: (1) benchmark models; and (2) difference-in-differences models. Both approaches to damages are based on the same basic principles and econometric tools as the before-during-after approach.

The benchmark analysis compares the outcome of interest (e.g., price) in the affected market to that same outcome in an unaffected benchmark market.[198] The benchmark market (or markets) can be a different geographic area or a different end-use market, although when using a different end-use market it can be particularly challenging to control sufficiently for all of the differences between the markets. The key is that the benchmark markets, however chosen, were unaffected by the alleged anticompetitive conduct. Further, the benchmark and affected markets should be characterized by sufficiently comparable economic conditions (at least after controlling for observable factors) such that prices in those markets would have been identical had there been no anticompetitive behavior.[199] The benchmark approach may be particularly useful if there are inadequate data for the before period, so that a before-during approach cannot reliably be performed.

The difference-in-differences model compares the differences in outcomes before and after the alleged anticompetitive conduct across the benchmark and affected markets. Under the assumption that the differences would have been stable, controlling for observable factors, but for the alleged anticompetitive conduct, the difference-in-differences provides an alternative approach to estimating damages. (Said differently, the difference-in-differences model requires an assumption that the market outcome would have changed in the same way in both the benchmark and affected markets, after controlling for observable factors, absent the alleged anticompetitive conduct.) The difference-in-differences approach can be implemented using a regression that takes into account the various factors that differ between markets and time periods.

The difference-in-differences approach requires data for the market of interest and the benchmark market that cover both a period of time that is unaffected by the alleged anticompetitive act and the period of time when the market of interest allegedly was affected. Thus, the difference-in-differences approach combines the before-during and benchmark approaches.[200]

198. van Dijk & Verboven, *supra* note 19, at 2336.
199. *Id.*

To take a simple example, suppose that Market A is presumed to be affected by a conspiracy and Market B is not. Suppose that prices in the non-conspiracy period in Market A are $15 and in Market B are $10. Further suppose that the prices in the conspiracy period in Market A are $40 and in Market B are $20. A basic before-during analysis, without controlling for anything else, would conclude that prices in Market A are $25 higher in the during period than the benchmark period. However, this estimate is likely to overstate the effect because prices were rising in general (e.g., in Market B). Similarly, a benchmark approach that compared Market A to Market B in the conspiracy period without controlling for anything else would conclude that prices are $20 higher in Market A than Market B. However, this estimate is also likely to overstate the effect of the conspiracy because it fails to take into account that prices in Market A are generally higher than in Market B (e.g., during the benchmark period). The difference-in-differences approach combines these two approaches by recognizing that the difference between prices in Market A and Market B was $5 in the benchmark period and $20 in the during period. Thus, it would conclude that the effective price difference was really $15.[201]

H. Summary of Key Points in Creating and Evaluating Econometric Models of Damages

As can be surmised from the previous sections, a number of considerations should be taken into account when building or evaluating an econometric model used to estimate damages.[202] Model specification and estimation involve many choices: explanatory variables, functional form, dynamic specification in a time series, estimation technique, and which of the basic approaches to damages to use. In many cases, statistical tests can help guide these choices. However, the starting point for any econometric model is economic theory and knowledge of the industry, along with confidence, that there are sufficiently reliable data to perform an econometric analysis.

200. WOOLDRIDGE, *supra* note 1, at 148.
201. A similar analysis could be undertaken based on percentage rather than level differences.
202. Much of the discussion here and elsewhere in this chapter can be applied to any econometric analysis. *See, e.g.*, WOOLDRIDGE, *supra* note 1; GREENE, *supra* note 2.

independent) variables are assumed to represent the major influences on price. These variables can include quantitative data, such as costs, prices of substitutes, inflation, and other indicators of supply and demand. In addition, "dummy variables" (which take on the values of one or zero) also can be used to control for other significant events, such as raw material shortages, plant interruptions, seasonality, and changes in government regulations. When properly specified, the model provides an estimate of the average price given specific values of the independent variables and their estimated coefficients.[15] The following section, discusses how such an economic model might be constructed and overcharges estimated for a typical price-fixing case.

C. Horizontal Price Fixing

The measure of damages that is commonly used in price-fixing cases is the overcharge multiplied by the relevant purchased quantity.[16] Simply put, the overcharge is the difference between the actual price paid and the competitive price, or the price that would have been charged absent the illegal agreement. Early on, the Supreme Court recognized the overcharge

influence supply and demand (such as costs, prices of substitutes, etc.). In principle, prices (and quantities) are the solution to a system of structural equations informed by economic theory, one equation for supply and one for demand. A reduced form model combines these relationships into a simpler expression by using the equilibrium condition that supply equals demand. A drawback to using a reduced-form equation is that it makes it more difficult to separate movements along the supply curve caused by anticompetitive behavior from shifts in the demand or supply curves caused by exogenous factors. *See Econometrics,* supra note 7, Chapter 3; Baker & Rubinfeld, *supra* note 7 (discussing class certification overcharge models in *In re* Propylene Carpet Antitrust Litigation, 996 F. Supp. 18 (N.D. Ga. 1997)).

15. If the average overcharge is not the most appropriate measure of the overcharge, in some circumstances the economic model may be constructed in a manner that yields estimates of overcharges for individual plaintiffs or groups of plaintiffs and for specific subperiods.
16. The precise calculation will depend on the construction of the overcharge model, which might for example estimate the overcharge as a percentage increase or as dollars per unit.

as the principal measure of harm in price-fixing cases.[17] Several methods are commonly used to estimate the overcharge.[18]

1. Before-During-After Model

The most conceptually straightforward method for estimating the cartel overcharge is through a "before-during-after" model.[19] This model is premised on the assumption that prices before and after, but not during, the relevant period were set free of any illegal cartelization. Using data from both the before and after time periods as nonconspiracy benchmarks, a model is constructed to estimate the but-for prices during the relevant period.[20] Overcharges are then estimated as the difference between the actual prices charged and the prices the model predicts would have been charged during the relevant period.[21] As noted in Chapter 6, when sufficient data for the period after the anticompetitive behavior are not available, a variation of the before-during-after model—the before-during model—may be used, where the nonconspiracy benchmark is restricted to the period before the alleged conspiracy.[22]

The simplest form of the before-during-after model assumes that the weighted average prices from *outside* the relevant period are a reasonable approximation of the prices *during* the relevant period absent the conspiracy. Put differently, this approach assumes that the entire price difference between the conspiracy period and nonconspiracy period was

17. *See* Chattanooga Foundry & Pipe Works v. Atlanta, 203 U.S. 390, 396 (1906) (affirming an award of damages based on "the difference between the price paid and the market or fair price that the city would have had to pay under natural conditions had the combination been out of the way").
18. Other methods have been proposed. For example, Douglas Zona proposes structural modeling to identify but-for prices and overcharges. See J. Douglas Zona, *Structural Approaches to Estimating Overcharges in Price-Fixing Cases*, 77(2) ANTITRUST L. J. (2009).
19. *See also* Chapter 6 for a discussion of Before-During-After models.
20. *See* Conwood Co. v. U.S. Tobacco Co., 290 F.3d 768, 793 (6th Cir. 2002) (before-during-after and regression analyses are "generally accepted methods for proving antitrust damages").
21. Unit charges may be lower than posted prices because customers are awarded credits or qualify for discounts.
22. *See In re* Auction Houses Antitrust Litig., No. 00-cv-0648, 2001 U.S. Dist. LEXIS 1713 (S.D.N.Y. 2001) (price-fixing overcharges estimated using the period before the conspiracy as the nonconspiracy period). In theory, the reverse may also be possible: a during-after model where the nonconspiracy benchmark is restricted to the period after the conspiracy.

due to the alleged anticompetitive conduct. While this strong assumption could hold in some circumstances, it is rarely justified, especially for lengthy conspiracy periods. First, the before-during-after model assumes that prices from the benchmark period are a good approximation of long-run equilibrium prices. It is important, however, to examine the economic conditions in the before and after periods for entry or exit, surpluses or shortages, or factors that would indicate that the market had not reached long-run equilibrium. For example, if price wars give rise to a cartel, then preconspiracy prices would not reflect long-run equilibrium prices.[23] Second, the assumption that but-for prices would have been constant during the relevant period generally implies that there were also no changes in the economic factors that normally determine prices—for example, changes in demand, changes in costs,[24] entry or exit of firms, or capacity constraints.[25] Third, the use of aggregate average prices from the benchmark period would produce inaccurate overcharge estimates for individual customers if their prices would have differed, for example, due to individualized negotiations and variation in bargaining power.

These limitations may be addressed through more rigorous methods that apply econometric techniques to estimate the but-for prices—such as dummy variable models and prediction models—while controlling for other factors that may have affected prices. Econometric techniques can be used to evaluate data relating to competing theories of the relationship

23. In the lysine matter, the plaintiffs' model was challenged on the grounds that the but-for world would have reflected oligopoly pricing instead of perfectly competitive pricing, and the alleged conspiracy period may have reflected normal seasonal pricing. *See* Lawrence J. White, *Lysine Price Fixing: How Long? How Severe?*, 81 REV. INDUS. ORG. 23 (2001).
24. The cartel may affect the price of an input, and failure to recognize this effect may lead to biased results. *See* Halbert White, Pauline Kennedy, and Robert Marshall, *The Measurement of Economic Damages in Antitrust Civil Litigation*, ECONOMICS COMMITTEE NEWSLETTER, American Bar Association, Section of Antitrust Law, Spring, (2006), pp. 17-22.
25. *See In re* Live Concert Antitrust Litig., 863 F. Supp. 2d 966, 976-79 (C.D. Cal. 2012) (finding expert's before-and-after model was unreliable because it failed to control for "changes in concert quality during the relevant time period."); Stein v. Pac. Bell, No. 00-CV-2915, 2007 WL 831750, at *12 (N.D. Cal. Mar. 19, 2007) ("Courts have consistently rejected 'before-and-after' models when experts failed to perform regression analysis or otherwise account for variables in the marketplace."); Blue Dane Simmental Corp. v. Am. Simmental Ass'n, 178 F.3d 1035, 1040-41 (8th Cir. 1999) (finding expert's before-and-after model was unreliable due to a failure to identify or examine other independent variables).

between a variable of interest—such as price—and a number of explanatory variables, as well as the magnitude of the effect of the explanatory variables on the variable of interest.[26] The use of econometric techniques should be guided by a sound economic model. Otherwise, the techniques may produce spurious results, estimates that do not reflect the counterfactual accurately or perhaps at all. Econometric techniques must also be used with appropriate data to produce reliable results.[27]

Dummy variable and prediction models are two different approaches to implement a before-during-after analysis, both of which allow one to control for factors that change over time and explain some of the observed price differences.[28] In a dummy variable model, price is related to various explanatory factors including a "dummy variable" to account for the influence of a conspiracy. A dummy variable takes on the value of one for observations during the conspiracy and zero for observations outside the conspiracy period.[29] The estimated coefficient of conspiracy period dummy variables provides an estimate of the average overcharge due to

26. For more extensive discussions of econometric modeling, *see Econometrics;* supra note 7; Rubinfeld, *supra* note 7 and Chapter 6.
27. *See In re* Plastic Cutlery Antitrust Litig., No. 96-cv-728, 1998 U.S. Dist. LEXIS 3628, at *22-23 (E.D. Pa. 1998) (as it pertains to generalized proof of impact in class certification, "[t]he court of appeals has noted that multiple regression analysis is reliable when based upon complete and accurate data").
28. For more discussion of dummy variable and prediction models, *see* Chapter 6.
29. *See In re* Chocolate Confectionary Antitrust Litig., 289 F.R.D. 200, 212 (M.D. Pa. 2012) (describing dummy variable approach to measuring overcharge). The economic model must be built on an understanding of the product market and what variables are affected by the conspiracy. *See*, ROBERT C. MARSHALL AND LESLIE M. MARSHALL, THE ECONOMICS OF COLLUSION: CARTELS AND BIDDING RINGS (2012).

the price-fixing activity[30] on either a dollar or percentage basis.[31] The dummy variable model is an econometric technique for estimating the before-during-after model, and thus here it is also essential to address whether the benchmark period prices are a good reflection of long-run equilibrium prices.[32]

In some cases, however, the use of a dummy variable to estimate the impact of the conspiracy on prices yields a negative coefficient for the dummy variable, suggesting that collusive prices were *lower* than competitive prices.[33] This apparently surprising result does not necessarily mean that the use of the dummy variable approach was incorrect; it may be an artifact of a variety of data and other econometric issues. A negative coefficient for the dummy variable, however, may actually be consistent with the economic model and suggest that: (1) the alleged conspiracy never occurred; (2) it triggered price wars; (3) it was ineffectual; or (4) it

30. *See* Justin McCrary and Daniel Rubinfeld, *Measuring Benchmark Damages in Antitrust Litigation*, 3 JOURNAL OF ECONOMETRIC METHODS 1 (2014). If more than one dummy variable is used, their values may be established to distinguish different subperiods within the conspiracy period. This may provide a more accurate estimate of overcharges if the effectiveness of the conspiracy varied over time or if there would have been important changes in the economic conditions affecting prices in the but-for world that could not otherwise be captured by the model. In class action cases where class membership varies over time, estimating an overcharge for various subperiods may lead to a more accurate estimate of overcharges for specific class members than would an estimate of the average overcharge over the entire relevant time period.

31. The coefficient of the conspiracy period dummy variable is the average overcharge expressed in the same units as the price for linear models; for example, where the price variable is expressed in dollars (often referred to as price "level"), the overcharge is also in dollars. If the price variable reflects the natural logarithm of the prices, the conspiracy dummy variable coefficient (multiplied by 100) is approximately the percentage overcharge.

32. *See In re* Ethylene Propylene Diene Monomer (EPDM) Antitrust Litig., 256 F.R.D. 82 (D. Conn. 2009) (order granting motion for class certification and approving use of dummy variable).

33. *See In re* Aluminum Phosphide Antitrust Litig., 893 F. Supp. 1497, 1503 n.14 (D. Kan. 1995) (noting that for two of the four defendant companies, the dummy variable analysis indicated that "defendants' prices were actually *lower* than would have been expected during the conspiracy period."); *In re* Chicken Antitrust Litig., 560 F. Supp. 963, 993 (N.D. Ga. 1980) (noting that regression yielded negative coefficient for the collusion dummy variable).

was outweighed by other events that took place during the relevant time period that exerted downward pressure on prices. In contrast, estimated results that do not comport with the underlying economic model—such as an estimated coefficient that has the wrong sign or one that should be, but is not, statistically significant—generally could indicate problems with the econometric approach. For example, the prices of substitutes included as explanatory variables may also be influenced by the dependent variable. In such circumstances, the expert may need to rely upon more advanced econometric approaches.[34]

An alternative to the dummy variable model is the prediction (or residuals) model, which could be used, for example, where the alleged conspiracy affected prices in ways that are not captured by one or more "conspiracy" dummy variables. The prediction model involves using data from the nonconspiracy period to econometrically estimate the coefficients for the independent variables, and then applying those coefficient estimates to the actual values of independent variables during the conspiracy period to predict nonconspiracy prices during the conspiracy period. The differences or "residuals" between the predicted (nonconspiracy) prices and the actual (conspiracy) prices yield an estimate of the overcharge.[35] Unlike the dummy variable model, this model uses price data solely from outside the conspiracy period. Whether it is appropriate to pool pre- and post-conspiracy price data depends on the economic characteristics of those periods. Because pooling may have a significant effect on econometric results, it should be carefully considered.

Applying estimates of preconspiracy or postconspiracy prices to the conspiracy period is known as *forecasting*; forecasting based on post-conspiracy data alone is sometimes referred to as *backcasting*. There are

34. See the discussion of more advanced econometrie techniques in Chapter 6. See also similar discussions in *Econometrics*, supra note 7; Zona, *supra* note 10; Fisher, *supra* note 7; WILLIAM H. GREENE, ECONOMETRIC ANALYSIS Chapter 8 (7th ed. 2012); ABA SECTION OF ANTITRUST LAW, ECONOMETRICS (2005). An alternative econometric model to the commonly used models is presented in Yuliya Bolotova, John Connor and Douglas Miller, *The Impact of Collusion on Price Behavior: Empirical Results from Two Recent Cases*, 26(6) INTERNATIONAL JOURNAL OF INDUSTRIAL ORGANIZATION 1290-1307 (2008).

35. In principle, one could also estimate the equation using data from the conspiracy period and reverse the procedure as Fisher did to illustrate the problems with a different model used in *In re* Corrugated Container Antitrust Litigation, 441 F. Supp. 921 (S.D. Tex. 1977). *See* Franklin Fisher, *Statisticians, Econometricians and Adversary Proceedings*, 81 J. AM. STATISTICS ASSOC. 394 (1986).

many techniques for forecasting as well as many types of information that may be forecasted. Both approaches may involve assumptions that should be carefully validated, as should the performance of the regression model in forecasting outside the benchmark period. For example, it is possible to forecast the changes in prices from the pre-conspiracy period into the conspiracy period based on the underlying changes in another economic factor—such as costs—during the conspiracy period. However, this method of forecasting for use in calculating overcharges assumes that margins from the preconspiracy period are identical to those during the conspiracy period. Econometric techniques may be used to estimate the error in forecasting. The most appropriate method of forecasting the but-for prices may depend on the dynamics of the economic markets at issue as well as the available data.

2. *Benchmark Method*

An alternative method for estimating overcharges is the benchmark or "yardstick" method.[36] This method seeks to estimate the but-for prices using data from analogous geographic markets or industries that are not affected by the conspiracy as a benchmark. More generally, the term "benchmark" is used to refer to any market, geographic area, or time period that may serve as a basis for estimating the overcharge. Thus, the term benchmark is also commonly used to describe the before or after periods in the before-during-after model described above. For example, if the plaintiffs allege a conspiracy in the Northeast, pricing trends from the Northeast could be compared with prices in other parts of the country, which presumably were not affected by the alleged cartel.[37] Regardless of the estimation approach used, however, it is important to ensure that the approach controls for any differences between the benchmark used and the relevant market and time frame under consideration.[38]

36. The benchmark method is also discussed in Chapters 4 and 6.
37. *See In re* Live Concert Antitrust Litig., 863 F. Supp. 2d 966, 974-75 (C.D. Cal. 2012) (describing "Yardstick" methodology of comparing damages by comparing prices charged by allegedly monopolizing defendants to prices charged by companies other than defendants); *In re* Plastic Cutlery Antitrust Litig., No. 96-cv-728, 1998 U.S. Dist. LEXIS 3628, at *23 (E.D. Pa. 1998) (the yardstick or benchmark model involves comparison of the plastic cutlery industry with the characteristics of a comparable, or "yardstick" industry that is not affected by the price-fixing conspiracy).)
38. *See In re* OSB Antitrust Litig., No. 06-826, 2007 U.S. Dist. LEXIS 56617, at *27 (E.D. Pa. 2007) (rejecting argument in class certification context that plaintiffs' expert "'didn't need to' account for any variables other than the increased cost" of the relevant product).

3. *Difference-in-Differences Method*

If data are available, the benchmark and before-during-after methods may be combined in a difference-in-differences model, which compares the changes in the prices in the relevant market to the changes in the benchmark market.[39] Accordingly, this method requires data for both the market of concern and the benchmark area or industry, both during the period of the conspiracy and in an unaffected period. To the extent that the benchmark market provides a valid counterfactual for how the affected market would have evolved but for the anticompetitive conduct, this method can provide a more reliable estimate than either before-during-after or benchmark models alone.[40]

4. *Cost-based Method*

Another method that has been used to estimate overcharges is the "cost-based" or "margin" method. This approach uses the difference between profit margins in the actual and but-for worlds to estimate overcharges. But-for prices are taken to be the estimated unit cost of production plus a "normal" competitive profit margin.[41] There are a number of limitations to this approach. First, it assumes that costs and price-cost margins would be constant during the relevant period. Second, if cost and profitability estimates are derived from the nonconspiracy period, the method assumes that costs and profitability would be determined in similar ways during and outside of the conspiracy period.[42] Third, it may be difficult to determine the competitive profit margin that

39. The difference-in-differences method is discussed in more detail in Chapter 6.
40. Econometric methods may be used to adjust for observable differences in the benchmark and affected markets within a difference-in-differences approach. *See* Chapter 6.
41. *See, e.g.*, *In re* High Pressure Laminates Antitrust Litig., No. 00-md-01368, 2005 U.S. Dist. LEXIS 20317, at *6 (S.D.N.Y. Apr. 27, 2005) (expert employed cost/price ratio to determine extent of overcharge).
42. *See In re* Industrial Silicon Antitrust Litig., No. 95-cv-2104, 1998 U.S. Dist. LEXIS 20464 (W.D. Pa. 1998) (order denying plaintiff's motion to preclude expert testimony); ABA SECTION OF ANTITRUST LAW, *supra* note 34 at 173-77 (margin model used to estimate price-fixing overcharges did not control for market factors that might influence prices and margins, and thus could not accurately predict out-of-sample prices).

is appropriate for the industry of interest and reflects an economic (rather than accounting) measure of profitability. The cost-based method is often implemented in a similar fashion to before-during-after or benchmark models, thus some of the same issues raised in the context of those methods apply here as well.[43]

5. *Implementation of a Damages Model*

We provide here an illustrative example that demonstrates some of the decisions and challenges in building a damages model. The example focuses on the before-during-after method, though many of the challenges apply to all of the methods. To begin, the before-during-after approach can be conceptualized with the aid of Figure 1, which depicts hypothetical prices for the product at issue between 1980 and 2001.

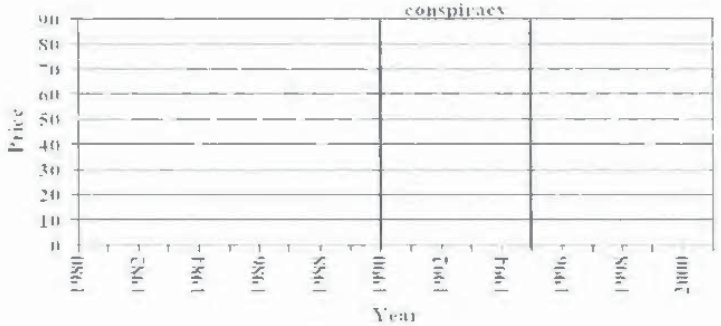

Figure 1

The first issue that must be addressed in calculating damages under all of the methods is the definition of the relevant conspiracy period, but this is particularly important for the before-during-after method because it identifies the price effect by comparing prices during the conspiracy to prices outside of the conspiracy period. In many antitrust cases, the beginning and ending points of a conspiracy may be determined based on the extrinsic evidence establishing liability, such as evidence of meetings to set prices or testimony by witnesses. In some cases, however, a plaintiff may simply pick a point in time, claiming that the conspiracy began "at least" that early. To the extent that the conspiracy was in operation and

43. *See In re High Pressure Laminates*, at 11-13.

effective prior to that point, however, any before-during-after model will underestimate damages.

In Figure 1, we have assumed that the conspiracy began in 1990 and ended in 1995. Using these dates, the average "competitive" price was approximately $50 in both the preconspiracy and postconspiracy periods, and almost $80 in the conspiracy period. Suppose instead, however, that the cartel actually started in 1981 and did not end until 1997. Using these dates, the average competitive price remains almost $50, but the average price during the conspiracy is only approximately $60. As this example shows, before-during-after models can be highly sensitive to the designation of the beginning and ending dates.

More importantly, if the conspiracy started in 1981 and led to prices above those that otherwise would have prevailed, the large price increase that occurred in the early 1990s would no longer be "correlated" with the onset of the conspiracy, suggesting that some other factor—not explicitly accounted for by the model—was responsible for the large price increase. Alternatively, some factor not accounted by the model may explain why conspiracy prices were not above historical "competitive" prices until 1990. Thus, $50 would be unlikely to be a good estimate of the competitive price in the early 1990s.

Because the designation of the beginning and ending dates of the conspiracy is so important, courts have been careful to ensure that they are chosen based on the evidence or well-established economic theory, and not based on the normative judgments of economic experts or their counsel. For example, in *In re Aluminum Phosphide Antitrust Litigation*,[44] the court rejected the plaintiffs' expert's proposed conspiracy period, finding that there was "no scientific or theoretical basis" for the chosen ending date. The expert had acknowledged that the conspiracy had ended in late 1991, but had used only data after 1993 in building his model. The expert had sought to justify this on the grounds that a lag time was necessary for prices to return to normal levels. The court rejected this approach, noting that there was no scientific basis that would allow an expert to "opine with any reasonable degree of economic or scientific certainty that a 15-month lag time was necessary or sufficient for prices to return" to normal levels.[45]

44. 893 F. Supp. 1497, 1503 (D. Kan. 1995).

45. *Id.* at 1502-03. *But see In re* Mushroom Direct Purchaser Antitrust Litig., No. 06-CV-0620, 2015 WL 5775600 (E.D. Pa. Aug. 5, 2015) ("[G]enerally criticisms of potential benchmark years go to the weight of opinions and not their admissibility") (quotation and internal ellipses deleted). The

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Chapter 93

QUANTIFICATION OF DAMAGES

Theon van Dijk and Frank Verboven*

This chapter provides a general economic framework for quantifying damages or lost profits in price-fixing cases. We begin with a conceptual framework that explicitly distinguishes between the direct cost effect of a price overcharge and the subsequent indirect pass-on and output effects of the overcharge. We then discuss alternative methods to quantify these various components of damages, ranging from largely empirical approaches to more theory-based approaches. Finally, we discuss the law and economics of price-fixing damages in the United States and Europe, with the focus being the legal treatment of the various components of price-fixing damages, as well as the legal standing of the various groups harmed by collusion.

1. Introduction

Economic damages can be caused by various types of competition law violations, such as price-fixing or market-dividing agreements, exclusionary practices, or predatory pricing by a dominant firm. Depending on the violation, there are different parties that may suffer damages, including customers (direct purchasers and possibly indirect purchasers located downstream in the distribution chain), suppliers, and competitors. Even though the parties damaged and the amount of the damage may be clear from an economic perspective, in the end it is the legal framework within a jurisdiction that determines which violations can lead to compensation, which parties have standing to sue for damages, and the burden and standard of proof that must be met by plaintiffs and defendants.

Quantification of damages may be required in both public and private enforcement of competition laws. In public enforcement, damages may be quantified as part of the decision by a competition authority regarding the appropriate fine to impose. In addition, victims of cartel activity in some countries may recover damages in the course of the enforcement proceedings by the competition authority. For the most part, however, quantification of damages arises in private enforcement of competition laws. Private enforcement often follows from a finding of a competition law violation by the public authorities. In the United Sates, where private enforcement is much more common than in Europe, the standard of proof for showing an antitrust injury varies depending on the type of case.[1] Once an antitrust injury has been established, plaintiffs

* Lexonomics; Catholic University of Leuven and CEPR.

1. For example, under the 1890 Sherman Act, price-fixing agreements are per se illegal in the United States. This means that prosecutors need to prove beyond a reasonable doubt that an agreement was made but need not prove that the agreement was actually implemented or that it raised prices and caused injury. Only parties that can establish that a price-fixing agreement was the direct and identifiable cause of their injury are said to have antitrust standing. *See* ABA SECTION OF ANTITRUST LAW, PROVING ANTITRUST DAMAGES: LEGAL AND ECONOMIC ISSUES (1996); John M. Connor,

and defendants frequently put forward damages estimates prepared by their economic experts. In addition, quantification of damages is often an important part of the settlement negotiations between the parties.

This chapter provides an overview of the economic principles and methods used to quantify damages. We focus on quantifying the damages associated with price-fixing agreements, although at the end of the chapter we briefly discuss damages due to other competition law violations. We also focus on the damages to a cartel's direct purchasers.[2] Section 2 develops a general economic framework for analyzing the damages experienced by a firm that must pay an artificially high price for an input but has the possibility of passing on at least some of the cost increase in the form of higher output prices. This framework decomposes the damages from collusion into a direct cost effect and two indirect effects. The direct cost effect represents the higher cost faced by the purchaser and is measured as the price overcharge multiplied by the number of units purchased at the collusive price. The indirect effects consist of the pass-on effect and the output effect. The pass-on effect reflects the extent to which the purchaser can shift the burden of the price overcharge to its customers. The output effect refers to the sales that may be lost when part of the price overcharge is passed on to the customers.

After the conceptual economic framework is presented, Section 3 discusses issues related to quantifying the direct cost damages, while Section 4 discusses issues related to quantifying the pass-on effect. Section 5 discusses the difference between the United States and Europe with respect to the legal treatment of the pass-on defense and ends with a policy discussion of the merits of allowing such a defense. Section 6 briefly situates the preceding discussions within the broader context of lost profits analysis in general. Section 7 provides a summary and conclusions.

2. An economic framework for assessing price-fixing damages

The concept underlying most economic damages assessments is that of the "but-for" world. In the case of a price-fixing agreement, the but-for world represents the economic outcome that would have occurred without the agreement. The difference between this counterfactual world and the actual world provides the measurement of damages. For example, in the case where a cartel's direct customer is a downstream firm, economic damages are the difference between the actual profit and the profit the firm would have made in absence of collusion, all else equal.

In principle, price-fixing damages may be determined by considering the impact of the collusive input price on the profits of the purchaser plaintiff. In practice, some jurisdictions consider only the direct impact of the collusive input price on the costs incurred by the purchasers and do not consider subsequent indirect effects on the price and output of the direct purchaser. Consequently, it is instructive to start with a

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Archer Daniels Midland: Price Fixers to the World (Purdue University, Department of Agricultural Economics, Staff Paper 00-11, 2000).

2. For an extension of our framework to damages on indirect purchasers or consumers we refer to Frank Verboven & Theon van Dijk, Cartel Damages Claims and the Passing-On Defense (CEPR, Discussion Paper 6329, 2007).

framework that decomposes the actual economic damages of the direct purchaser into the direct cost effect and possible indirect effects.

The relevant question is how the increased costs from paying the collusive input price translate into reduced profits. If the input price increase relates to a fixed input, there are no further effects and the damages may be computed as the price overcharge from the cartel multiplied by the quantity of the input purchased by the plaintiff.[3] In contrast, if the input price relates to a variable input, there may be additional indirect effects. The plaintiff may pass on some or all of the variable cost increase by raising its own price. That price increase may in turn lead to a reduction in the output sold by the plaintiff firm.[4]

To understand these various effects more precisely, consider a plaintiff firm charging a price p and selling a total output q. For simplicity, assume that the plaintiff requires one unit of input from the cartel per unit of output and does not need any other inputs. The price of this input prior to collusion, i.e., the but-for price, is constant and equal to c. The plaintiff's actual profits π in the but-for world are then given by the price-cost margin, $p - c$, multiplied by total output sold:

$$\pi = (p - c)q \tag{1}$$

It is now possible to consider the various channels through which a variable cost increase due to a collusive input price affects the plaintiff's profits. Using Δ to refer to a (small) change of a variable from its actual world value, the change in profits $\Delta\pi$ of the plaintiff due to the cartel price can be decomposed into the sum of three possible changes:

$$\Delta\pi = -q\Delta c + q\Delta p + (p - c)\Delta q \tag{2}$$

Note that $\Delta\pi$ represents the profits in the actual (cartelized) world less the profits in the but-for world. We discuss each of the three terms in Equation (2) in turn.

Direct cost effect. The first term ($-q\Delta c$) is the direct cost effect of the cartel on the plaintiff's profits. It represents the increase in variable cost per unit due to the cartel (Δc) multiplied by the total output of the plaintiff. Equivalently, it is the *price overcharge* (the cartel price minus the but-for price), multiplied by the total inputs purchased by the plaintiff from the cartel.[5] This effect on profits is negative and forms the basis for damages claims in both the United States and Europe.

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3. One could argue that an increase in fixed costs may lead to additional effects because the increased costs reduce the incentives for innovation or product development. For simplicity, we do not consider such dynamic effects in this chapter.
4. In the case where the plaintiffs are final customers, there are no subsequent price effects to be considered and damages equal the price overcharge times the number of units of the cartelized input actually purchased.
5. This equivalence follows from the assumption that the plaintiff requires one unit of input from the cartel per unit of output, and does not require any other inputs. However, it is straightforward to extend this framework to more general constant marginal cost technologies with several inputs. *See* Verboven & van Dijk, *supra* note 2.

The second and third terms of Equation (2) refer to the indirect effects from the collusive price, i.e., the subsequent effects on the plaintiff's price and output that follow from the increase in the variable costs per unit associated with the price overcharge (Δc).

Pass-on effect. The second term ($q\Delta p$) is the increase in revenue that follows if some of the cost increase is passed on in the form of higher prices (Δp). The impact of the pass-on effect on profits is typically positive ($\Delta p > 0$), thus acting to counteract at least some of the direct damages. The pass-on effect may then be used as a starting point for computing a discount or an offset to the direct cost damages claims, provided the legal jurisdiction allows for the consideration of such factors.

Output effect. The third term ($(p - c)\Delta q$) is the lost profit associated with any lost sales. It is comprised of the reduction in output due to the cartel (Δq) multiplied by the price-cost margin in the but-for world ($p - c$). The output effect is typically negative, unless the plaintiff's market is perfectly competitive ($p = c$). As the plaintiff's market becomes less competitive, the importance of the output effect increases. If the plaintiff is a pure monopolist, the negative output effect will completely counteract the positive pass-on effect.[6] The output effect is frequently ignored by the parties, even when the pass-on effect is considered. Unless the plaintiff's market is perfectly competitive, this is incorrect and may lead to significant understatement of lost profit damages.

Based on this general economic framework, we now discuss empirical methods to assess price-fixing damages. We focus on methods to assess the direct damages from the collusion because this has a strong legal basis in the United States and Europe. (See Section 5 for a discussion of differences in antitrust standing between the United States and Europe.) In addition, we discuss methods to assess the pass-on effect. From a purely economic standpoint, the pass-on and output effects should always be considered, but in most jurisdictions they are not considered in calculating direct purchaser damages. The same economic concepts are involved, however, in indirect purchaser claims, and some jurisdictions allow such claims.

3. Quantifying direct cost damages

This section discusses practical empirical approaches to measuring the direct cost damages suffered by customers who purchased products from cartel members. These damages should be computed over the entire period during which the collusion took place.[7] The challenge primarily lies in estimating the price overcharge, which is the difference between the actual price charged during the collusive period and the hypothetical price that would have occurred but for the collusion.

There are two general approaches for assessing the price overcharge. The first approach quantifies the price overcharge by comparing the actual cartel prices to prices

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6. For a more detailed analysis of the relationship between the pass-on and the output effect in a general economic framework, see Verboven & van Dijk, *supra* note 2; *see also* George Kosicki & Miles B. Cahill, *Economics of Cost Pass Through and Damages in Indirect Purchaser Antitrust Cases*, 51 ANTITRUST BULL. 599 (2006).

7. For an overview of empirical studies affecting cartel success and longevity, see Margaret C. Levenstein & Valerie Y. Suslow, *What Determines Cartel Success?*, 44 J. ECON. LIT. 43 (2006); *see also* John M. Connor & Yuliya Bolotova, Cartel Overcharges: Survey and Meta-Analysis (Purdue University, Department of Agricultural Economics, Working Paper, 2005).

that have not been tainted by collusion. These benchmark prices may include pre- or postcartel prices, prices in comparable markets, or prices in the same market in comparable countries. The second approach directly constructs the but-for price using analytical methods. The methods range from a simple cost-plus framework to a complete simulation analysis that involves building an economic model of the market under conditions where there is no collusion.[8]

3.1. Assessing the price overcharge using benchmark prices

The first approach to estimating the overcharge is largely empirical and does not require making specific economic assumptions about the market. In econometric terms, this approach may also be referred to as a reduced form approach (as opposed to a structural modeling approach). Within this approach, the "before-and-after" and the "yardstick" methods can be distinguished.

The before-and-after method. In this method the prices that prevailed before and after the collusive period are used to estimate the prices that would have emerged during the collusive period had the collusion not taken place. To the extent that cartel prices differ in a statistically significant way from the pre- and postcartel prices, it may be possible to attribute the difference to collusion. The before-and-after approach is usually implemented within a multiple regression framework in which one estimates the price over the entire period (conspiracy and benchmark period) and includes an indictor (or "dummy") variable that is equal to one during the conspiracy period and zero otherwise. The estimated coefficient associated with this dummy variable then measures the amount of the price overcharge. For this interpretation to be valid, however, control variables that account for other factors that affect prices must be included, particularly if there is chance that these factors are correlated with the conspiracy period. Failure to include such controls may result in an inference of significant damages when in fact prices simply reflect changes in competitive market conditions.

For example, suppose that one has data on prices during and after the cartel period, and suppose that there was an increase in imports starting around the time the cartel ended. These imports would likely result in reduced prices regardless of whether there had been a cartel. Therefore, a failure to control for these imports would lead one to confuse normal competitive pressure with a cartel breakdown, thereby overstating the effect of the collusion. More generally, the before-and-after approach should include any determinants of price that changed during the period of observation. These variables include demand factors (e.g., gross domestic product, prices of substitutes) and cost factors (e.g., input prices, capacity usage).

More sophisticated versions of the before-and-after method allow for a statistical determination of the beginning and the end of the cartel period (endogenous structural break analysis), as well as gradual price changes around the beginning and the end of the

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8. *See, e.g.*, John M. Connor, *Global Cartels Redux: The Amino Acid Lysine Antitrust Litigation (1996)*, *in* THE ANTITRUST REVOLUTION 252 (John E. Kwoka, Jr. & Lawrence J. White eds., 4th ed. 2004); EMILY CLARK, MAT HUGHES & DAVID WIRTH, STUDY ON THE CONDITIONS OF CLAIMS FOR DAMAGES IN CASE OF INFRINGEMENT OF EC COMPETITION RULES: ANALYSIS OF ECONOMIC MODELS FOR THE CALCULATION OF DAMAGES (Ashurst Study for the European Commission, 2004).

cartel period (dynamic analysis).[9] While such refinements are sometimes important, these methods are significantly more complex and may involve a loss of transparency.

Several authors have recently suggested that a comparison of the actual and postcartel prices may lead to an underestimation of the price overcharge. Connor argues that implicit or tacit collusion is more likely after explicit collusion because firms may have learned ways to coordinate their behavior during the period of explicit collusion.[10] Harrington shows that because damages estimates may be based in part on postcartel prices, there is an incentive for parties to price above the noncollusive level in the postcartel period.[11] Both arguments suggest that precartel price information is the more appropriate benchmark.

The yardstick method. The yardstick method is similar in spirit to the before-and-after method. It compares the cartel price to prices in similar markets where there are no allegations of collusion. These yardsticks can be other product markets in the same state or country that are similar in terms of demand, cost, and market structure conditions, or they can be the same product markets in other states or countries. As in the before-and-after approach, it is necessary to control for as many differences across the markets, states, or countries as possible (e.g., differences in income, input costs, capacity usage, etc.).[12]

3.2. Assessing the price overcharge when benchmark prices are not available

The second approach to estimating price overcharges constructs the competitive but-for price using information about cost and demand conditions in the market during the collusive period. There are several methods that can be characterized in this way: the cost markup approach, simulation analysis, and critical-loss analysis. Each approach then attempts to predict the price in the market under the assumption that there is no collusion.

Cost markup method. This method involves collecting information on production costs and estimating the competitive price on the basis of some measure of costs per unit plus a markup for "reasonable" profit. Various cost measures have been used in this approach, including short-run incremental costs, long-run incremental costs, or average unit production costs. Which of these is most appropriate in a particular case depends in part on the time horizon taken in the analysis. From an economic perspective, fixed costs should not play a role in determining the optimal price in the short run. In the long run, however, price must be set in a way that covers all costs.

Cost data are typically derived from the accounting systems or management information systems of the companies involved. However, attention should be given to

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9. For a discussion of these approaches, see Joseph E. Harrington, Jr., *Detecting Cartels*, *in* HANDBOOK OF ANTITRUST ECONOMICS (Paolo Buccirossi ed., 2008).
10. *See* Connor, *supra* note 8.
11. *See* Joseph E. Harrington, Jr., *Post-Cartel Pricing During Litigation*, 52 J. INDUS. ECON. 517 (2004).
12. *See, e.g.*, John E. Lopatka, *Overcharge Damages for Monopolization of New Economy Markets*, 51 ANTITRUST BULL. 453, 490 (2006). Lopatka notes that the yardstick approach was used by the plaintiffs' experts to estimate damages in consumer class action lawsuits against Microsoft.

the fact that accounting cost data are not the same as economic cost data.[13] For example, an accounting system amortizes fixed costs and generates annual depreciation costs that will be different from those associated with economic depreciation, which represents the actual decline over time in the market value of an asset.

The costs per unit of production plus a "reasonable" profit markup are then taken as an estimate of the competitive price. In utilizing this method, one must keep in mind that the but-for world may be characterized by imperfect competition and that the noncollusive price may be well above both long-run marginal and average cost. In addition, unit costs may be inflated as the cartel lowers output below the competitive level.

There is no simple way to determine a "reasonable" profit margin to be added to the production costs, but such determinations are typically made on the basis of the firm's weighted average cost of capital.[14] In addition to difficulties involved in estimating a firm's cost of capital, it is important to keep in mind that even in highly competitive markets firms should be able to earn profits for superior efficiency or innovation, and that without these incentives there is the potential for productive and dynamic inefficiencies. Moreover, while competition is a dynamic process that leads to a long-run equilibrium characterized by "reasonable" profits, various factors may disturb this adjustment, and short-run profits may be temporarily higher or lower than long-run profits.

Simulation analysis. Another approach to quantifying damages when benchmark price data are not available is to specify an economic model that incorporates information on demand and cost conditions and the nature of oligopolistic behavior in the market under consideration. Such an economic model can be calibrated using information on observed prices and margins, price elasticities of demand, cost structures, and market shares. When the model is completely specified in this way, it is possible to carry out counterfactual simulations, i.e., ask how the equilibrium prices would change once the collusion no longer exists. This simulation approach could also be used to provide information about margins in the but-for world that could then be applied to specific cost data.

The simulation approach has proven to be a useful tool in merger analysis,[15] and an important advantage is that it makes the economic assumptions more transparent. The main challenge in applying the simulation approach is the specification of the nature of oligopolistic behavior. The simulation results may be sensitive to how one models

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13. For more on the difference between accounting and economic cost data, see Franklin M. Fisher & John J. McGowan, *On the Misuse of Accounting Rates of Return to Infer Monopoly Profits*, 73 AM. ECON. REV. 82 (1983).

14. For more on "reasonable" profit margins and cost of capital estimation, see U.K. OFFICE OF FAIR TRADING, ASSESSING PROFITABILITY IN COMPETITION POLICY ANALYSIS (Economic Discussion Paper No. 6, 2003) (a report prepared for the U.K. Office of Fair Trading by Oxera).

15. For early U.S. applications, see Jerry Hausman, Gregory Leonard & J. Douglas Zona, *Competitive Analysis with Differentiated Products*, 34 ANNALES D'ÉCON. STAT. 159 (1994); Gregory Werden & Luke Froeb, *The Effects of Mergers in Differentiated Products Industries: Structural Merger Policy and the Logit Model*, 10 J.L. ECON. & ORG. 407 (1994). For a European application, see Marc Ivaldi & Frank Verboven, *Quantifying the Effects from Horizontal Mergers in European Competition Policy*, 23 INT'L J. IND. ORG. 669 (2005).

actual cartel behavior as well as behavior in the but-for world. For example, in describing litigation related to the lysine cartel, Connor points out that the defendants put forward the argument that the lysine industry has an oligopoly structure and that conditions are such that implicit price coordination would keep prices substantially above the long-run competitive price.[16] In contrast, plaintiffs tend to argue that the market without collusion would be intensely competitive and that the cartel's impact was therefore considerable.

While disputes about the appropriate specification of oligopolistic behavior may limit the usefulness of this approach, the advantage is that the modeling exercise helps to focus debate over the factors that shape competition in the market at issue. On balance, the simulation approach tends to be quite useful, especially if it is used as a complement to (rather than a substitute for) a cost-based approach.

Critical loss analysis. This approach calculates the defendant's break-even point for lost sales given a particular price increase and so may provide an upper bound on the price increase that would be profitable for the cartel. To illustrate, suppose the price overcharge has been estimated as, say, 15 percent above the competitive price.[17] Suppose further that, given the typical cost structure and contribution margin of cartel members, the largest reduction in sales the firm could sustain without a reduction in profits would be 30 percent. That is, if more than 30 percent of sales is lost, a 15 percent price increase is no longer profitable.[18] If the actual loss associated with a 15 percent price increase has been estimated at more than 30 percent, then this analysis suggests that the price overcharge estimate of 15 percent is not plausible. Alternatively, one could go further and compute the price increase that would just bring the break-even loss in sales equal to the actual loss. This price increase would represent an economically logical upper bound on any overcharge estimate.

Summary. The price overcharge from collusion can be estimated in various ways, all with different strengths and weaknesses. The competitive benchmark approach has the advantage of relying on "hard evidence" from actual prices pre- or postcollusion, or possibly prices in other comparable markets where no collusion is alleged. This approach requires, however, that there be sufficient data to construct a reasonable competitive benchmark. It is also necessary to control for other determinants of price that have changed over time or differ across markets, but that may be correlated with the collusive period. An in-depth benchmark approach, while simple in principle, may be complex in practice, so it is necessary to keep the assumptions and methods transparent and to conduct a careful sensitivity analysis.

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16. *See* John M. Connor, *"Our Customers Are Our Enemies:" The Lysine Cartel of 1992–1995*, 18 REV. IND. ORG. 5, 17 (2001).
17. Typically, the overcharge is expressed as a percentage of the actual price, not the but-for price. Any overcharge expressed in terms of the actual price, however, can be transformed into a percentage of the but-for price. For example, an overcharge that represents a 10% reduction from the actual price will represent an 11.1% increase over the but-for price.
18. For a discussion of the formula determining the break-even reduction in quantity, see Barry C. Harris & Joseph J. Simons, *Focusing Market Definition: How Much Substitution Is Necessary?*, 12 RES. L. & ECON. 207 (1989).

When there is no information available to serve as a reasonable competitive benchmark, one may assess the overcharge using more theoretically based approaches, but such approaches will inevitably require additional assumptions. The cost-based method requires the use of accounting information and estimates of a reasonable competitive margin. At the other end of the spectrum, the simulation approach typically avoids the need for accounting cost data, and it has the potential of better modeling the competitive margin based on explicit assumptions about oligopolistic behavior. However, this approach has the risk of culminating in theoretical debates about the most appropriate oligopoly model to use. Critical loss analysis may provide an upper bound estimates of the overcharge, but it is not option for creating a precise overcharge estimate.

3.3. Other issues affecting direct damages

In addition to the main issue of assessing the overcharge from collusion, there are several additional factors that need to be considered to quantify the direct damages. It is necessary to properly define the collusive period and measure the total sales that were subject to the overcharge. In addition, there is the issue of how damages faced by an individual cartel member should relate to the role of that member in the cartel. A final question is whether one should account for the plaintiff's efforts (or lack thereof) to mitigate the effects of the collusion.

Total purchases over the collusive period. Even if a price-fixing agreement has been established, plaintiffs and defendants are likely to disagree on exactly when the agreement started and when it stopped. In addition to direct evidence from diaries, recordings, memos, or e-mails mentioning actual discussions on price, there are statistical techniques to assess the timing and duration of the collusion. An example of such a technique is the structural break analysis referenced previously in Section 3.1. Once the collusive period has been established, the actual sales purchased from cartel members is typically constructed from invoices and other accounting records of the purchaser. Determining the actual sales may be complicated by volume, early payment, and bundled discounts, rebates, and shipping costs.

Individual cartel member's role within the cartel. The role that an individual cartel member played in the cartel may be important in the liability stage of the case, but it could also be taken into account when assessing damages. Some cartel members may have had a leading role in establishing and maintaining the cartel, while other cartel members may have merely been followers. If one wished to differentiate damages according to the roles played within the cartel, the damage share of a single member could be expressed as some deviation from the actual share of sales, i.e., the damages share could be adjusted upwards if that member had a leading role or lowered if the member was more of a follower.[19] While it may be desirable to account for these different roles from the perspective of deterrence, the typical legal practice is to regard

19. For example, the European Commission took into account the roles (leader or follower) played by the various cartel members in determining fines in the vitamins case. *See* Case Comp/E-1/37.5 12, Vitamins, 2003 O.J. (L 6) 1.

each cartel member as having full responsibility for the price overcharges experienced by all purchasers.

Plaintiffs' efforts to limit damages. An additional issue in assessing damages is whether parties that are adversely affected by the cartel should be assumed to simply accept the higher collusive price, or should they be assumed to actively limit the damages by purchasing from firms outside the cartel. Strictly speaking, economic damages are the money equivalent difference between a customer's first-best choice in the absence of the cartel, and his first-best choice in the presence of the cartel. It is possible that the actual purchase from the cartel is for some reason not the customer's first-best choice. For example, it may be the case that the customer would have been better off buying an alternative product at a lower price from outside the cartel. Consequently, treating damages as simply the overcharge on a given purchase from a given supplier may result in an overstatement of the true economic damages.

One should of course be skeptical of explanations suggesting that a customer did not actually choose his first-best option in presence of the cartel.[20] On the other hand, there may be strategic considerations that prevent a customer from doing so. For example, if the customer mitigates the cartel price by purchasing elsewhere, the customer still suffers damages but has a much lower chance of receiving compensation. This is because it is hard for customer to establish that he would have purchased from the defendant at a lower price. Section 5 provides a brief summary of the legal standing of the various groups that my have been affected by a collusive price.

4. Quantifying the pass-on effect

As discussed in Section 2, the direct cost effect (the price overcharge multiplied by the amount purchased) may overestimate the amount of damages resulting from the cartel if the plaintiff passes on part of its cost increase in form of higher prices to downstream customers.[21]

We now discuss empirical methods that can be used to measure the pass-on rate.[22] We distinguish between two possible approaches. The first approach uses historical information on the relationship between prices and input costs to assess the extent of pass-on. The second approach is more theoretically based and involves specifying an

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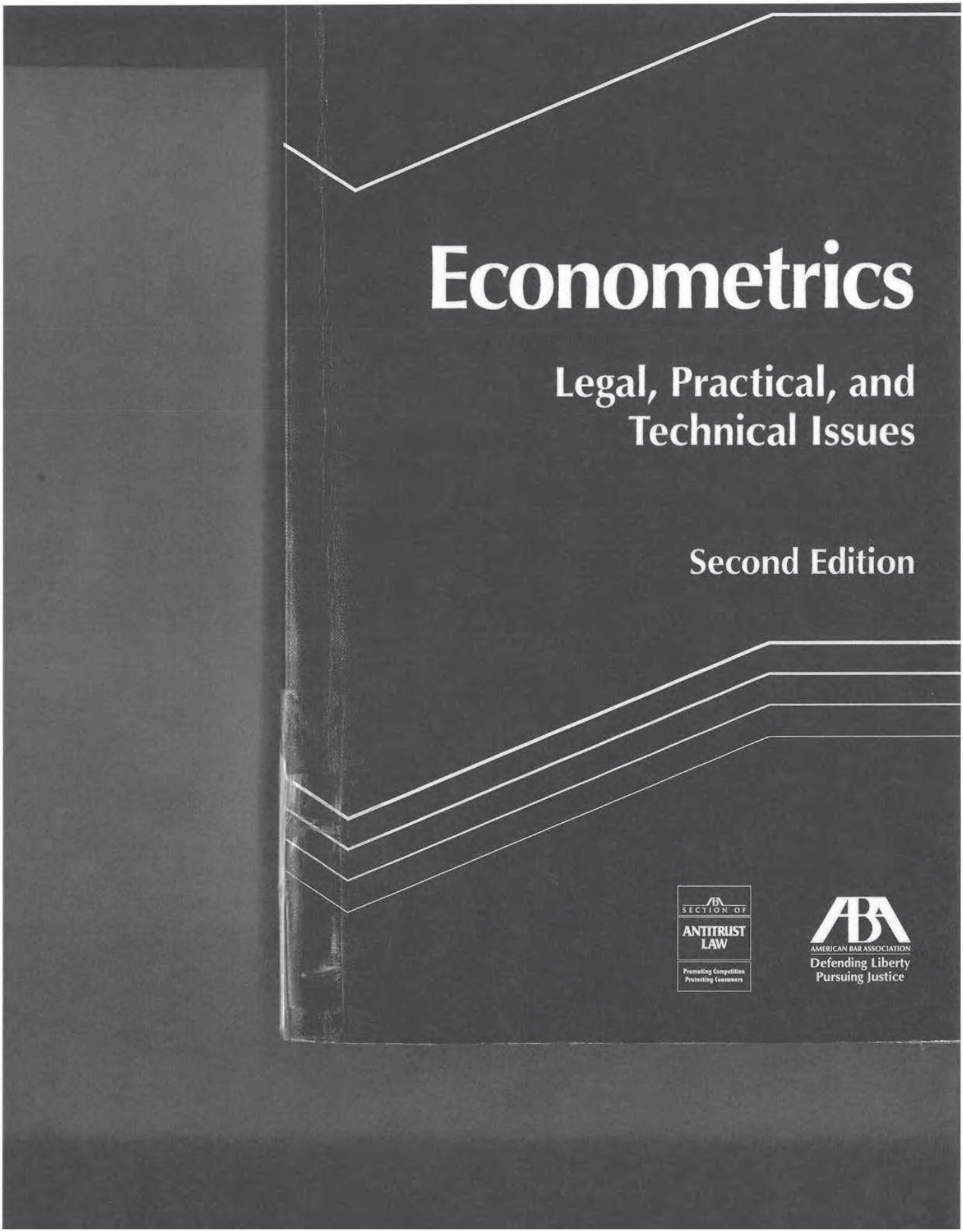
20. The framework to assess damage set out in Section 2 of this chapter assumes that plaintiffs act rationally. For example, it is assumed that the plaintiff passes on the price overcharge to the degree that it is profit maximizing to do so. Similarly, if the cartelized input price increases, it is assumed that the plaintiff adjusts its mix of inputs in order to maximize profits.

21. Recall, however, that the presence of a pass-on effect also implies the presence of an output effect, which may be especially important when the plaintiff has much market power. For a discussion of methods to adjust the pass-on effect downwards when the output effect is present, see Verboven & van Dijk, *supra* note 2.

22. For an overview of empirical studies of pass-on, see Johan Stennek & Frank Verboven, *Merger Control and Enterprise Competitiveness: Empirical Analysis and Policy Recommendations*, 5 EUR. ECON. 130 (2001). Other empirical considerations related to pass-on are discussed in Samid Hussain, Daniel M. Garrett & Vandy H. Havek, *Economics of Class Certification in Indirect Purchaser Antitrust Cases*, 10 COMPETITION 18 (2001).

ATTACHMENT E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CHAPTER 12

APPLYING ECONOMETRICS TO ESTIMATE DAMAGES

The calculation of damages requires estimating the economic impact of an allegedly anticompetitive act. A damages analysis, however, must isolate the impact of an allegedly illegal act from other potentially causal factors. Econometric analysis is often used to identify and quantify the impact of allegedly illegal acts and distinguish that impact from effects caused by other factors.

To illustrate when and how econometric analysis can be useful, this chapter considers estimating damages in an alleged price-fixing case in which defendants are alleged to have fixed the sale price of the product in question, i.e., a sell-side price-fixing conspiracy. Assuming there has been an agreement to raise prices, the basic questions relating to the calculation of damages are (a) whether the alleged conspiracy affected prices (the fact of injury) and, if so, (b) the extent to which prices have increased as a result of the alleged conspiracy (the amount of injury).[1] Because prices prevailing in the market likely were affected by a wide variety of other demand and supply factors unrelated to the alleged conspiracy, isolating and measuring the effect of the alleged conspiracy on price requires properly accounting for these other factors. Otherwise, one might confuse the effects of one or more of these other factors with the effects of the alleged conspiracy, thus overestimating or underestimating damages attributable to the alleged anticompetitive conduct. The goal is to isolate the impact of the conspiracy on prices (the overcharge), and then multiply the overcharge by the quantity of sales to calculate damages recoverable by the purchasers.

1. *See* John E. Lopatka, *Antitrust Injury and Causation*, in 3 ISSUES IN COMPETITION L. & POL'Y 2299, 2311 (ABA Section of Antitrust Law 2008); Theon van Dijk & Frank Verboven, *Quantification of Damages*, in 3 ISSUES IN COMPETITION L. & POL'Y 2331, 2334 (ABA Section of Antitrust Law 2008).

A. Non-Econometric Approaches to Damages

One approach to estimate the overcharge could be to perform a simple comparison of prices in the market before and after an allegedly anticompetitive event (i.e., the alleged agreement to fix prices) to determine if prices increased after the alleged agreement.[2] The underlying premise of this approach is that the market has not changed substantially over the relevant time period, except as a result of the allegedly illegal behavior.

Figure 1 below provides a hypothetical example in which prices are substantially higher in the period after the alleged price-fixing agreement than they were before the agreement came into force. The dots show actual prices over the entire period. The horizontal line shows the average price before the alleged agreement, which extends into the period after the alleged agreement. Absent any substantial changes in supply and demand in the market, an economist might use the average price in the pre-conspiracy period to predict prices during the alleged damages period, but for the alleged conspiracy. The difference in average prices between the pre-conspiracy and post-conspiracy periods is illustrated in Figure 1 as the difference between the dots and solid line after the date of the alleged agreement (shown as the vertical line). The difference between these actual and estimated prices "but for" the alleged conspiracy multiplied by the units of sales in the conspiracy period might be used to measure damages,[3] so long as (a) there are no significant changes in the market other than the alleged illegal behavior and (b) the time period of the alleged anticompetitive conduct has been identified correctly.

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2. See detailed discussion of before and "during" analyses below.
3. In addition to estimating the but-for price in this conspiracy example, economic analysis also predicts that the but-for quantity could be larger than actual quantity because of the lower but-for price. However, most conspiracy cases focus on overcharges as the measure of the damages. Accordingly, this example focuses on overcharges.

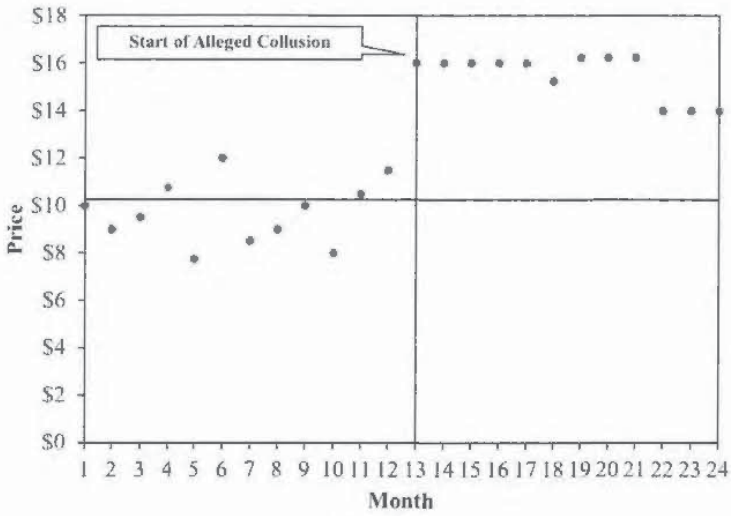

Figure 1. Average Price Approach to Price Overcharge

There are, however, limitations to this approach.[4] In particular, other important external influences on prices often have changed during the time period of the alleged anticompetitive actions and thus may explain the price increase, at least to some degree. The simple approach described above would mistakenly attribute the effects of these external influences to the alleged conspiracy. If so, this approach would not be reliable for estimating prices but for the alleged conspiracy.

Several methods can be used to control for other influences. For example, using the example above but assuming that a significant cost increase occurred at or about the time of the alleged price-fixing agreement, which similarly affected all firms in the market, a more complete analysis than just comparing prices before and after the alleged

4. For example, determining the end of the alleged conspiracy to coincide with a decline in price can cause a bias to finding damages and suggesting a conspiracy. Dennis Carlton and Gregory Leonard have suggested an approach to address this problem. *See* Dennis Carlton & Gregory K. Leonard, *Correcting the Bias When Damage Periods Are Chosen to Coincide With Price Declines*, 2004 COLUM. BUS. L. REV. 304 (2004).

conspiracy would likely find that the cost increase caused at least some of the price increase that occurred after the agreement. Figure 2 replicates the Figure 1 example above, except that the predicted prices during the conspiracy period now equal the average price before the alleged conspiracy plus the increased per unit cost that occurred about the same time as the alleged agreement.

This approach assumes that the cost increases are passed on in the form of higher prices, although one presumably needs to conduct some analysis to document how much of a given cost increase would be passed on absent any conspiracy. Figure 2 shows that much of the price increase is explained by the cost increase, and that at least a portion of the price increase would have occurred even without the alleged conspiracy. Accordingly, damages might be estimated by calculating the difference between (a) the actual prices and (b) average pre-conspiracy prices plus the per unit cost increase (the price but for the conspiracy), and then multiplying this difference by the number of units sold during the conspiracy period.

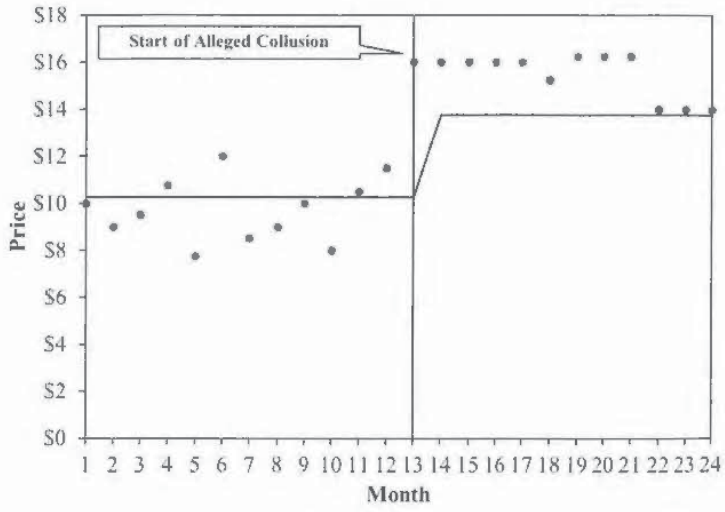

Figure 2. Average Price Approach Adjusting for Cost Increase

B. The Econometric Approach to Damages

The example above illustrates how one might estimate damages without using econometric analysis. However, in many situations it is difficult to estimate what would occur in a market but for the alleged anticompetitive behavior because there could be other major influences that affect prices or other important variables one needs to take into account to estimate damages. Econometric and regression analyses are particularly useful in separating the impact of an alleged anticompetitive act on market outcomes (such as pricing) from the impact of other influences.[5] That is, when correctly implemented, econometric techniques can isolate and measure the effect of a single explanatory factor on the economic outcomes that are relevant when estimating damages.[6]

To illustrate the potential benefits of econometric analysis, assume that in the example discussed above, there is also a substantial increase in demand about the time of the alleged agreement. Increased demand would typically be expected to increase prices, which may explain at least part of the price increase during the alleged conspiracy period. Neither of the approaches illustrated by Figures 1 and 2 easily addresses how multiple factors can affect prices simultaneously. In fact, other influences may explain the observed price increase, and the allegedly anticompetitive practices may have had no significant causal effect on the market.

Figure 3 shows how using econometric estimation that includes both supply and demand factors (e.g., cost and demand increases) can predict prices but for the alleged conspiracy. Figure 3 illustrates that there may not be measureable impact of the alleged agreement once the impact of both cost and demand increases have been taken into account, since the estimated prices but for the conspiracy would be very similar to the prices in the actual world. This result would be consistent with cost and demand driving up prices, and there being no measureable effect of the alleged agreement. Because the actual and "but-for" predicted prices are relatively close, the difference between them is about zero and so damages would be about zero.

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5. *See* Jonathan B. Baker & Daniel L. Rubinfeld, *Empirical Methods in Antitrust Litigation: Review and Critique*, 1 AMER. L. & ECON. REV. 386, 388 (1999).
6. *See* JEFFREY M. WOOLDRIDGE, ECONOMETRIC ANALYSIS OF CROSS SECTION AND PANEL DATA 3-4 (2002).

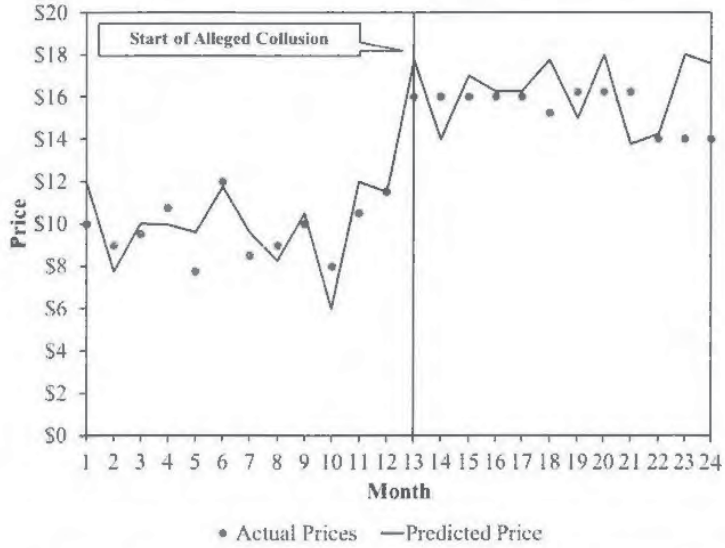

Figure 3. Econometric Approach Accounting for Changes in Cost and Demand Conditions

As with the simple non-econometric approach, the econometric approach has its own limitations. For example, even sophisticated econometric techniques are of no use if the partial effect of interest is not identified (i.e., distinguishable from other "confounding" factors).[7] Identification is often a function of the available data. In many situations, identification requires that the existence (or the extent) of the alleged unlawful conduct varies over the observations in the data in a way that is not perfectly mirrored by ("correlated" with) other explanatory variables. If such data exist and there are adequate controls for the effects of other economic factors, identification generally will be possible.[8]

C. Overview of Legal and Economic Framework

The legal requirements for regression analysis fall under the rules for testimony by experts. Under Federal Rule of Evidence 702:

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7. *Id.* at 52-53.
8. *Id.*

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.[9]

Regression analyses have been found to meet these requirements in litigation for a wide range of issues, including the estimation of antitrust damages.[10] A competent expert should be able to tell the litigant whether sufficient facts and data are available for econometric analysis, explain the types of econometric analyses that are applicable, and reliably apply these econometric techniques.

As suggested above, a key advantage of econometric analysis is that it allows the expert to separate the impact of an anticompetitive act from other economic factors that may affect the variable of interest, such as sales volumes and prices. In general, econometric results will be more reliable as the amount and quality of data increase. If sufficient data are available, econometric analysis has been found necessary for achieving the minimum scientific standard for establishing lost sales and price changes. For example, in *Zenith Electronics Corp. v. WH-TV Broadcasting Corp.*,[11] expert opinion and internal forecasts for sales growth were excluded because data to estimate sales growth via regression analysis were available but not used.

The use of regression analysis, however, does not guarantee that the analysis will be admitted or accepted. The regression must be in a form that assists in determining a material fact, such as the amount of lost sales or the size of price changes.[12] The analysis also must be based on

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9. FED. R. EVID. 702.
10. *See, e.g.*, Conwood Co. v. U.S. Tobacco Co., 290 F.3d 768 (6th Cir. 2002); City of Tuscaloosa v. Harcros Chems., 158 F.3d 548 (11th Cir. 1998); Allapattah Servs. v. Exxon, 61 F. Supp. 2d 1335 (S.D. Fla. 1999).
11. 395 F.3d 416 (7th Cir. 2005).
12. *See* Daniel L. Rubinfeld, *Reference Guide on Multiple Regression*, *in* FEDERAL JUDICIAL CENTER, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 186 (2d ed. 2000), *available at* http://www.fjc.gov/public/pdf.nsf/lookup/sciman03.pdf/$file/sciman03.pdf.

data "reasonably relied upon by experts in the field."[13] Because experts typically verify data for accuracy in consulting work or academic research, experts presenting regression analyses in court need to conduct similar verifications of the data that they use.[14]

The principle for reliability encompasses many factors bearing on the regression analysis, and a competent expert should conduct reliability checks to ensure that the results survive the rigors of litigation. Part D of this chapter discusses many of the issues that arise in implementing reliable econometric techniques and econometric tests that a testifying expert should perform when appropriate. Moreover, econometric results typically should not change materially with minor changes in the data (e.g., deleting a few potentially inaccurate observations).[15]

In addition to requiring experts to verify the reliability of the underlying data, courts typically require an analysis of damages that not only quantifies the amount of damages, but also demonstrates that those damages are causally linked to the allegedly anticompetitive acts.[16] In a price-fixing case, for example, there must be an analysis that provides evidence of a clear link between the agreement to fix prices and an increase in prices that is not explained by other factors.[17]

D. Estimating Damages Using Econometric Techniques

As discussed above, assuming liability and the construction of a reasonable explanatory variable representing the anticompetitive act at issue, econometric tests can be used to determine whether the data are consistent or inconsistent with the anticompetitive act having caused changes in the dependent variable.[18] Properly applied econometric techniques can provide both reliable estimates of the magnitude of damages and useful information about causation.[19]

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13. FED. R. EVID. 703.
14. *See, e.g.*, Cooper v. Travelers Indem. Co., 113 F. App'x 198 (9th Cir. 2004).
15. *See* Rubinfeld, *supra* note 12, at 199.
16. *See, e.g.*, Lopatka, *supra* note 1, at 2299.
17. *See* van Dijk & Verboven, *supra* note 1, at 2335.
18. *See* WOOLDRIDGE, *supra* note 6, at 3-4.
19. *See* Rubinfeld, *supra* note 12, at 184-85. An econometric test called the Granger Causality Test is designed to determine whether changes in one variable occur before changes in another variable. While this property can potentially supply some useful information, it is not the same as causality

For example, assume a properly specified econometric analysis finds a measure of the partial impact of the allegedly anticompetitive act on the dependent variable of interest to be statistically significant and of the expected sign.[20] This result would be consistent with the act resulting in damages, as long as there is a clear economic explanation of the link between the act and the measure of the partial effect. Econometric analysis also can provide an estimate of the magnitude of the impact to estimate the amount of damages. A finding that the estimated impact is not statistically different than zero would be consistent with a lack of causation and zero damages.

Assuming liability and given the construction of a reasonable explanatory variable to represent the anticompetitive act, properly applied econometric techniques can provide a reliable estimate of damages based on a statistical estimate of the partial effect of the anticompetitive act on the dependent variable of interest, such as price. These techniques also can provide useful information about the important damage-related issue of causation, which is linking the assumed anticompetitive acts to adverse outcomes for competition and for plaintiffs. In particular, econometric analyses can test whether the data are consistent or inconsistent with the proposition that the relevant explanatory variable "caused" changes in the dependent variable.[21]

One frequently used econometric method is the before-during approach. It can be used when data exist from both the period before an alleged anticompetitive act (e.g., a price-fixing conspiracy) and the period of the alleged anticompetitive act. This approach identifies the effect of an alleged anticompetitive act by comparing, for example, prices in the "during" period (the affected period, frequently referred to as *treatment* period) to prices in the "before" period (the control period), while also controlling for differences in other economic factors between

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in the sense in which this chapter uses the term. For example, as PETER KENNEDY, A GUIDE TO ECONOMETRICS 64 (6th ed. 2008), notes, Christmas cards "Granger-cause" Christmas, but obviously do not "cause" Christmas. *See also* Jerry A. Hausman, *Specification and Estimation of Simultaneous Equation Models*, *in* 1 HANDBOOK OF ECONOMETRICS 391, 435-436 (Z. Griliches & M.D. Intriligator eds., 1983).

20. For example, the "expected sign" would be positive if the allegedly competitive act was a price-fixing conspiracy and the dependent variable of interest was price.

21. *See* WOOLDRIDGE, *supra* note 6, at 3-4.

the during and before periods. "Before-during" is used here to distinguish it from a "before-during-after" approach. This latter approach can be used when data exist not only from before and during, but also from after, the alleged unlawful conduct.[22]

Another frequently employed method uses data from a benchmark market,[23] where the alleged unlawful conduct did not occur, as a control.[24] A benchmark market may be a different geographic area than where the unlawful conduct occurred, a different product, or a different end-use market. The idea again is that one can compare the prices or profit margins in the market of interest (the treatment market) to prices in the benchmark (control) market, accounting for other economic factors that might have differed between the two markets. This approach may be particularly useful when the data available from the time before the anticompetitive act are limited or unreliable.

In some instances, the benchmark and before-during approaches can be combined into what is called the difference-in-differences approach.[25] Under this approach, the before period is used to calibrate the difference between the variable of interest (e.g., price) in the treatment and benchmark markets in the absence of the alleged unlawful conduct. To identify the partial effect of the alleged unlawful conduct, this approach then subtracts the difference between the variable (price) in the market at issue and the benchmark market in the before period from that difference in the during period (i.e., the difference in the differences).[26] For

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22. *See* van Dijk & Verboven, *supra* note 1, at 2335.
23. Unless otherwise noted, our use of the term "market" is meant to denote an economic market, and not necessarily an antitrust relevant market.
24. For a discussion of benchmark approaches see, e.g., PHILLIP E. AREEDA ET AL., ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION 483 (2d ed. 2005); Robert H. Lande & James Langenfeld, *The Perfect Caper? Private Damages and the Microsoft Case*, 69 GEO. WASH. L. REV. 902, 903, 907, 908-09 (2001). A benchmark approach or before-during-after approach is similar to a natural experiment, in that both rely on a control group or event that is economically similar to the market being studied, but is unaffected by the alleged anticompetitive act. *See* Mary Coleman & James Langenfeld, *Natural Experiments*, in 1 ISSUES IN COMPETITION L. & POL'Y 743 (ABA Section of Antitrust Law 2008).
25. *See* WOOLDRIDGE, *supra* note 6, at 130.
26. One might still want to control for other economic factors that might have changed between the two periods in the two markets.

example, suppose prices were $10 higher on average in the affected market than in the benchmark market before the alleged conduct, but that differential increased to $15 during the alleged conduct, controlling for changes in other economic factors. In this example, an estimate of the effect of the alleged conduct would be a $5 price increase.

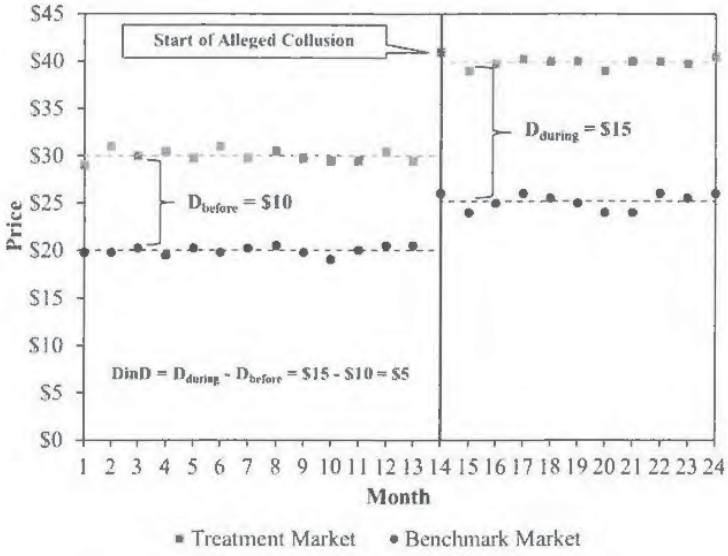

Figure 4. Difference in Difference Approach

With sufficient and sufficiently reliable data and identification, economists have a wide variety of econometric techniques available to estimate the partial effect of the alleged unlawful conduct in an antitrust case.[27] The appropriate technique to use in a given circumstance depends on the type of available data, the properties of the underlying economic variables, and the specification of the econometric model used.

27. Such techniques include ordinary least squares regression, nonlinear least squares regression, maximum likelihood, instrumental variables estimators, generalized method of moments estimators, and various semi-parametric and nonparametric estimators. For a description of a wide range of econometric techniques, see generally WOOLDRIDGE, *supra* note 6, and WILLIAM GREENE, ECONOMETRIC ANALYSIS (4th ed. 2000).

1. Before-During Approach

The before-during approach identifies the effect of the alleged conduct by using data from a period before the alleged conduct in combination with data from the period when the alleged conduct occurred.[28] Comparing the values of the dependent variable in the before period to the values it took on in the during period may serve to identify the effect of the alleged conduct.[29] In making this comparison, however, it is critical to account for any significant differences in other economic factors between the before and during periods.[30]

a. "Dummy Variable" Models Versus "Prediction" Models

For simplicity of exposition, assume that the best explanatory variable available for capturing the potentially anticompetitive effects is a dummy variable representing the time period when the alleged anticompetitive acts took place.[31] This variable will be one during that

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28. *See* van Dijk & Verboven, *supra* note 1, at 2335-36.
29. *Id.* The before period may be considered the control period and the during period the treatment period. See the discussion in part A of this chapter.
30. *See* van Dijk & Verboven, *supra* note 1, at 2335-36.
31. Depending on the nature of the antitrust allegations, the theory of causation, and specific facts of the case, variables other than a dummy may better measure the anticompetitive behavior in estimating damages. *See* Philip Johnson & Armen Markosyan, *Regression Techniques for Estimating Overcharges Using Market Concentration Data*, 12 ECON. COMM. NEWSL. 7 (2012). Assume, for example, prices can only increase when existing customer contracts expire over time. The impact of the alleged conspiracy would not increase prices to all customers immediately, so average price increases related to the alleged conspiracy would be expected to trend upward over time. There could be several ways to model this effect other than using a simple dummy variable for the alleged conspiracy period, depending on the available data. *Id.* Under certain circumstances, one simple method to create a variable to approximate the conspiracy might be a "time trend" beginning at the period of the alleged conspiracy, with the value "1" in the first observation (e.g., a month) of the conspiracy period, "2" in the second, "3" in the third, etc. If average prices were the appropriate dependent variable, then the coefficient on this trend variable would be interpreted as the average monthly price increase due to the conspiracy. The

period and zero at other times. Assuming prices relate to other economic factors in the during period in the same way as they did in the before period, prices can be expressed of as an equation of these other economic factors plus the dummy variable.[32]

With data on prices and other economic factors in the before and during periods available, one can estimate the relationship between the price, other economic factors, and the dummy variable, using regression techniques. The coefficient on the dummy variable represents the estimated impact of the alleged anticompetitive conduct on prices in the during period while taking into account the impact of other economic factors on price. Because of the crucial role played by the dummy variable, this type of model is often called a *dummy variable model*.[33]

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overcharge in any month during the conspiracy would be the corresponding time trend value multiplied by that coefficient. However, care must be used with this and any approach for creating a variable that measures the impact of an alleged anticompetitive act. For example, at some point all contracts will have been renegotiated, so it would be inappropriate to continue to predict price increases beyond a certain number of observations.

32. Specifically focusing on a reduced form model, one can account for the differences, if any, between the way price was determined in the during period (for example, with alleged price-fixing) and the way price was determined in the before period (without price-fixing). Suppose that the reduced form equation for price in the before period and the during period can be represented by a single equation that applies to both periods (See Chapter 5 for a discussion of reduced form models). Further, suppose that the price-fixing conspirators set price by adding a fixed amount "Δ" to the price that would have prevailed otherwise. The "overcharge" resulting from the price-fixing conspiracy would then simply be Δ. The reduced form equation for price would then be:

$$P_t = \alpha + \beta_1 x_{1t} + \beta_2 x_{2t} \ldots + \beta_n x_{nt} + \Delta A_t + v_t$$

where α is an intercept term, $x_{1t}, x_{2t} \ldots, x_{nt}$ are a full set of exogenous explanatory variables (identified by any relevant economic analysis), β_1, $\beta_2 \ldots$, β_n are the estimated coefficients capturing the partial impact of these variables on the price P_t, A_t is a dummy or indicator variable that takes the value of one if the time period t is in the during period and the value of zero if the time period t is in the before period, and v_t is the error term.

33. *See* Daniel L. Rubinfeld, *Econometrics in the Courtroom*, 85 COLUM. L. REV. 1048 (1985); James F. Nieberding, *Estimating Overcharges in*

This model assumes that the relationships between price and the predetermined variables that represent other economic factors are the same in both the before and during periods. This assumption may not always be valid. For example, price-fixing conspirators may react differently to changes in supply and demand factors than they would have had they not been conspiring.[34] Thus, it may be important to test whether prices relate differently to the supply and demand factors in the during period than they did in the before period. In more technical terms, it can be important to test whether there has been a significant shift in the relationship between the exogenous variables and the dependent variable of interest.[35] Statistical tests of whether the additional restrictions inherent in the dummy variable model are appropriate can be performed by including *interaction* terms in the equation; this is equivalent to testing whether the parameters of the model differ between the before and during period.[36] If the hypothesis that the coefficients of the regression have not changed is rejected, then this test suggests that the underlying assumption of the dummy variable model is inconsistent with the data.

An alternative to the dummy variable model is the *prediction model*.[37] The prediction model assumes the relationships between prices and other economic factors would have been the same in the during period but for the anticompetitive acts as they were in the before period. The first step in implementing a prediction model is to estimate the relationship between prices and other economic factors using data from the before period. One can then predict what the prices would have been in the during period but for the alleged anticompetitive conduct based on the estimated relationship in the before period.[38] Finally, the differences

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Antitrust Cases Using a Reduced-Form Approach: Methods and Issues, 9 J. APPLIED ECON., 361, 367-69 (2006). See Appendix and Glossary.

34. For example, Rosa M. Abrantes-Metz, Luke M. Froeb & Christopher T. Taylor, *A Variance Screen for Collusion*, 24 INT'L J. INDUS. ORG. 467 (2006) shows that the relationship between prices and costs during a collusive period may be very different from the relationship during a competitive period.
35. *See* GREENE, *supra* note 27, at 287-93.
36. *Id.*
37. *See* G.S. MADDALA, INTRODUCTION TO ECONOMETRICS 5 (3d ed. 2001), § 4.7; Nieberding, *supra* note 33, at 367-69.
38. Let $x_{1t}, x_{2t} \ldots, x_{nt}$ denote the values of the exogenous variables in the during period and $\alpha, \theta_1, \theta_2 \ldots, \theta_n$ are the coefficients for these

between the actual and the predicted but-for prices in the during period provide a measurement of the overcharge due to the alleged anticompetitive conduct.

As noted above, the prediction model assumes the relationships between the variable of interest (e.g., price) and other economic factors would have been the same in the during period in the but-for world as they were in the before period in the actual world. Under certain conditions, however, this assumption may not be valid. For example, assume there was a change in the relationship between other economic factors and the price in the during period that had nothing to do with the alleged anticompetitive conduct (e.g., entry or exit of firms from the market) and the prediction model does not take that change into account. Under these conditions, estimates using data solely from the before period may not accurately predict pricing but for an alleged conspiracy or other anticompetitive act.[39] Moreover, a prediction model should be tested where possible to check whether it accurately predicts turning points in the data.[40]

In addition, the model also may be fit to the during period and used to predict back ("backcast") into the before period. To the extent that the backcast is above the actual prices in the before period, that would suggest the price-setting process in the during period produced higher prices than the price-setting process in the before period. This finding would be consistent with the proposition that the alleged anticompetitive behavior in the during period increased prices, and the difference between the actual and predicted prices in the before period could form the basis for calculating an overcharge and damages.[41]

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variables estimated based only on data from the before period. Then the "predicted" price for time t of the during period, $\hat{P}_t$, can be written as: $\hat{P}_t = \alpha + \theta_1 x_{1t} + \theta_2 x_{2t} \ldots + \theta_n x_{nt}$.

39. In this way, the prediction model may suffer from some of the same limitations related to the dummy variable model discussed above. However, unlike the dummy variable model, the prediction model does not assume that the coefficients for the exogenous variables are the same across the before and during periods in the actual world.

40. A dummy variable model can suffer from a similar problem of failing to fit turning points well, and thus incorrectly attributing to the conduct turning points that may have nothing to do with the alleged conduct. *See* WOOLDRIDGE, *supra* note 6, at 61-62.

41. Of course, the backcast model suffers from some of the same limitations as the forecast model.

2. *Before-During-After Models*

The previous section discussed before-during models that assume there is a single unaffected period (the before period). Sometimes, data might exist on several unaffected periods. For example, data may exist not only for the before period, but also for an after period. With more than one unaffected period, the question arises as to whether one should combine the two unaffected periods and, if not, then which of the two unaffected periods should be compared to the affected period.[42]

The before and after periods should be combined, if appropriate, since that will result in a larger sample and more precise estimation.[43] It is appropriate to combine them if the parameters of the reduced form equation are the same across the two periods.[44] The difficult decision arises when this test rejects combining the two periods into a single model and one must choose which unaffected period is the better basis of comparison for the affected period, assuming both are truly unaffected.

Before addressing how to decide which unaffected period to use, first consider why two unaffected periods might exhibit different relationships between the dependent variable and the explanatory variables. There are economic models of competition that suggest that periods of more intense competition ("price wars") will alternate with periods of less intense competition.[45] These models suggest that the relationship between price and the explanatory variables may change over time with the intensity of competition. In this case, a before period that was dominated by more intense competition might look different than an after period that was dominated by less intense competition, even though both periods were unaffected by the anticompetitive conduct at issue.[46] Alternatively, there may have been substantial differences in market conditions between the two periods (e.g., there may have been

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42. *See* van Dijk & Verboven, *supra* note 1, at 2336. Of course, it is important to ensure that the supposedly unaffected periods really are unaffected.
43. *See* MADDALA, *supra* note 37, at 69, 270; A.H. STUDENMUND, USING ECONOMETRICS: A PRACTICAL GUIDE 71 (5th ed. 2006).
44. *See* Appendix and Glossary, and TAKESHI AMEMIYA, ADVANCED ECONOMETRICS 399-402 (1985).
45. *See, e.g.*, Jerry Green & Robert Porter, *Noncooperative Collusion Under Imperfect Price Information*, 52 ECONOMETRICA 87 (1984).
46. *Id.*

substantial new entry into the market), which led to the differences in the model coefficients.

In the event that there are substantial differences between the before and after periods, one needs to determine how to select which period to use. One way to answer this question is to try to model explicitly the switches between competitive regimes, and then use this model to predict which competitive regimes would have prevailed during the affected period in the but-for world. *Switching models* are econometric techniques that can be used to do this.[47] Although not commonly applied, a switching model of this sort may also provide a more realistic picture of competition in the during period. In contrast to the implicit assumption of the dummy variable model, a price-fixing conspiracy may be subject to breakdowns, where price would return to competitive levels (or even below-competitive levels) for a period before the conspiracy price level was re-established. Failure to model this possibility may lead to less precision in the estimate of the damages, or possibly even to an unreliable estimate of damages if explanatory variables are correlated with the onset of price wars because of omitted-variable bias.

An alternative approach for choosing between the before and after periods involves using general market information and non-quantitative evidence from the case. For example, suppose that the after and during periods were characterized by strong demand for the product, while the before period was characterized by weak demand. These factors would suggest that the after period would provide a better basis of comparison for the affected period than would the before period. It is also possible that the effects of the anticompetitive conduct at issue last beyond the time when the conduct actually ended.[48] If so, then the after period is not truly "unaffected" and the before period may be the superior basis for comparison.

Another approach is to predict but-for prices (absent the allegedly anticompetitive acts) for the affected period alternatively using the before and after periods, using the greater of these two predictions. Both of these predictions are consistent with competitive behavior. Using the higher of the predicted but-for prices will yield a lower estimate of

47. *See* AMEMIYA, *supra* note 44, at 399-402.

48. For example, Joseph E. Harrington, Jr., *Post-Cartel Pricing During Litigation*, 52 J. INDUS. ECON. 517 (2004) argues that standard methods for calculating antitrust damages in price-fixing cases may create a strategic incentive for firms to price above the non-collusive price after the cartel has been dissolved.

damages (calculated as the difference between the actual and but-for prices) and thus represents a "conservative" approach from the plaintiffs' perspective.

When assessing damages using a before-during or a before-during-after approach, the beginning and end points of the damages period must be identified. However, the beginning and the end of the damages period alleged in many cases may not accurately reflect the actual beginning or end of the alleged unlawful conduct. For example, in price-fixing class action cases, the plaintiffs' attorneys often choose the beginning and end dates for the "class period" before discovery is undertaken. Moreover, the beginning or end of the effects of the alleged unlawful conduct may not coincide with the beginning or end of the conduct itself. The effects might occur later, end earlier, or last longer than the conduct. Experts should rely on the evidence developed in discovery, market facts, and the analysis of liability experts when determining the relevant starting and ending dates for calculating damages.

Damages experts should be flexible when determining the appropriate beginning and end dates for damages, and econometric analysis may be able to assist in this respect. Recently, econometric methods have been developed that may be used to choose beginning and end dates based on market data.[49] These methods involve estimating the point in time when an econometric model exhibits a *structural change*, or shift in the model parameters. In the case of alleged anticompetitive conduct that had an effect, a structural shift in the econometric model should have occurred when the effect of the conduct began and a second structural shift should have occurred when the effect of the conduct ended. Thus, for example, identifying when there were structural shifts in the regression model can provide useful evidence concerning the beginning and end of overcharges from a price-fixing conspiracy.[50]

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49. Jushan Bai & Pierre Perron, *Estimating and Testing Linear Models with Multiple Structural Changes*, 66 ECONOMETRICA 47 (1998). See Carlton & Leonard, *supra* note 4, for a discussion of the application of these methods to price-fixing cases.
50. *See* Carlton & Leonard, *supra* note 4.

3. Benchmark and Difference-in-Differences Approaches to Damages

The benchmark approach to damages is based on the same basic principles and econometric tools as the before-during-after approach.[51] However, in a benchmark analysis, the variable of interest (e.g., price) in the affected market is compared to that variable in an unaffected benchmark market.[52] Instead of using past prices in the affected market as a control, the benchmark approach uses prices in the unaffected market as a control. The benchmark market (or markets) can be a different area or a different end-use market. The key is that the benchmarks (the control group) were unaffected by the alleged anticompetitive conduct. This approach may be particularly useful if there are insufficient data for the before period, such that a before-during approach cannot reliably be performed.

One potentially significant problem with the benchmark approach is that differences in economic conditions between benchmark and affected markets make it likely that prices in those markets would not be identical, even if there were no anticompetitive behavior.[53] Comparing variable profit margins between the market of interest and the benchmark can control for many cost- and demand-based differences in prices, although there are recognized problems in calculating and comparing economically meaningful profit margins.[54]

The difference-in-differences approach also can be used to account for at least some of the persistent unobserved differences between the benchmark market and the market of interest. This approach requires data for the market of interest and the benchmark that cover both a period of time that is unaffected by the alleged anticompetitive act and the period of time when the market of interest allegedly was affected.

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51. The benchmark approach is sometimes also referred to as the cross-sectional approach.
52. *See* van Dijk & Verboven, *supra* note 1, at 2336.
53. *Id.*
54. *See, e.g.*, Franklin Fisher, *On the Misuse of the Profits-Sales Ratio to Infer Monopoly Power*, 18 RAND J. ECON. 384 (1987). However, if the benchmark and the market of interest can be shown (1) to have similar supply and demand characteristics and (2) to have similar accounting methodologies, then one may be able to estimate the difference in those margins and from that calculate whether prices are higher in the market of interest, even if data are only available in the during period.

Thus, the difference-in-differences approach combines the before-during and benchmark approaches.[55] The difference-in-differences approach can be implemented using a regression that takes into account the various factors that differ between markets and time periods, as shown in the Appendix and Glossary.

E. Key Considerations in Creating and Evaluating Econometric Models of Damages

A number of considerations should be taken into account when building or evaluating an econometric model used to estimate damages.[56] As discussed in previous chapters, model specification and estimation involve many choices: explanatory variables, functional form, dynamic specification in a time series, estimation technique, and which of the basic approaches to damages to use. In many cases, statistical tests can help guide these choices. However, the starting point for any econometric model is economic theory and knowledge of the industry, and being sure that there are sufficiently reliable data to perform an econometric analysis.

Economic theory provides guidance as to the general types of explanatory variables that should be included in the model. For example, for an econometric model of price, economic theory suggests that variables representing cost, demand, and competitive factors would be important types of explanatory variables.[57] Knowledge of the industry helps determine with more specificity which variables to include. For example, if the industry in question were plastics, the price of petroleum (an important input to plastics) likely would be a relevant cost variable and production levels in downstream industries that use plastics likely would be relevant demand shifters.

One must be able to obtain sufficiently reliable data to implement an economically sound econometric model. Econometric analysis based on very few data points in general will be much less reliable than econometric analysis based on a larger data set. There may also be issues with how accurate the data are, and whether they represent an unbiased

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55. *See* WOOLDRIDGE, *supra* note 6, at 130.
56. Much of the discussion here and elsewhere in this chapter can be applied to any econometric analysis. *See, e.g.*, WOOLDRIDGE, *supra* note 6; GREENE, *supra* note 27.
57. *See* van Dijk & Verboven, *supra* note 1, at 2335.

sample of what has occurred in the market. Accordingly, the data need to be checked for accuracy and any potential selection bias. Finally, in many instances the data will need to be "cleaned" to some extent, removing obviously incorrect observations. For example, many damages analyses use data from a company's sales database. Care must be taken with such data to ensure that all significant discounts have been accounted for, and to weed out any obvious errors.[58]

Economic theory and industry knowledge might suggest a large number of potential explanatory variables. While there is a benefit to parsimony (namely, potentially increased precision of the estimates), there is typically a greater concern with omitting a potentially important explanatory variable, which can induce omitted-variable bias. Thus one generally should exercise great care if potentially important variables are to be excluded from a model. In general, statistical tests or the Akaike Information Criterion ("AIC") and Schwarz Criterion ("SC") criteria should be employed before dropping variables.[59] It is rarely advisable to drop a theoretically important variable, especially if its coefficient is statistically significantly different from zero. Similarly, one generally should not drop a group of theoretically important variables when their coefficients are jointly statistically significantly different from zero (even if they are individually not statistically significantly different from zero).[60] In some circumstances, "shrinkage" estimators may be used to help make a model more parsimonious.[61]

An important step of model specification concerns the selection of the mathematical formula (functional form) relating the dependent variable to the explanatory variables.[62] For example, the dependent variable might be the price level (i.e., dollars per unit) of the product at issue, and the explanatory variable could be its variable costs of production. This model would provide an estimate of the price increase

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58. For example, frequently these transactions data sets include credits for returned goods, etc. It is important to use net revenue and net sales to calculate a measure of the price actually paid.
59. See the Appendix and Glossary for the definitions of AIC and SC.
60. *See* KENNEDY, *supra* note 19, at 94.
61. Shrinkage estimators adjust least squares estimates by imposing a constraint on the estimates. The resulting estimator is no longer unbiased, but may have lower mean squared error than least squares. *See, e.g.*, Robert Tibshirani, *Regression Shrinkage and Selection via the Lasso*, 58 J. R. STATIST. SOC. B 267 (1996).
62. *See* Chapter 5. Results may be sensitive to the functional form selected.

related to a dollar increase in costs (The coefficient on costs represents the answer to the following question: what is the price increase in dollars caused by a one dollar increase in costs?) However, there may be good theoretical or industry-specific reasons to believe that the relationship between price and production costs is better measured in percentage change terms. If so, then it would be more appropriate to regress the logarithms of price on the logarithm of variable costs (The coefficient on the logarithm of costs represents the answer to the following question: what is the percentage price increase caused by a one percentage increase in costs?)[63] Statistical tests can help determine which functional form is most appropriate for the situation at hand.[64]

In a time series context, specification of the dynamics is important. Again, model specification might be guided by industry knowledge and statistical tests. The AIC and SC tests can help identify the appropriate lag structure.[65]

The statistical distribution of the econometric error term also must be carefully specified. It is frequently appropriate to use estimates of the standard errors that are robust to deviations from the assumption of independent, identically distributed error terms. Only with correct standard errors will the resulting statistical inference be valid. The correct method for calculating standard errors can be determined based on the outcome of statistical tests, and in general such tests should be performed.[66]

The decision of which of the basic damages models to use can be of great importance. A reduced-form model typically will provide the most straightforward model for damage estimation. However, the explanatory variables to be included in such a model need to reflect the important underlying supply and demand aspects of the market, and in some

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63. More precisely, if a is the coefficient on the logarithm of variable costs, the percentage price increase caused by a one percentage increase in costs is $exp(a) - 1$, where $exp(a)$ is the exponential transformation of a. For values of a close to zero, $exp(a) 1$ is approximately equal to a (for example, when $a = 5$ *percent*, then $exp(a) 1 = 5.13$ *percent*) but the approximation is less precise away from zero (for example, when $a = 50$ *percent*, then $exp(a) 1 = 64.9$ *percent*).
64. *Id.*
65. *See* Chapter 5 and the Appendix and Glossary for further discussion.
66. *See* Chapter 6 and the Appendix and Glossary for further discussion.

instances estimating the underlying structural model will be a superior approach.[67]

The decision regarding which damages approach to employ also will depend on the available data and the nature of the market. Are there sufficient data to implement a before-during or before-during-after model? Is there a good benchmark? Can a difference-in-differences approach be used? In general, if reliable data are available from outside of the period of that alleged anticompetitive act, then techniques that take advantage of those data will likely be the most reliable.[68]

Deciding whether to use a dummy variable or prediction model can also be important. Is there evidence that the dummy variable technique is unreliable due to substantial changes in the model coefficients due to the alleged illegal act? Will the prediction model yield reliable results? Again, there are statistical tests that can help determine if one approach is clearly superior to another.[69] Because neither approach likely is perfect, in the absence of strong statistical test results favoring one or the other, it may make sense to use both approaches and see if they yield similar results.

Once the econometric model is specified and estimated, another series of statistical tests and checks can be performed on the reliability and robustness of the estimates.[70] The starting place is typically examining the sign and statistical significance of the coefficients. If, for example, the coefficient on cost in a price regression is negative and statistically significantly different from zero, this would cast doubt on the reliability of the model, since we would normally expect cost to have a positive effect on price. When performing this sort of check, however, one must take care that there is a clear interpretation to the coefficients; there may not be one in a reduced-form model, for instance.[71]

When there is reason to question a model's specification, a variety of specification tests can and should be employed. For example, a model may impose potentially questionable restrictions on the coefficients, such as that the coefficients are the same during two time periods. Specifically, an econometric model of pricing at the customer level might assume that all customers have the same coefficients on the cost and demand variables. However, there may be reason to think that

67. *See* Chapter 5.
68. *See* Chapter 5 and the Appendix and Glossary for further discussion.
69. *See* Chapters 5 and 6 for additional discussion.
70. *See* Chapters 5 and 6 for additional discussion.
71. *See* Baker & Rubinfeld, *supra* note 5, at 392.

customers have different responses to cost and demand conditions, so there could be different coefficients on the explanatory variables across customers, including the variable measuring damages. In this case, it may be necessary to estimate the model for different groups of customers, or otherwise to employ a more complex model that takes these differences into account.[72] Similarly, a time series model might assume that the coefficients are the same over the course of the entire time period, but there may be evidence that the structure of the model changed at some point in time. A Chow test (or a more sophisticated test for structural breaks) can be used to test whether such a change occurred.[73] If so, the appropriate model needs to adequately control for such a change.

There may also be reason to question the crucial assumption that the error term of the regression is uncorrelated with the explanatory variables (which leads to endogeneity bias). This assumption often can be tested using a form of the Hausman specification test. For example, if there is concern that an explanatory variable might be endogenous (which would bias OLS regression results), then the Hausman specification test comparing the OLS results to the IV results can be used to check for this problem.[74] If such a problem is found to exist, then more complex econometric techniques can be used to correct for the bias.[75]

Finally, virtually any regression model eventually will fail one or more tests if enough tests and specifications are run, even if nothing is wrong with the model. However, failure of a test should be taken seriously, and a model should be rejected when it fails a test of a critical assumption, or if it fails a large number of the specification tests to which it is subjected.[76]

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72. *See, e.g.*, John H. Johnson & Gregory K. Leonard, *Economics and the Rigorous Analysis of Class Certification in Antitrust Cases*, 3 J. COMP. L. & ECON. 341, 351-52 (2007).
73. The Chow test is a statistical and econometric test of whether the coefficients in two linear regressions on different data sets are equal. *See* Gregory C. Chow, *Tests of Equality Between Sets of Coefficients in Two Linear Regressions*, 28 ECONOMETRICA 591 (1960).
74. *See* Jerry A. Hausman, *Specification Tests in Econometrics*, 46 ECONOMETRICA 1251 (1978).
75. *See* WOOLDRIDGE, *supra* note 6, at 167-180.
76. *See* KENNEDY, *supra* note 19, at 76-79.

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